MONASTERY, SANCTUARY, LABORATORY
50 Years of IIT-Bombay

ROHIT MANCHANDA
MONASTERY, SANCTUARY, LABORATORY

IIT-Bombay is celebrating the Golden Jubilee of its foundation this year, and this has formed part of the stimulus to bring out a book on its history. The Institute had unassuming, even troubled, beginnings. How did it grow into one that was to win acclaim for the vigour of its academic programmes, for its internationally competitive faculty and staff, for its remarkably successful alumni? Monastery, Sanctuary, Laboratory tracks IIT-Bombay’s evolution from its earliest days to the present, uncovering the people and processes that brought it into being, then nurtured it into its present shape. Embedded in the larger tapestry of India’s science and technology campaign, the road IIT-Bombay has traversed proves to have an interesting story to tell. It affords opportunity for reflection, not just on the Institute’s own course but on broader issues as well, such as the evolution of higher technical education in India and the strains and tensions that have fashioned it, ideas from which may emerge useful lessons for the future. Equally important, when taking stock, is to tackle the Institute’s perceived shortfalls over the years, such as in the domains of frontline research, in technological innovation catering to national needs, or in its responsiveness to winds of change.

The book is written in the style of a narrative history, steering clear of the ‘compendium-of-information’ format often adopted for institutional histories. Apart from a variety of archival sources, it draws liberally upon the personal accounts of those who have seen the Institute grow at first hand or have been involved intimately in steering its course in a range of capacities—faculty, alumni, students, staff and campus residents, whose memories and views have been woven into the narrative. It is thus IIT-Bombay’s history as it has been lived by its agents, an approach which should make for lively reading. Concurrently, the analytical concerns of the book will provide much to ponder on broader issues, such as the Indian engagement with technical education and with the creation of technocrats and in-house technology.
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With chapter frontispiece illustrations by RAJA MOHANTY
Monastery, Sanctuary, Laboratory.
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To those who would have taken pleasure in seeing this book
But did not stay on long enough
As we celebrate the golden jubilee of IIT-Bombay, among other activities, bringing out a historical account through enlightened human interest narration interwoven with the philosophy and values embedded in building of an engineering and technological institution dedicated to higher education and research has its own importance and timeliness.

I have had the good fortune of being associated with IIT-Bombay in various ways and thus watch the progress and growth of the institution from close quarters. The success and experience of IIT-Bombay under the conditions that prevail in our country has many a lesson that have importance not only for the IIT system but also for taking higher technological education forward. This has become more important today than any time before, simply because empowering of our vast youth power through quality education and training has become a crucial factor in taking India forward in the present day knowledge economy driven world. While this could be a major prime mover for our national growth, failure to meet this challenge could, on the other hand, become a formidable drag. IITs have been very successfully engaged in this endeavour at the highest end of our education system and the results in terms of the impact of brand IIT are there for everyone to see. There is thus a strong need to build on this experience both in terms of quality and quantity.

Bridging our basic research activities with the national development has also been a major challenge. We are yet to fully recognize the magnitude of this effort and resource support that is needed. Quite apart from the enormous benefits in terms of technology leadership that such broad based activities on the interface of basic research and technology can
bring, such an environment is also important to bring in the necessary corrections in our value systems related to our view of science and technology development. I think the IIT environment has something unique to offer in this regard both for the students and the research community alike.

Finally, it is increasingly becoming apparent that we need to create a more holistic learning environment that exposes students to teaching, research, innovation and entrepreneurship quite apart from humanities and personality development. IIT-Bombay has been uniquely successful in this regard through its continuously evolving efforts.

I am thus certain that this book would present to its readers a rich account of experience over the last fifty years on which we can build further to meet the challenges before our nation.

ANIL KAKODKAR Chairman, Board of Governors, IIT-Bombay
In September 2006, I went to Silicon City to visit a friend. I landed at eight in the evening; my friend, keen for me to sample a slice of the city’s famed after-hours life, drove me from the airport straight to a Bangalore pub. At the pub – actually a make-believe American bar, busy with all manner of American kitsch – Bangalore’s young and restless were out in force; no table was untaken. Spotting a young man alone at one, we asked him if we could join him. He agreed readily; we shook hands; and soon, trim in his snug-fit jeans and haute T-shirt, he had struck up an amiable conversation, in the course of which he proved to be what he should by all accounts have been: one of Bangalore’s teeming Infotech legionnaires. The moment came when he asked us what we did. His reaction, when I replied I was from IIT-Bombay, was startling. His jaw dropped; to his eyes rose a bedazzled glint. Springing to his feet, he insisted on shaking hands with me again – or, more precisely this time round, on gripping my hand in an earnest, quivering clasp. In what may best be called a continuing ‘awe reflex’, gushing sounds flew in the air: to the effect that it must be fantastic to be amidst the ‘best brains of the country’, and what a wonderful life it must be on one of the most renowned campuses of the land, Mood-Indigo and Techfest an in-house affair, and how it must be an ‘out of the world’ experience to belong in the pinnacle of technical R&D... I tried what I could to assure him that being at an IIT wasn’t quite the overflowing cup of elixir he seemed to imagine it to be, but to no effect. The gushes continued. Desperate to deflect him, I said, ‘I’m just a lowly teacher at IIT, I never actually went to one. My friend here, however – he’s the real McCoy, he was a student at the Institute.’
Our new acquaintance – we call him KS – repeated the reflex, rising again, now to clutch the hand of the second IITian before him. My friend, in his own bid to calm him down, told him that although he had been to IIT-Bombay as a student, he still wasn’t quite the real thing: he’d chosen to opt out in his final year there, forgoing the degree. So what!, exclaimed KS above the avant-garde din all about. You went to an IIT, that too to IIT-Bombay! What more, in a lifetime, could one possibly ask for? And he went on to relate how, if he’d had one burning desire as a schoolboy, it had been to make it to an IIT, and how it would be his life’s greatest and most lasting regret – he was sure of this – that he hadn’t made the cut. (He’d been to the next best thing, a Regional Engineering College, but that was cold comfort). ‘IIT is IIT,’ he concluded. ‘It makes you for life. After that, there is nothing.’

For me, there have been few illustrations more vivid than my near-surreal encounter with KS (there were many other flattering, and embarrassing, superlatives he heaped on us and on IIT-Bombay) of how glamoured some sections of our populace can be of the IITs and of their perceived peerlessness in the realm of technical education. That’s to speak of the view from without. And the one from within? Not long afterwards, as part of a web survey conducted for this book, students at IIT-Bombay were invited to recount their experiences during their sojourns here. While some degree of dissatisfaction, born of familiarity, was only to be expected, what came as a surprise was the severity with which some of them expressed their disenchantment with traits of the Institute’s functioning. On the academic scene, an undergraduate spoke of having been in awe of IIT-Bombay before coming up to it, but gaining the impression, while here, that it wasn’t really ‘world-class’, and that its repute rested not so much on inner strengths as on ‘a fraction of its students that make it big and bring it renown.’ Amongst the upper ranks of students, this is how one doctoral student felt about conditions for research here: ‘R&D is not great in IITB. Many of us do not have [even] basic facilities… How do you expect to do great research then?’ While another wrote: ‘I think IIT-Bombay still has a long way to go to compete with the west in R&D. We still lack organized infrastructure for research.’ When they turned to how they felt the Institute was run, students were equally unflattering: they spoke of ‘mismanagement at such a prestigious institute’, ‘the rigidity of rules’ here, and
the ‘limits put on my freedom’ by an ‘entrenched and indifferent bureaucracy, be it administrative, academic, hostel, whatever.’

Why this wide chasm between the views from without and within? While it’s true that the positions presented above may represent extremes along a continuum (and that both without and within the IITs, opinions located at the opposite ends also exist: outsiders who disdain all that the IITs stand for, insiders who unreservedly extol the institutes), the extremes do drive home a point or two. Although the IITs, especially of late, have become unapproachable objects of desire for those who seek their stamp, to some of those who work, study, and live in them there has frequently been disappointment at the Institutes’ inner state of affairs. What keeps the latter groups ticking, and what is closer to reality, is the fact that the IITs, despite their shortfalls, yet remain in a league of their own – then again a rather rarefied league – compared with the vast majority of Indian technical institutions, be it for rigour of education, evenhanded administration, inclusiveness of decision-making, or freedom of academic action.

Another manifestation of the visceral hunger for the IIT education is the coaching class phenomenon, now an industry by itself whose turnover runs into the hundreds of crores; a third, the volley of reportage centred on the IITs between May and July each year, when the media pin their all-dissecting gaze on the Joint Entrance Examination for the Institutes (JEE), its organization, its results, and the myriad agonies and ecstasies it spawns. Why is so much made of the IITs, what does it mean to have institutions like them in a country like India? It fuels, for one thing, a sense of possibility: that institutions of the dependability and robustness epitomized by the IITs can indeed be set up, and sustained, in a higher education canvas often marred by dysfunction and the degeneration of core academic values. The IIT story assumes further significance in the wake of the waves made by their alumni across the continents, giving the institutions the added cachet (one that proves real for some, illusory for others) of being failsafe tickets to success. Tracing the history of an IIT offers a means of gaining insight into the steps – steps that are numerous, some small and some large, and that stretch across decades – by which these institutions’ homespun brand of solidity and success was conjured and nurtured. Equally, when considering spheres in which the IITs’ achieve-
ments have been only modest (or where they have evidently faltered), the reasons for their failings can slant into focus from an examination of the circumstances they were embedded in, permitting in turn a useful lesson or two to be drawn.

Set against these backdrops, Monastery, Sanctuary, Laboratory: 50 Years of IIT-Bombay has been written with a few broad ends in mind. The first, and foremost, is to set down the history of IIT-Bombay’s first five decades, never before documented in any appreciable detail. As part of the observances connected with the golden jubilee of its foundation, IIT-Bombay felt this an opportune moment to unravel its past and reflect on the course taken so far, the better perhaps to chart its passage into the future. The book’s second purpose is to pick out the influences, external and internal, that have shaped the Institute’s evolution. In doing so one seeks also to illumine the genesis of the ‘IIT phenomenon’, as it may be called, from which have arisen perceptions of the kind depicted above. Although the IITs’ autonomy has meant that each has followed a trajectory uniquely its own, they were set up as ‘sister’ institutions within a common regulatory framework, making also for a number of affinities; IIT-Bombay (or for that matter any IIT) may therefore be treated as a prototype closely representative of its kin.

These purposes find a broad expression in the book’s structure, dividing it into two nearly equal halves. The first half, in three parts, chronicles the Institute’s growth, recording the major milestones in its physical, operational and academic development: the inception and growth of its departments, its campus, its curricula, its forays into R&D. The second half, comprising Part 4, is a thematic exploration of a few salient features of the Institute’s voyage so far. One of my aims here has been to position IIT-Bombay in the landscapes of higher technical education, of R&D, and of academic governance, at both the national level and beyond, to see how it has fared in these arenas, and under what stresses and limitations. Also explored in Part 4 is the human face of the Institute. As well as chapters in which we glimpse the intellectual pursuits and preoccupations of the Institute’s staff and students over the years, and some of their quirks and talents, there are others on its inner customs and ceremonies: the rhythms of its campus life; the sparkle of its student festivals; the opinion in which it has been held, and has held itself, over the years; and what avenues it
might seek to explore in the future. The purposes of the first and second halves of the book are not unintersecting, however, and nor are their ingredients. While the first half is in the nature of a chronology inlaid with anecdote and reflection, the second is chiefly anecdote, reflection and analysis sprinkled with dates and events.

The chapters of Part 4 have been so written that they may be read more or less independently of each other; the same should hold, at another level, for the two halves of the book, each being largely self-contained. This has resulted, inevitably, in the repetition of certain facts and figures across the halves. An effort has been made, however, to keep these to a minimum and to see that they serve to cast key ideas in a fresh light rather than merely restate them. For those who might like to turn to a quick snapshot of IIT-Bombay’s history, a timeline of the Institute’s most memorable landmarks is presented in Appendix 4.

A third major purpose I’ve had in mind for the book is to draw attention to the part played by the Institute’s early recruits, whether faculty, other staff, or students, in nurturing it and shaping its course, many of whom are in danger already of being obscured by the veils of time and of amnesia. These are IIT-Bombay’s institution builders, some of them pioneers for their time, and in much of current institutional reminiscence and pronouncement go unnoticed or overlooked. Their exertions were made at a time when there wasn’t much reward for those exertions save the work itself, and I have tried here to assign them the place in the Institute’s history that is rightfully theirs.

AN EMULATABLE MODEL?

India, in the words of one of the most trenchant observers of the national scientific scene, ‘is in the throes of a new round of institution building. It is clear that many schemes can be conceived in committee rooms; the real challenge lies in defining and realizing a vision. Can anything be learnt from the past?’ a Perhaps the most striking of the recent stirrings is the government’s decision of 2008 to set up as many as eight new IITs with-

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in just a couple of years. This is institution building on a formidable scale, given that the first five IITs were set up over a span of fourteen years, the sixth came along after another thirty, and the seventh after a further seven. As the massive undertaking unfolds, many of the new members of the IIT community may find their birth pangs and teething troubles an echo of those that IIT-Bombay went through, and recognize in their own growth the corresponding points and phases in IIT-Bombay’s. While each of them will need to tackle their own particular anxieties and will celebrate their own high points along the way, it is possible that they may take a leaf from IIT-Bombay’s pages to serve as pointers to the kind of course they might most profitably chart, and no less importantly to the kinds of perils they’d do well to be alive to.

History can have its uses if it helps revise received notions of the past, or informs decisions that brushstroke the future. An examination of the circumstances of IIT-Bombay’s evolution reveals a number of points that deserve being pondered. To tackle the history of a technical institution situated in a country not renowned, in the modern era, for its technological offerings to the world – or indeed to itself – makes for an especially interesting case study. For decades together, political cynicism, bureaucratic apathy and economic mismanagement hobbled Indian entrepreneurship, sentencing the nation to being a technological backwater and a butt of ridicule right into the late 1990s. It bears keeping in mind that the IITs were set up, in the Nehruvian vision, to ‘provide scientists and technologists of the highest calibre’ who would help India attain ‘self-reliance in her technological needs’. Have the Institutes played the part they were meant to play in India’s technological enterprise? To what degree must they shoulder the blame for India’s poor showing in the arena of deployable, robust technology, to what extent have they been victims of the very ills they were meant to mitigate? It’s a conundrum that has no easy answer, but to which a first approach may be made through the eyeglass of history.

Other questions this book takes up include those linked to the autonomy of action and decision-making that IIT-Bombay, in common with other IITs, enjoys, and how this matters for its avowed ‘tryst with excellence’. Much of the vigour of IIT-Bombay’s academic programmes has stemmed from the autonomy enshrined in the IITs Act, and the relatively flexible modes of governance this has promoted. Yet, autonomy is often
a hotly contested terrain, and a bequest that can no longer be taken for granted. It is of some importance, in this context, to examine the pulls and pressures that define its contours, which in turn inflect the effectiveness with which the Institute functions.

The IITs came into being at a time when the nation could scarcely pay for educational institutions on their scale; they were therefore set up with international aid, in both financial and human form. A question often asked is: what flavour did these aid programmes carry, what complexion did they impart to the institutes’ academic rubric and to their operational philosophy? This is a question into which some inroads can be made here, if within the limited ambit of the UNESCO-mediated Soviet aid that IIT-Bombay received during its inception.

Finally, as amply testified by media coverage of late, IIT-Bombay’s alumni can be counted among the brightest sparks on the academic, industrial and entrepreneurial landscape of the nation, and sometimes beyond. We also try to uncover what part their IIT-Bombay experience played in shaping their success, and what stirred in them the profound loyalty to their alma mater they’ve so freely expressed, both in spirit and in material terms, triggering the impressive ‘payback’ of recent times.
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My thanks go foremost to the entity this book is about, IIT-Bombay, for having thought of chronicling its history along lines quite distinct from those usually taken by public organizations. From the start, it was settled that IIT-Bombay’s story should be told not in the form of a compendium of unconnected data and articles but as a narrative history, although researched with care and informed by contemplation and analysis. It was this slant that drew me to the task, and it’s my pleasure to record that, as the book took shape, working on it proved to be less a task and more an absorbing journey ramifying into several interesting byways, each bringing its own surprises and revelations. Another reason for the transformation of task into pleasure was to do with the strong democratic traditions at this Institute, and the freedom of expression they foster. They have meant that the people interviewed for this book, and respondents to surveys, haven’t held back in declaring how the Institute has stood in their eyes, voicing their grumbles and reservations every bit as freely as they’ve relived the joys and exhilarations they’ve encountered here. This openness will, I trust, have imparted to the narrative that vital ‘ring of truth’, in the absence of which a book like this can easily flounder. Just as importantly, it has meant that I’ve been free to shape the book, and set its tone and texture, entirely as I’ve wished, with no ‘well-meaning advice’ floating in my direction from any quarter.

My thanks go next to IIT-Bombay’s current Director and Deputy Director, Dr Ashok Misra and Dr Juzer Vasi, for taking a personal interest in the project and facilitating the writing of the book in every way needed, not least by smoothening my access to records and my use of a range
of institutional facilities. A special thanks to them also for their empathy with a writer’s need for solitude and immersion, and for relieving me, to this end, from my involvement in a number of committees. This helped to free up very many afternoons, during which much of the interviewing and research for this book was done. I am indebted to the Dean of Faculty, Dr Devang Khakhar, in whose administrative charge the project was placed, for his very heartening ‘never say no’ policy on requests for approvals, and for fielding with admirable patience the persistent demands I’ve made on his time. To him I owe my insulation from petty concerns during the preparation of this book.

As will become evident in the pages that follow, virtually nothing appears to move in IIT-Bombay without a committee first being formed for it. There has existed, therefore, an IIT-Bombay History Book Committee, too; but it has proved to be, to my relief and then to my delight, more a circle of friends and guiding-lights than a committee, and utterly an antithesis to the arid conjurings of the word. Its members, self-effacing as they all are, will probably prefer to be left unnamed here; but I’m obliged to them for gently nudging me in the right direction every now and again and for their vigilant reading of the drafts. They have also picked out errors, some of them slight or subtle, some even arcane, in information sourced from documents and in the portrayal of people and events, and have passed on many useful snippets and leads that have enriched the account at several places. Any poverty in narration that remains is of my making.

In a very fundamental way, this book owes its existence to one person above all others: Dr S.P. Sukhatme. It was his brainchild, and his long-standing conviction that IIT-Bombay’s history be set down: primarily for its own sake, and to enshrine in a durable record the people and processes that brought the Institute to life and gave it shape and substance. It was he, again, who kept the project afloat at times when it seemed a lost cause, and he who took the keenest interest as it eventually unfurled. My conversations with him have been rewarding for his sweeping overview of and pointed insights into the Institute’s evolution, and to him Monastery, Sanctuary, Laboratory owes a debt bigger than can easily be expressed in a formal acknowledgement.

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nating, against a short deadline, the many elements that needed to fall into place to bring this version to life.

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In addition to chronicling IIT-Bombay’s growth, my attempt has been to capture what may be called the mood that came to prevail at the Institute from time to time during various phases of its evolution: to portray its hopes and anxieties, its desires and frustrations, its fortes and weak spots. This I’ve tried to do for certain facets of the Institute’s development, such as the health of its inner functioning and the conditions of work and of living for its faculty, students, and staff, and how these have affected both their attainments and their self-image. In turn, it is their academic world-view, preoccupations and impulses, and their shifting levels of optimism and pessimism along the years, that have imbued the Institute with the spirit it has come to possess. These attempts at the evocation of mood and spirit wouldn’t have been possible on the strength of official documents alone: most of these are dry and unconfiding, giving little away beyond the superficial. Elaborately intertwined relations of this sort are best captured through subjective recall; I have relied heavily, therefore, on conversations with those who have witnessed the times at first hand, and played an intimate part in shaping the Institute even as it has shaped them. Their memories and reflections have at times been woven into an imaginative reconstruction (without, it is hoped, sacrificing historical accuracy) of some of the defining moments in IIT-Bombay’s history. As much as it is a book of dates and landmarks, therefore, it’s one of voices, views and sentiments tied to each of the Institute’s phases of growth.

Before I put pen to paper for the first words of the book, I was sure of one thing: that while in the popular imagination an institute of technology is all about graphs, charts and tables, this volume should have none
of these rather forbidding visual aids. On having written the book’s last sentence, it’s a relief to see that I’ve managed to keep the resolve. But while graphs and charts can be dispensed with, numbers, alas, cannot; some positions and trends are brought alive only through them. I’ve tried, however, to include only as many numbers as are needed to underpin the conclusions I’ve drawn. The book, in this way, contains data that are not necessarily exhaustive, but correct to the best of my knowledge. One consequence of the selectivity exercised in the choice of data is that, rather than claim any sort of comprehensiveness for the book, it’ll be fair to say that it represents a start in charting the Institute’s history.

Another way in which Monastery, Sanctuary, Laboratory marks a start is in the approaches it takes. There can be as many histories written as there are people willing to write them, each with their chosen emphases and elisions. My particular interest has lain in mapping out what lies at the heart of the Institute’s existence: its academic work. This is a spacious domain in itself, and includes its academic programmes, the R&D in its laboratories, the multiplication of its academic units (departments, centres, schools), and its governance. Other forms of historicization can surely be undertaken, revolving on one or more of the Institute’s other dimensions, particularly those that stand out as uncommon on the Indian educational scene. Some that fall in this realm are the pronounced gender imbalance the IITs have been notorious for, at times skewing the social and psychological development of their students, the work environment for their staff, and relations between the teachers and the taught; the ever-changing demography of those who can or cannot access an IIT education, especially when this comes to be progressively, and powerfully, governed by financial status, and what this means for distribution of opportunity; or the IITs’ vulnerability to national economic and political swings that leave them at the mercy of vicissitudes beyond their control, and what this augurs for the ambitions they nurse for themselves. Although this book does have sections and passages on these facets, they’re more in the nature of synopses than of explorations, and it’s left to other studies to chart out these and other terrains.

Faculty, Scientists and Academic Units: Historically, academic staff at IIT-Bombay have fallen broadly into two categories: faculty, recruited for the most part to the departments, schools and centres
that conduct academic programmes; and scientists, recruited to what have been called its centres of advanced study or research. The nomenclature is misleading, deriving as it does from the historical origins of the respective entities; today, the boundaries are blurred. ‘Advanced study’ or research is by no means confined to the centres that once bore this tag. Rather, by virtue of their size and numbers, it’s the departments that currently house the larger part of the Institute’s R&D. And ‘research’ centres, for their part, have now started offering academic programmes of their own, bringing them closer to departments on this defining count; thus the distinction between ‘faculty’ and ‘scientists’ is dimming fast. In the interests of brevity, therefore, the word ‘faculty’ has been used inclusively in this book, and implies scientists as well. Similarly the word ‘department’ has, here and there, been used in an omnibus way, embracing all academic units.

**Titles:** The title ‘Professor’ is currently the most sweeping for academic staff at IIT-Bombay, applied to faculty irrespective of their rank (Assistant, Associate or ‘full’ Professor). While today no member of the faculty is recruited unless they come armed with a doctorate, so that the title ‘Prof’ has come to subsume, and invariably imply, ‘Dr’, this was not so in IIT-Bombay’s germinal years. Many early faculty were recruited straight after their Bachelor’s or Master’s degrees, and some of them chose not to go in for a Ph.D. thereafter. Observing this distinction, I have used ‘Dr’ expressly for those with a Ph.D. to their name, and ‘Prof’ otherwise.

**Place Names:** In 1996, Bombay was renamed Mumbai; accordingly, ‘Bombay’ has been used in this book wherever reference is made to the city in its pre-1996 days, and ‘Mumbai’ for later; the same logic has been followed for other cities. It’s to be noted, however, that IIT-Bombay itself was not rechristened ‘IIT-Mumbai’ with the city’s change of name, though it’s easy to assume this to have happened, as numberless media reports attest to this day.

**Academic Evolution:** The reader familiar with IIT-Bombay’s academic growth will notice a selectivity exercised in the matter of recording the inception of academic programmes at the Institute. Of the many M.Tech. specializations that have been launched, for example, only some have been singled out for mention in the book. The criterion for inclusion has been their importance from an institutional standpoint, such as in signalling academic innovation or a discernible shift in institution-
al trajectory. This judgment is necessarily subjective, and some omissions or inclusions might be contested; it was felt, however, that more exhaustive accounts of the introduction of academic programmes would belong better in histories of individual departments, some of which are already being compiled.

**Footnotes and Interviews:** In the interests of readability for what seeks to be a narrative history, notes and references have been placed at the end of the book (See Appendix 1), and footnotes kept to a minimum. An effort has, however, been made to ensure that the referencing is adequate for anyone interested in pursuing at greater depth any of the events recounted here. Again with readability in mind, quotes from interviews have not been referenced, as they are numerous and would have cluttered the text, perhaps to the detriment of its flow. Instead, a list of those interviewed for this book is provided in Appendix 5, as is the mode of interview for each, which includes video recordings, audio recordings, responses to questionnaires, and interviews on phone and on e-mail. Responses were also collected through a web survey conducted especially for the purpose, but these haven not been identified separately.

Many of IIT-Bombay’s early faculty interviewed for this book have now retired. Since it would have been cumbersome to indicate their status in each instance they’ve been quoted, it was felt more expedient to do this in Appendix 5. Documentary sources include the Institute’s archival records – amongst them its annual reports, the records of the meetings of its Senate, of its Board of Governors, and of other academic and administrative bodies; committee reports; and institutional correspondence with a variety of agencies and individuals. Web-based sources referenced in the text were last accessed, and verified for content, in June 2008.
MONASTERY, SANCTUARY, LABORATORY

50 Years of IIT-Bombay
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PART I

CHANCE & DESIGN: CONCEPTION AND BIRTH OF IIT-BOMBAY
MARCH 10, 1959. A small team of men drive into a north-eastern outpost of Bombay. It’s an area still desolate and hard to reach, but one of striking natural beauty. Taking a sharp left at one point, they drive up a steep rise of terrain and into its saddle; and suddenly before them, to their right, materializes a sprawling, tranquil vista, a study in contrast to the city’s industrial areas they’ve been driving through. It’s an arena an eagle wheeling up in the sky would see as a large bowl of landscape, amphitheatre-like, its northern rim as if chipped away to form the saddle the contingent has crested. Dominating its background there glistens an outspread lake, amoeba-shaped, reflecting the brilliant blue of the March sky above; garlanding the lake is a rolling crescent of hills. The whole arena is dotted with trees. This watery, hilly, leafy locale our team are looking out upon is the precinct of Powai, inlaid with its own fine reservoir named after it, the Powai lake.

From its privileged vantage the eagle can see long stretches further than the human eye. Due north of the hills beyond Powai lake it notes another, larger lake, cupped in a second bowl of terrain. Yet further, north of this second lake, the Vihar lake, lie dense, brooding tropical forests, lifetimes removed from the urban bustle of Bombay, despite being hemmed in on all sides by its suburbs.

Between the two lakes, Powai and Vihar, lies a tract of land shaped, in this aerial view, roughly like the body of a crab with two stubby claws extended. This enclave, an expansive 550 acres that until recently was semi forest land, is the destination our travellers are about to gain. For some
time now, a part of the enclave has been abuzz with activity. Every hundred metres or so, new buildings are being put up; or at any rate their rudiments are visible. Foundations are being dug in, plinths smoothed into place. Rough-hewn, unmetalled roads, specially clawed out for the day, criss-cross the grounds. About a kilometre in from the road, a large festive shamiana has been erected in a clearing.

The group arriving at the site are cause for considerable excitement for the throng already assembled here: the entourage includes in its number independent India’s first Prime Minister, Jawaharlal Nehru. To those present, the occasion itself is as singular as their guest of honour. He has made his way here to lay the foundation stone for the organization in which they’re employed: an institute of technical education and scholarship, only the second of its kind in the country: the Indian Institute of Technology, Bombay.

The day unravels. The visiting contingent drive about the rocky uneven roads, speeches are made, the foundation stone is laid; an Institute comes into being. To be more precise, though, today’s event is really a sort of ceremonial flagging-off, somewhat in the nature of a baptism: the Institute is already a living, breathing organism, having been absorbed in its working life for the better part of a year.

The Indian Institute of Technology, Bombay (IIT-Bombay for short) is to be one of five sister Indian Institutes of Technology, in around two years from then to be favoured with the status of ‘Institutes of National Importance’ by an act of parliament. Their birth orchestrated with a keen personal interest by Nehru himself, he envisions the IITs as the leading producers of the large numbers of technical personnel, also the repositories of technical expertise, needed to bring to life a dream he cherishes dearly: the technological and industrial self-sufficiency of the fledgling nation. In Nehru’s words, the IITs are meant to ‘provide scientists and technologists of the highest calibre who would engage in research, design and development to help in building the nation towards self-reliance in her technological needs’.

The laying of the foundation stone of this, the second of the IITs, at Powai in Bombay, is naturally cause for celebration. It’s no less an occasion, though, to breathe a deep sigh of relief: the event is taking place after
an unexpected hiatus following the formation of the first IIT at Kharagpur. Although the institutes in the eastern and western zones of the country were meant to come to life near-concurrently, the one at Bombay has for a variety of reasons lagged as many as seven years behind the first.

The occasion is therefore a momentous one for all concerned. Yet while the general mood is upbeat, in the midst of the festive cohorts bustles a man who, although the picture of good cheer on the surface, is not entirely at ease within. In fact he is inwardly quite troubled. Brigadier S.K. Bose, who has formally taken charge as the Institute’s first Director just a couple of months ago, in January 1959, has plenty to occupy his mind. He doesn’t allow his anxiety to show, however, and fortunately there is much to divert him today. He busies himself playing host to Pandit Nehru and the accompanying Soviet delegation; he drives them personally round the nascent campus in an open-top jeep; he listens to Nehru’s speech, gives his own.

Pandit Nehru, in a reference to the ‘IIT project’, says, ‘I suppose that among the many things that are being done in India today, the establishment of the great institutes of technical training and knowledge is perhaps the most important.’ There follows one of his most widely quoted assen-
tions on the technological enterprise: ‘It is relatively easy to put up a factory or a plant, it is much more difficult and it takes much more time to train the human beings that will run a factory or put up another factory or plant.’ Speaking of IIT-Bombay, he says he is happy it has ‘very suitably been established near the great city of Bombay which has such a fine record in various kinds of endeavour in the progress of our country – almost in any front of national activity.’ He then goes on to remark that he sees today’s occasion as ‘another symbol of our attempt to grasp the future’.

Nehru ends with a paean to the toiling multitudes in the villages of the country, declaring we have much to learn from them. He quotes a rural song ‘recited to me by my friend and colleague, the Governor,’ which is
a gospel of work without getting involved in the consequences of work.’ Consequences come, says Nehru. ‘Work without fear and without too much attachment.’ Speaking of the key role played by the financial assistance received jointly from UNESCO and the USSR in bringing this IIT to life, Nehru ends with a vote of thanks to them ‘for their great help in this undertaking.’

This flurry of activity may help sweep, for the time being, Brig. Bose’s worries to the back of his mind, but he knows they will return to haunt him once the event is over. The situation he and his Institute find themselves in is an unenviable one. Though the Institute’s activities have formally commenced (academic sessions having started the previous July, in 1958), IIT-Bombay doesn’t enjoy a corporeal existence yet. A campus may have been identified for it, and work begun on constructing it, but there are still no buildings to speak of. The Institute is eking out a nomadic existence, operating doughtily from its temporary lodgings in Worli, some 25 kilometres from its earmarked site here in Powai. A somewhat unlikely benefactor is hosting it there, the Silk and Art Silk Mills Research Association (SASMIRA), which has generously provided IIT-Bombay a roof and an address during its period of homelessness. Crucially, however, the Institute has been housed at SASMIRA on the firm understanding that it will vacate the premises rented out to it inside two years – on or before July 1960 – by which time it should move to Powai.

There is thus only a little over a year remaining before IIT-Bombay’s allotted time at SASMIRA comes to a close. In this short interval, an entire campus for a technical institute – then again one conceived on a lavish scale – will need to be fashioned from scratch. This is a task daunting enough in itself; and to compound the problem, the portents before the Institute aren’t the rosiest. Construction work has thus far been excruciatingly slow. Nor is it showing any signs of picking up, mired as it is in the convoluted procedures of the agency executing the project, the Central Public Works Department.

The energy and inventiveness with which the Institute was eventually put into place over the next year and a half, against formidable odds and in good time to honour its commitment to SASMIRA, makes for a story all by itself, enlivened with its own turns and conjunctions. But all of that
will have to await its telling in a subsequent chapter. For the moment, we flash forward along the Institute’s journey from its Foundation Day (as the 10th of March was subsequently to be known and observed) across a few decades, taking a telescopic view of IIT-Bombay’s evolution from its early days to the threshold of the recently concluded century, and the circumstances it found itself in at this cusp of time.

A SUDDEN STIRRING

Over the ensuing three decades and a half, going into the late 1980s and early 1990s, the Institute builds itself up. It starts its working life, grappling with the many growing pains that lie in the way. It moves on to consolidate its initial strengths and successes and, without fanfare but with perseverance, sets itself to doing what it is meant to do. There rides on its air the hum of activity one would expect to pervade any institution of technical learning in its infancy going about its business. There are the lectures in cavernous halls, the practicals in laboratories, the occasional research seminar. There is perhaps the odd book or research paper being written, the
odd academic visitor happening to drop by, the Institute’s superstructure being added on layer by layer. Graduates and post-graduates are churned out with clockwork regularity year after year. There is all this, but it is little more than a hum. It may just be discernible in its immediate vicinity, perhaps – in the city of Bombay, and possibly in the satellite towns in its catchments – but is barely audible to the world beyond.

Indeed the world at large – and this includes successive governments of the nation, the media, and the general public – scarcely takes notice of the Institute, an indifference that’s particularly evident when one contrasts this with what is to follow near the turn of the century. There may be the occasional appreciative murmur about how its graduates have flourished in both the engineering and in other, at times quite unallied, sectors, making it more and more a sought-after destination for the brightest school-leavers. There may also be the occasional rumble about whether or not IIT-Bombay (in common with the other IITs) is too elitist, catering to too small a population of students privileged with, for instance, a splendid campus, well-equipped laboratories and an enviably low student-to-teacher ratio; and the occasional complaint about the exodus of many of its graduates to other countries, chiefly the US. By and large, however, it is left well alone to get on with its prescribed mandate – that of training tomorrow’s engineers and technologists to the highest level of competence attainable under the circumstances.

On the Indian academic and technological map, the IITs do make their presence felt, but by no means throw the longest shadows. That distinction is cornered by the older, more venerable figureheads of modern Indian science: the Indian Institute of Science (IISc) in Bangalore, or the grander, older universities of the land such as those of Delhi, Calcutta, and Banaras. As for the world beyond India’s shores, it is scarcely likely that IIT-Bombay, or for that matter any of its sister IITs, trouble anybody’s thoughts much, or are known even to exist. Indeed it is perhaps true to say that over the 1970s and 80s hardly anyone overseas, other than those in some way linked to the Institutes, would have been conversant with the expansion of their initials. If they’re thought of at all, it is in the way of a clutch of Indian ‘engineering colleges’, one of the many that dot the country’s vast canvas, producing engineers of sound if not outstanding calibre.
The Institute leads, in sum, a low-profile, practically reclusive existence through these years, and to the kite wheeling in the sky must seem like a drowsy infant spread-eagled in its cradle-like setting, perhaps pondering on whether it should stir to life, and when.

The unremarkable years trickle past; they stretch into decades; then, as if at the flick of some metabolic switch, the infant decides it is time to waken. The awakening is as sudden as it is blustery: so much so, in fact, that within a few years the Institute will be unrecognizable as its former sedate, retiring self.

We pan over, now, to 2007: to the fiftieth year of its existence, and the eve of the Golden Jubilee of its foundation. If the levels of activity just 15 or 20 years ago were in the nature of a quiet hum, they’ve now swollen into a piercing buzz. There’s an almost charged intensity to day-to-day life here. No matter which metric one chooses to judge it by, a newfound buoyancy coasts the air. There is as always the teaching: the customary 8.30 am start to the instructional day, the 5.30 pm close. There’s the rush between lectures in widely separated buildings, magnified now by the greatly risen number of students milling around, enrolled in an ever increasing suite of academic programmes. There are the forever tinkering, forever expanding laboratories, and the lively flux they generate – of students, of visitors, of fresh supplies and installations, of seminars and group meetings. There is all this; what is new and unaccustomed, however, is the volume of activity layered over the routine, and the mood that surrounds it.

Seminars abound. Across the Institute, especially during the in-semester months, they are practically a daily affair; often, better than daily. Not infrequently, several seminars are announced on any given day, their audiences intersecting, their times often clashing, to the understandable chagrin of some. Externally sponsored research projects stream in, often at the rate of three a week; consultancy projects at higher rates still. Which also means that money is pouring in at a previously unheard-of clip, helping to upgrade existing laboratories and create new ones, to energize existing research programs and engender new ones. The money is streaming, moreover, not just from the sources that have traditionally underwritten the Institute’s activities: the Ministries of the Government of India, and the industrial and commercial houses of the land. It is flowing also from a source hitherto impalpable and untapped: the Institute’s alum-
ni, some of whom have earned themselves dazzling wealth, and are now willing to part with some of it in favour of the place that shaped them in their formative years. And this money is flowing in not just to rejuvenate the old teaching labs and classrooms they’d spent their daytime hours in. It’s also to refurbish their old hostels and put up new ones, to improve campus amenities, and for an assortment of other ends.

The effects of this variegated influx of capital are all too evident. Any which way you turn, some patch of ground is being cleared, some stand of trees marked out, for a new construction project; some staid old building is being razed to the ground to make way for a new, flashier successor.

The numbers speak eloquently for themselves. Set the current levels of activity against those that prevailed some 12-15 years ago, and the scale of the transformation is evident. The yearly intake of students in 1992-93 was around the 800 mark; this, in 2005-06, had more than doubled to about 1620. The total number of students had climbed from less than 3000 to around 5000. In 1992-1993, the Institute attracted Rs 7.2 crore in sponsored research and development projects; in 2005-2006, this figure was Rs 75 crore – making for a fair jump even after adjusting for inflation. In recent years, the Silver Jubilee celebrations of IIT-Bombay’s graduating batches have become a focal point of alumni pledges and donations. In 1992-93 these hadn’t started to take place (it was only in 1995-96 that the ‘Class of 70’ set the ball rolling with a contribution of close to Rs four lakh); in 2005-06 alumni pledges for endowments had soared to Rs 1.21 crore, some 30 fold greater than a decade ago. While in 1992-93 visits by teams from universities overseas would have been virtually unheard of, certainly in the sense one thinks of them now, in 2005-06 the Institute welcomed as many as thirty one official international delegations; six of these visits, involving institutions in the USA, Australia and Africa, resulted in MOUs of collaboration being signed. And while the eye of the world at large, in the form of the press, drifted in IIT-Bombay’s direction only once in a long while until the early nineties, in 2005-06 it was trained steadily upon the Institute, some Mumbai newspaper or other carrying a story on it almost every week.³

While these data may be compelling in themselves, perhaps one of the most remarkable changes has to do with the professional visitors the Institute receives, and the tenor of their engagement with it. Their compo-
position, for one, has undergone a sea-change. They arrive at the Institute's gates not just from the ranks of local industry and other academic institutions in the country, as they once did. They file in also – and in equally thick streams – from much further away: visits by individuals and delegations from organizations overseas, both industrial and academic, are the order of the day. They come from all corners of the globe: Australasia, Europe, the Far East, the UK, the Americas, Africa. In striking ways the flavour of their visits, too, has changed, the more so if they hail from the North America–northern Europe axis. No longer do they come, as they once did, chiefly in the capacity of 'experts' or 'advisors', looking to – and no less being looked up to – pass on their expertise to their local, allegedly less accomplished counterparts. Many come, instead, as seekers. They make their way to see what links they can forge, what collaborations strike up, what joint ventures undertake. They come hoping to engage departments and laboratories in IIT-Bombay as equal partners, and participants, in these joint ventures, not as passive recipients. There are some, however, whose gaze is aligned along an avowedly narrow line of sight: they're out on the hunt. With a keen eye for talent, they are out on trips of reconnaissance to see which of the Institute's close-to-graduation students are ripe for the plucking: which of IIT-Bombay's well-drilled workforce they can recruit for their own labs.

And they come in this range of new modes for the simple reason that the aura surrounding IIT-Bombay's name has, over a few short years, undergone what one might call a paradigm shift.

The aura is no longer one of provincial obscurity at the margins of modern science and technology; nor is it one of mere solidity unattended by excellence. Instead, it is that of a production house for some of the most talented technical minds to have burst upon the global scene over the last decade or two. What, then, has fuelled this sweeping change in perception? While IIT-Bombay's steadily growing in-house academic prowess has had some part to play, much the greater reason lies in the accomplishments of IIT-Bombay's alumni, in particular some of those settled in the US and Europe, engaged in surprisingly diverse occupations. There, several amongst their number have risen to the highest executive echelons of giant multinational corporations – Citicorp, Bell Labs, Daimler-Benz,
Goldman Sachs and IBM, to name a few. Several others, meanwhile, have distinguished themselves in the topmost tiers of academia – at Stanford, Berkeley, Johns Hopkins. Yet others have excelled as entrepreneurs in infotech start-ups – TIBCO, TiE, Syntel amongst them – amassing reputedly fabulous fortunes in Silicon Valley and elsewhere. Here in India, firms like Infosys, Technocraft and Mastek, academic institutions across the country, and no small number of government organizations, have benefited from the leadership and creativity they’ve provided. To such an impressive stature in such a short time have they risen, that the exploits of these IIT-Bombay products (along with, it needs to be said, those of other IITs), have turned IIT into something of a ‘brand name’ the world over. And virtually a household name, too. They’re featured with startling regularity on national news channels, in influential sections of the press (even finding their way into popular comic strips), and in American senatorial and presidential speeches. A name that in its early days was treated with indifference, even disdain, is now viewed with equal parts of fascination, bewilderment, and muted awe.

And so for IIT-Bombay now there is not just acknowledgement, but also respect and recognition, not infrequently spilling over into a consuming curiosity. The IITs are more than wan specks on the global academic landscape; they can now justly claim to be identifiable landmarks on it. It’s little surprise, then, that IIT-Bombay’s visitors today should approach it from the standpoints just described. All in all, the academic climate in the corridors, classrooms and labs – and no less in the administrative offices – at the Institute today is more akin to that you’d find in one of the better established universities in Europe or America, not the sleepy hinterland of academia it had until recently resembled.

This earlier impression was, it could be argued, a fallacy. No harvest of such proportions can be a chance occurrence; it can only be reaped if the soil has been scrupulously tilled, the seed carefully sown. It might have gone on more or less unsung, even unnoticed, but there was a substantial body of work and activity conducted behind the quiet façade, also belying that façade – work of the kind that can be called ‘institution-building’ – without which the rise to prominence of the present would not have been possible.
Moreover, IIT-Bombay’s journey along these decades was no leisurely amble along a rose-strewn path. Not infrequently in the course of these years, the going wasn’t easy, the sailing far from smooth. There were times, for instance, when the Institute went through a financial crunch so severe that even minor running repairs, amounting in outlay to no more than a few thousand rupees at a time – be it to laboratories or to residential apartments or to student hostels – could not be taken in hand for want of funds. As for estate work involving extensive renovation and refurbishment (of which there was much that was badly needed), to ask for these was to ask for the moon. At other times, in the Institute’s infancy, there were moments when its academic operations threatened to come to a grinding halt because of delays in laying down its infrastructure. And there were instances, in its middle decades, when conditions for competitive, visible R&D, vital for an institute of higher education charged with technological advancement and innovation, were so unfavourable that they caused many to despair if the Institute would ever realize the visions it had drawn up for itself.

But the Institute pressed on, unwaveringly. Its footsoldiers – its faculty, staff, and students – plugged away at what was needed to be done, surmounting the hindrances along the way. Periods of crisis were tided over; the long-range objectives of the Institute partially, and to a fair level of satisfaction, realized. Today, as IIT-Bombay approaches the golden anniversary of its foundation, while many causes for concern persist, and while there remain fronts on which honest, unsentimental introspection will be necessary, there is also a pleasing ensemble of successes it can congratulate itself on.

This book is about the growth of IIT-Bombay from the germ of an idea into the conspicuous presence it is today on the scientific and technical map of the country – and arguably a palpable, if not yet an insistent, presence on the map of the larger world. In purely functional terms, IIT-Bombay’s history could be said to begin in July 1958, when its first batch of students was admitted to its academic programmes (this being the phase during which, as noted, the Powai campus was still under construction and the Institute was functioning at its temporary moorings at Sasmira, in Worli).
But to take that moment, though a watershed in itself, as our starting point would be to leave untouched some of the most interesting events surrounding IIT-Bombay’s birth. For the story of its inception doesn’t begin in 1958 at all, with the curtain-raiser of its inaugural academic session; it begins, instead, a good four years earlier. At which time, in late 1954, there unfolded a chain of events every bit as unlikely as the exotic locale in which they were set; and to begin at the beginning of IIT-Bombay’s history, it is to that zone in place and time we must take the trouble to travel.
CHAPTER 2

BORN IN THE REPUBLIC OF URUGUAY

The number of ‘hits’ IIT-Bombay’s home page receives these days is sure to be gratifyingly large. Interest in the Institute, and in the IITs in general, has spiraled in recent years, both amongst the lay public and in academic circles. Once alighted on the home page, the ‘focused’ Web prowler will most likely tunnel into one of a select basket of links, depending on what they’re looking for. The prospective student will veer into the Admissions or the Departments pages; the corporate firm seeking collaboration or consultancy, into the Industrial Research and Consultancy pages; the alumnus seeking to re-establish old links or indulge a dose of nostalgia, into the pages of the Hostels and the Gymkhana; and so forth. Unsurprisingly, such visits number in their thousands every day. How many of those that arrive at IIT-Bombay’s home page, however, are ever likely to work their way into the links that deal with the Institute’s history? How many, I’ve often wondered in the course of researching this book, would be interested in learning how IIT-Bombay was set up; what were the forces and who the people instrumental in its birth?

The answer that has suggested itself intuitively has been a humbling one. Probably very few, I’ve had to accept; and in frequency, quite likely none for weeks or months together.

This may not be so, I’ve gone on to reason, because nobody is interested in the subject of IIT-Bombay’s inception. The more likely reason is that most people suspect there to be no real history to the whole thing at all. The ‘high command’ mode in which the IITs were set up is by now such common wisdom as to have passed into popular folklore. The ideas most often reprised are all too familiar. They begin with Nehru’s vision of newly inde-
ependent India’s self-sufficiency in science and technology, both in industry and in academia, and with the country’s pressing requirement of large numbers of engineers. They move on to his vision of the IITs as the nurseries for the ideas and the technological workforce that would propel India’s fast-expanding industrial campaign; they culminate in the setting up of the IITs under his commanding hand, IIT-Bombay the second of five IITs so created…Thus, in most minds, does the story begin and end. There appears to be little to engross the reader here, nothing like the scientific, political or ecclesiastical churnings, the often subterranean movements of intellectual rebellion, stretched out over scores of years and sometimes a century or two, that have underpinned the gradual, piecewise crystallization of the elderly members of the academic community – of an Oxford, a Heidelberg, or an MIT.

The birth of IIT-Bombay, in this line of thought, becomes shorn of interest for two reasons. It appears first to be an uninviting example of the cut-and-dry, ‘plan-sanction-implement’ style of institution building. Second, it is subsumed within the larger IIT canvas, and is forgivably assumed to be no different from that of any of the other IITs.

Indeed if for some reason a maverick bee does start to stir in the casual Web-prowler’s bonnet, insisting on seeing if the story of IIT-Bombay’s nativity can be traced, she’s liable to come across very little to sink her teeth into. What she’s most likely to encounter on the Net – and this includes the Institute’s own links and documents – is a potted history that runs something like this:

A high-power committee of the Government of India recommended in 1946 establishment of four higher institutes of technology of the level of their counterparts in Europe and United States to set the direction for the development of technical education in the country…Planning for the Institute at Bombay began in 1957 and the first batch of 100 students was admitted in 1958.²

Gruff, matter-of-fact, it gives away little more than is already known, though in some places it may move on to divulge:

IIT-Bombay was established with the cooperation and participation of the UNESCO, utilizing the contribution of the Govt. of USSR. The Institute received substantial assistance in the form of equipment and expert services from USSR through the UNESCO from 1956 to 1973.
All very true; yet it only serves to reinforce our surfer’s impression that IIT-Bombay’s origins were rather as drab as she had anticipated – if imparted an unforeseen splash of colour in the shape of a global forum (the UNESCO) and a technological superpower of the time (the USSR) angling into the picture without warning. For the informed searcher, though, this is no real news either: it’s also a commonplace that the IITs were set up with foreign assistance, each helped along by a different country.

It’s only on peering below the surface that one senses how patchy the picture would be were one to go by the paragraphs reproduced above. For the more one delves into them the more one finds IIT-Bombay’s beginnings, far from being humdrum, to be infused with their own highs and lows, their own accidents and enigmas. To make the acquaintance of which we move over in space not to the long, dim corridors of our Ministries in Delhi as one might at first suppose (although those corridors did form an ever-present backdrop to much of the action), but to a spot some 10,000 miles away, the city of Montevideo; and slip back in time to December 1954.

**A SOFT-CURRENCY WINDFALL**

Montevideo isn’t, it’s safe to say, a name familiar to many in India save those who make it their passion to pore long and hard over political maps in atlases; but also perhaps to die-hard football enthusiasts amongst us. The city, settled on the southern stretches of South America’s Atlantic coast, was the venue for the inaugural soccer World Cup in 1930. It is also the capital of the Republic of Uruguay, which hosted and went on to win the inaugural Cup – an achievement sufficient in itself to secure for Uruguay an indelible place in the soccer fan’s memory.

Whatever its other claims to fame, Montevideo is certainly not a name that crops up in anyone’s mind as having anything to do with Indian history, much less that of an IIT. Yet it’s one that figures large in the annals of IIT-Bombay’s formation, for it was here that the wheels of IIT-Bombay’s inception, then at an unwelcome standstill, were set rolling again, and in irrevocable fashion.

IIT-Bombay, along with its sibling institutes, had already been conceived several years previously, arising from the recommendations of the
Sarkar Committee (see Chapter 3). It was slated to be the second of the IITs, to be started close on the heels of the first. Over in the east, IIT-Kharagpur’s classrooms and laboratories had already been abuzz with students since 1951; it was IIT-Bombay’s turn to come up next; but at this point the whole carefully laid plan had come to a grinding halt. The problem was the immemorial one: money.

In the years during and after IIT-Kharagpur’s formation the myriad demands of nation-building, then proceeding apace, had left the country’s foreign exchange reserves depleted, and the IIT-Bombay project stranded. India’s own industry was in its inceptive stages, and in no position to supply the high-end equipment indispensable to getting a technical institute off the ground; with foreign exchange scarce, it wasn’t possible to import the equipment either.3 This unwelcome pause persisted for several years; presently, 1954 was coming to an end, and there was still no clear way visible to flagging IIT-Bombay off.

A favourable historical accident of commensurate magnitude needed to take place if the Institute was to be launched in any reasonable time. Little could anyone have known it, but just such an accident was waiting in the wings to happen: for it was at this tenuous juncture that UNESCO’s General Conference convened in Montevideo. The fortunes of a yet-to-be institute of technology in faraway India couldn’t have been anywhere on UNESCO’s mind; they did, however, preoccupy the Indian delegate to the meeting, then a Secretary in the Ministry of Education and Cultural Affairs, the Ministry overseeing the initiation of the IITs. This delegate, spotting a ‘window of opportunity’ as it may now be called, lost no time in seizing it – and in so doing provided the decisive step in the commencement of the new IIT, procuring for it the foreign aid vitally required.

It was all a matter of the global economic dispensation of the time, and the sometimes curious situations it spawned. The funds in question were held not by UNESCO directly, but by a sister UN programme, the UN Technical Assistance Programme (UN-TAP), in particular under the aegis of its ‘expanded’ version, the Expanded Programme of Technical Assistance. The monies were, however, available to the UNESCO and other UN agencies to draw upon. They were comprised of the contributions of the UN’s member nations, each adding to the kitty in its own currency.
The hard currencies of the time (the US dollar, the British sterling and the French franc amongst them) were, then as now, in high demand: and the UN-TAP’s reserves in these currencies were already committed to meeting the demands of a number of developing countries, including India. As for its holdings in soft currencies, it was a different story. Since inconvertible to the hard currencies of the day, for them there was precious little demand; their immutability rendered them of limited use in the practical world. One such currency was the Soviet rouble.4

Although the Expanded Programme of Technical Assistance had been initiated in 1950, the USSR had elected not to contribute to it over the first three years of the Programme’s operation. In 1953, however, it suddenly and mysteriously reversed its position of three years’ standing, announcing a contribution of 4 million roubles.5 Another large deposit followed the next year. With takers for their roubles being few, the USSR’s deposits with the UN-TAP had swollen by end-1954 to a sizeable corpus. Precisely how the Indian delegate at the General Council meeting came to be privy to this information is lost to the mists of history. He is said to have had no foreknowledge of it – Brig. Bose remarks it was ‘a situation quite unknown to India then’6 – and it is tempting to suppose that it must have surfaced in the course of some emissarian tête-à-tête or other, when such facts most readily spill out (‘informal discussions’ are the officially cited avenues leading to the insight)7. What mattered was that he was alert to the situation, and that the obvious, and bold, question suggested itself: could the UN-TAP’s idle soft-currency fund – in particular its roubles cache – be harnessed towards resurrecting IIT-Bombay’s fortunes?

The odds appeared stacked against the possibility. There were, for one thing, UNESCO policy complications. UNESCO until then had not concerned itself with extending grants to support higher technical (as distinct from general and scientific) education.8 To do so would call for a change in UNESCO’s established policies; and diversifying into the field of technical education would mean a dilution of UNESCO’s assistance in previously

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This assertion is lent credence by the inscription on the plaque in IIT-Bombay commemorating UNESCO assistance, which reads, ‘UNESCO assistance to the Indian Institute of Technology, Bombay Stands Unique as the First Venture of Generous Assistance in Establishing an Advanced Centre of Learning and Research’. Note here the mention of ‘First Venture’, and ‘Advanced Centre’.
established scientific and cultural fields. Furthermore, India’s share of allocations for assistance had already been exhausted, and a special provision would need to be made for the surplus amount.

On another level, since the aid sought was in the inconvertible Soviet rouble, this would entail an intimate involvement of the USSR in getting IIT-Bombay going. Aid received in an inconvertible currency obliges the recipient country to depend entirely on the donor nation for the three conventional forms in which assistance is extended: equipment, experts, and training. Thus, the Soviet Union would need to agree to supply equipment, depute academic experts to Bombay, and admit select faculty from IIT-Bombay to Soviet institutes of technology for their training. Whether the USSR, in the charged geopolitical climate of the time, would be willing to comply was by no means certain.

This mixed bag of imponderables might have deterred most journeyman bureaucrats from pursuing the possibility with the General Conference. India’s representative, however, was hardly your typical journeyman bureaucrat. Scholar and essayist, in his day an establisher of academic records in the University of Calcutta, Professor Humayun Kabir was an academic luminary of his time. Described variously as ‘educationist, politician, writer, philosopher’, and ‘an exceptional talent’, Kabir was a polymath in the classical tradition. Some idea of the range and eclecticism of Kabir’s interests can be gained from a selection of the many books he authored, some in Bengali, others in English: *Immanuel Kant; Muslim Politics in Bengal; Marxism; Poetry, Monads and Society; Banglar Kavya (The Poetry of Bengal); Education in India.* (He was later to become the Union Minister for Education and Cultural Affairs, and also the Chairman of the IIT Council.)

The chief question Kabir proceeded to clear was whether UNESCO would widen their doors of assistance to include higher technical education within their ambit. Fortunately for the IIT-Bombay project, UNESCO agreed. The problem of surplus financial allocation to India was resolved by designating the additional assistance a ‘Special Fund’; with these measures, the first hurdle had been overcome. The issue of Soviet involvement, however, was another matter. The proposal would simply have to be taken up with the USSR.
‘Historians will record’, wrote Brig. Bose with prophetic flourish, ‘that a Protocol was formed at the conclusion of the meeting at Montevideo consisting of representatives of the UNESCO and India to approach the Government of the USSR for this purpose. The Protocol members went to Moscow later and represented the case of the UNESCO supporting it for implementation.’

The membership of this Protocol has been difficult to ascertain. The events predate IIT-Bombay’s formal inception and records specific to the Protocol’s formation were unavailable. However, an allusion contained in IIT-Bombay’s Silver Jubilee souvenir suggests it was a three-member group that in 1955 proceeded from India to Moscow. Led by Dr S.K. Sengupta, Director of IIT-Kharagpur (who was the signatory on the Indian side to the agreement), its other members were Mr G.K. Chandiramani, then Joint Secretary in the Ministry of Education and Cultural Affairs, and Dr P.K. Kelkar, then Vice-Principal of the Victoria Jubilee Technical Institute in Bombay (and the following year, in 1956, to be appointed Planning Officer for IIT-Bombay).

The historic meeting was held ‘from 15 September to 11 October 1955’, between representatives of the Government of India, of UNESCO, and of the USSR’s Ministry for Higher Education and its ‘Main Board For Economic Relations’, on the subject of ‘Establishing a Higher Institute of Technology in Bombay.’ It was recorded that the Soviet side was ‘prepared to render assistance in establishing the Higher Institute’ by way of:

(a) Providing professors and teaching staff to organize and carry on training and scientific research work within the term of five years.
(b) Selection and supply of equipment for the laboratories of the Institute.
(c) Providing training facilities in the Institutes of the USSR for advanced training and research for 20 Indian teachers during the five years. The equipment was ‘to be forwarded to India not later than December 31, 1958’. The Government of India for its part was to ‘provide adequate land in Bombay and carry out the construction of the buildings at their own expense.’

The signatories to the Protocol other than Dr S.K. Sengupta were N. Cacciapuoti, as representative of UNESCO, and the representatives of the Soviet Ministries. This is how IIT-Bombay was envisaged then:
‘The representatives of the Government of India pointed out that the estimated approximate number of students and post-graduates would amount to 1000 with further extension of enrolment up to 1500.’

The October 1955 protocol left unspecified the exact amount to be provided for the project. However, the Soviets did commit themselves to a minimum sum. The Indian government’s estimate stood at $2 million for equipment and $1 million for recurring costs annually, over five years. This amounted to $7 million in all, or about 28 million roubles (roughly Rs 3.3 crore). The Protocol recorded that ‘the request of the Government of India could be complied with approximately for a half of it from out of the contribution made by the USSR to the UN Assistance Fund’ – that is, to the tune of $3.5 million, or 14 million roubles. The document ends with a request to UN-TAP ‘to reserve an amount of approximately 6 million roubles (this would work out to $1.5 million), the exact amount of assistance to be determined by an appropriate agreement to be reached after the lists of equipment are finally settled.’

Six million roubles fell well short of the Indian government’s expectations; but it helped matters along that further talks were held in Moscow, Paris and New Delhi before the final agreement between the Government of India and UNESCO was reached. The eventual outcome: UNESCO agreed to provide 10 million old roubles (about Rs 1.2 crore, or $2.5 million) in the form of equipment and technical experts for IIT-Bombay, mainly from the Soviet Union. The Government of India was to be responsible for all other expenses, including the cost of buildings and recurring expenses, initially about Rs 5 crore (Rs 10.5 million).18

With the signing on the dotted line, the windfall the Indian government had been hoping for had taken place; new life could now be breathed into the IIT-Bombay project. In about a year from the time the Protocol was sealed, Soviet experts had started to arrive at IIT-Bombay; by end-1957, equipment too had started flowing in to populate IIT-Bombay’s yet-to-exist laboratories.

While people like Humayun Kabir and others, such as G.K. Chandiramani, were pivotal to the initiation of the IIT-Bombay project, they were really acting as executors of an idea: the idea of IIT-Bombay for sure, but also, more broadly, the idea of the IITs in general, of which IIT-Bombay was but one realization.
Where and when did the idea for the IITs originate? To ascertain this we need to take another small detour, backtrack yet further in time – back, in fact, across the threshold of Indian independence, to the early and mid-1940s. And take a look at a landmark document drafted in that period – the Sarkar Committee Report as it is widely known – a document that not only gave shape to these institutions but inspirited their functioning to such a degree that it came to be regarded as virtually a ‘charter’ for their operation.
AN INTERIM REPORT OF THE COMMITTEE APPOINTED TO
CONSIDER THE DEVELOPMENT OF HIGHER
TECHNICAL INSTITUTIONS IN INDIA

To

Hon'ble Sir, Dr. Sir Jagendra Singh,
Member of the Viceroy's Executive Council,
Department of Education, Health and Agriculture
New Delhi.

Sir,

In view of the certainty of an appreciable increase in
the demand for higher specialists in Industry, a rapid expansion
in the facilities of higher Technical Education is a pressing
necessity. It is evident that apart from any other considerations the
calls of reconstruction in Europe and elsewhere, and the
enormous industrial and Government undertakings contemplated in
Europe and America to provide full employment, will make it
difficult, if not impossible, to secure from abroad, the services
of the right type of engineers, architects, technologists and
planners, etc. to carry out India's post-war projects. The
initiation of a programme of higher technical education and
research in India should therefore be pushed forward with the
utmost speed and determination.

Although the Committee have not as yet completed their
labours, in view of the extreme urgency of the situation they
submit an interim report for your consideration and express the
hope that the Committee's recommendations will be given effect
to with the least possible delay.
CHAPTER 3

BLUEPRINTING THE IITs
THE SARKAR COMMITTEE REPORT

If there is one name that springs reflexively to the public mind in connection with the establishment of the IITs, it has to be that of Jawaharlal Nehru. The perception that Nehru drew up the idea for these institutions is so often enunciated, and unquestioningly absorbed, that it bears examination. Although Nehru did vigorously champion the cause of the IITs, they were not his brainchild; they were conjured up in fact by an arm of the very monolith he surrendered much of his life to battling: British rule in India. Predating India’s independence, the idea for the IITs crystallized in the aftermath of the 1939-45 war. At this time, a time of extensive revival and reconstruction, the institutes were an outcome of the need felt by the colonial administration to produce, within the country, trained engineers in numbers large enough to meet its targets of post-war industrial expansion.

Engineering education in India was by this time more than a century old. The first industrial school is said to be the one established at Guindy, Madras, in 1842, attached to the Gun Carriage Factory there. The first engineering college was established in present-day Uttarakhand in 1846 for the training of civil engineers at Roorkee (it is now the IIT-Roorkee). By 1947 India had four independent institutions, and about a dozen colleges or departments affiliated to universities, offering undergraduate programmes in engineering and technology. Their total annual intake was around 2,500 and the out-turn (in the face of the rather high ‘failure rate’ of around 45% prevalent then), only around 1,300. In general, facilities for advanced scientific and technical education and research fell well short of those required.
By the mid 1940s, the economic and industrial disarray caused by World War II had heightened the need for professional engineers the world over, and it was felt that the state of technical education in India needed appraisal. Assessment of post-war needs began with a report in 1944 by Sir John Philip Sargent, educational adviser to the Government of India from 1943 to 1948, on the role of technical education. There were interesting antecedents, unrelated to the Great War, to these ruminations. Over the years 1938-43 the Central Advisory Board of Education (the CABE) had commissioned a number of committees to look into the country’s educational rubric. Their reports drew upon the earlier study commissioned by the CABE, to explore ways and means of developing technical education in the country.a

In anticipation of widespread industrial expansion and infrastructure creation after World War II, the Sargent Report envisaged a comprehensive system of technical education in India. Opining that ‘technical education must include commercial education and art in relation to industry’,5 it went on to recommend the creation of three main types of technical institutions for the purpose. Institutions of the nature and type of IITs had not been envisioned at this stage; it is interesting, however, to note that the report did recommend the creation of ‘Senior Technical Institutions’.6 In 1944 the inputs from these committees were synthesized by another under the chairmanship of ‘Sardar’ Sir Jogendra Singh, a member of the Viceroy’s Executive Council, Department of Education, Health and Agriculture. By this time the war was already in its final year, and a comprehensive report titled ‘Post-War Education In India’ was submitted, purporting ‘to place a practicable plan (of education towards) post-war development before the Reconstruction Committee of the Viceroy’s Executive Council’.7 In this suite of reports can be detected the immediate progenitors of the Sarkar Committee and the more definitive proposals of the latter.

At about the same time the British government in India took two important decisions: first, to develop facilities for advanced technological training; second, to establish, in 1945, the All India Council of Technical

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a This report as well as reports of cognate committees referred to an earlier document, ‘Vocational Education in India’, authored by A. Abbott, formerly H. M. Chief Inspector of Technical Schools, Board of Education, England, who visited India in 1936-37
A prominent businessman, industrialist and public leader of his era, Sarkar was closely involved in the political and economic regeneration of Bengal, and active in the Congress movement of the 1920s there. Appointed to the Viceroy’s Executive Council in 1941-42 as Member in-charge of Education, Health and Lands, he was to go on to become Finance Minister of West Bengal in 1948 and for a few months in 1949 Chief Minister of the state. (Biographical detail from an article by R. S. Basu hosted on http://banglapedia.search.com.bd/HT/S_0113.htm.)

The defining moment came in 1946, when Sir Jogendra Singh set up a committee to deliberate the establishment of centres of higher technical education. Commentators have paid tribute also to Sir Ardeshir Dalal, also on the Viceroy’s Executive Council (of which Sir Jogendra Singh was chairman), who ‘with rare foresight…foresaw that the future prosperity of India would depend not so much on capital as on technology’. He was convinced, moreover, that India should learn to train her own technologists instead of relying on other countries for this training – the seed of thought that led to the conceptualization of the IITs; it’s said to be on his initiative that the Sarkar Committee was formed. Sir Ardeshir, however, ‘did not live to see his vision fulfilled. He died young and was on the Viceroy’s Executive Council for barely two years.’

The body constituted by Dalal and Singh came to be known, after its chairman Nalini Ranjan Sarkar, as the Sarkar Committee. In composition the Committee, 22 strong, was more or less evenly balanced between British and Indian members on the one hand (9 and 13 respectively), and between representatives of academia, industry and government departments, including the defence services, on the other – this latter mix implying that it was government agencies and industry that were foreseen to benefit directly from the establishment of the new institutes. The Committee was certainly high-powered: amongst the members from academic bodies were Dr (Sir) S. S. Bhatnagar, then Director of the Council of Scientific and Industrial Research (CSIR); Dr (Sir) J. C. Ghosh, Director of Indian Institute of Science, Bangalore; and Dr K. Venkatraman, Director of the Department of Chemical Technology, University of Bombay.

The Sarkar Committee adumbrated in considerable, often astonishing, detail the institution and the principles of operation of the IITs. So all-embracing was its compass that the IITs can be said to owe to this report

A prominent businessman, industrialist and public leader of his era, Sarkar was closely involved in the political and economic regeneration of Bengal, and active in the Congress movement of the 1920s there. Appointed to the Viceroy’s Executive Council in 1941-42 as Member in-charge of Education, Health and Lands, he was to go on to become Finance Minister of West Bengal in 1948 and for a few months in 1949 Chief Minister of the state. (Biographical detail from an article by R. S. Basu hosted on http://banglapedia.search.com.bd/HT/S_0113.htm.)
not just their existence but also the unique character and spirit they came to possess. This included their governance, their academic programmes, and the conditions for work and for scholarship for their faculty and their students, all of which were delineated to a fine grain. In time to come, its recommendations were also to form the lens under which the IITs’ performance was scrutinized. The Sarkar Committee Report, therefore, has been and remains of such salience to the evolution of the IITs that it warrants an attentive look.

‘A PRESSING NECESSITY’

The core of the Sarkar Committee’s recommendations concerned the establishment of four ‘Higher Technical Institutions’, one apiece in the eastern, western, northern and southern regions of the country. These institutes, the Committee felt, should not only produce undergraduates of a standard at par with top-notch institutions anywhere in the world, but also engage in research and development, producing ‘engineer-scientists’ and ‘technical teachers’ to help bolster the nation’s science and technology enterprise.

A prescient work, the report was astute in its anticipation of the features of operation that would help these institutions blossom, equally of the pitfalls that might vitiate their success. Titled An Interim Report of the Committee Appointed to Consider the Development of Higher Technical Institutions in India, it is addressed to ‘Hon’ble Sirdar Sir Jogendra Singh, Member of the Viceroy’s Executive Council’. Its opening paragraph cuts straight to the heart of the matter.

‘Sir’ (it begins), ‘In view of the certainty of an appreciable increase in the demand for higher specialists in Industry, a rapid expansion in the facilities of higher Technical Education is a pressing necessity.’

Without pause it moves on to the premise on which its recommendations are based:

It is evident that apart from any other considerations, the calls of reconstruction in Europe and elsewhere, and the enormous industrial and Government undertakings contemplated in Europe and America to provide full employment, will make it difficult, if not impossible, to secure from abroad, the services of the right type of engineers, architects, technologists and planners,
etc. to carry out India’s post-war projects. The initiation of a programme of higher technical education and research in India should therefore be pushed forward with the utmost speed and determination.

Wars have all kinds of fallouts, some of which prove to be oddly profitable; amongst those of World War II, for all its horrors, can be counted the genesis of the IITs. Consider the rationale for the posited urgency for the indigenous production of engineers. It is explicitly a measure designed to counter the worldwide surge in demand for engineers anticipated in the aftermath of the War, and the consequent difficulties in ‘importing’ them from overseas, a practice prevalent at the time.

In setting the scene for its ‘labours’, the Sarkar Committee drew attention to the deficits in the prevailing provisions for technical education, and appealed to Sir Jogendra Singh to act on their report post-haste:

Although the Committee have not as yet completed their labours, in view of the extreme urgency of the situation, they submit an interim report for your consideration and express the hope that the Committee’s recommendations will be given effect to with the least possible delay.

Sir Jogendra Singh – or whosoever succeeded him in office (for Singh, like Ardeshir Dalal, did not live to see the fructification of his initiatives, dying later the same year)11 – must have complied; it is interesting to note that the interim recommendations were never finalized. The British administration clearly felt it could afford to lose no time: an interim report, despite the two notes of strong dissent it contained, was reckoned adequate to launch a new institutional system.

The notes of dissent are of some interest since they advocated models of engineering education at variance with the Committee’s. One was sounded by Dr Nazir Ahmad, of the Office of the Indian Tariff Board, Bombay. Ahmad thought it preferable to strengthen India’s many existing engineering colleges rather than to create a handful of new, elite institutions. ‘Very little attempt’, he felt, had been made ‘to explore the facilities which are already available in the country and which can be developed

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c This and all subsequent quotes in this chapter are, unless otherwise stated, from the so-called Sarkar Committee Report, An Interim Report of the Committee Appointed to Consider the Development of Higher Technical Institutions in India, Central Bureau of Education, New Delhi, 1946.
for the purpose of higher technical education. We must take into account the existing resources and must try to build upon them,' he urged, and sounded the caution, 'If this process is not followed, the existing institutions are likely to stagnate and decay while the newer institutions will work in an atmosphere of isolation.' As he himself observed, though, 'the majority of the Members of the Committee have not found it possible to agree with my views.' In the light of all that ensued – particularly the disproportionately generous governmental funding the IITs have enjoyed compared with most other engineering institutions – one may well wonder if Ahmad’s apprehensions were well founded.

One of the Sarkar Committee’s terms of reference was to identify the possible lines along which the IITs could be sculpted. They considered
‘whether it is desirable to have (a) a central institution possibly on the lines of the Massachusetts Institute of Technology, with a number of subordinate institutions affiliated to it, or (b) several higher institutions on a regional basis, or (c) any other organization.’

In view of the size of the country, and the location of her industries, the Committee settled in favour of the second option. Provisionally christening them the ‘Higher Technical Institutions’, they held that not less than four – one each in the north, east, south and west – would be required. Not only did this geographical distribution map on to the nucleation of industrial activity in the 1940s, and to the location of the great majority of existing technical institutions, it was seen also to be the most ‘equitable and effective’ solution ‘in the interest of India as a whole’.

Turning to the sequence of their establishment, it was felt that the first should be set up in the east, ‘in or near Calcutta at an early date’, reflecting the pre-eminence of Calcutta as an industrial centre of the age. For the institution proposed for the Western region the committee chose Bombay as the favoured location, and elaborated: ‘In view of the important industrial developments in Bombay and neighboring areas, they feel that the Western Institution should be taken in hand concurrently with the Eastern or failing that as soon after as possible.’

It was in the light of this projection that IIT-Bombay should ideally have come up ‘concurrently with’ or close on the heels of IIT-Kharagpur; but circumstances, as we have seen, had held it up by a good seven years.

THE ACADEMIC MANDATE

If there’s one singularity which over the IITs’ first five decades or so has characterized the entry of students to their degree programmes it is the uncompromising operation of the criterion of merit, the best known

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This is a decision that I, and several colleagues I know, have often puzzled over. Climatic conditions are not the friendliest in Mumbai, given the unremitting warmth, the extreme humidity, and a monsoon often hostile in its intensity (and at the hands of which the IIT-Bombay campus has taken a severe annual beating). Why couldn’t the second IIT have been set up around, say, Pune or Nasik, where the climate is more equable, and upkeep easier? The problem was not unanticipated by the committee; they accorded primacy, however, to one of the chief mandated functions of the institutes: to supply industry with expertise and technological solutions. ‘The proposed institutions should be located,’ they opined, ‘so as to be within easy reach of large industrial areas, even though climatic conditions may not altogether be favourable’.
symbol of which is the Joint Entrance Examination for undergraduate admissions, by now famous beyond India’s frontiers. The Sarkar Committee took special care to declare the primacy of merit as inviolable: ‘Selection for admission should be made purely on merit’, they stipulated, ‘and no provincial quotas should be allotted’.

Elsewhere in the report they urged that only those applicants be admitted whose ‘evidence of academic fitness and professional promise’ indicated that they were likely to pursue the programme with profit, adding that an ‘Entrance Board’ should conduct a written exam to test the applicants’ academic fitness (this the seed of thought from which the JEE was born). Recognizing, however, the profound social and economic disparities in the Indian populace, they proposed that ‘some proportion of the seats should be reserved for the educationally backward classes so that in due course the general level of education throughout may be raised’.

Once the students had been admitted, the committee were anxious that the standard of education and training they received at the Higher Technical Institutions should be ‘on modern lines’ and no inferior to the best available anywhere; noteworthy ‘not lower than that at a first class institution abroad, for example B.Sc.(Tech.) of Manchester or B.S. of the Massachusetts Institute of Technology.’

The choice presented here between Manchester and MIT assumes significance in light of the pattern the IITs eventually settled upon. It proved to be the MIT model (and not the Manchester) that the IITs attempted, with varying degrees of success, to emulate, a leaning that has powerfully influenced the tone and texture of the academic programmes and curricula at the Institutes.

**STUDENTS AND THE CURRICULUM**

One hallmark stands apart from all others as having been instrumental in earning for the IITs the renown they have come to enjoy: their teaching programmes. (Research at the Institutes, while it has always figured on their agenda, can’t be said to have made anything like the same mark yet.) It is again the recommendations of the Sarkar Committee Report to which one can ascribe not just the flavour but also the operational details of the IITs’ academic offerings.
The Committee were alive to the erosion in the quality of engineering education and outlook that afflicted the rank-and-file institutions of the time. To obviate the danger, the course of study in the new Institutes was meant to afford students an education that ‘avoids on the one hand the narrowness common among students in technical colleges and, on the other, the superficiality and lack of purpose noticeable in many of those taking academic college courses’; it was instead to provide a combination of a ‘fundamental scientific training’ and a ‘broad human outlook’.

These assertions are important. From the first arose the emphatically science-based engineering curricula of the IITs, crucial to inculcating the scientific temper in their graduates, equipping them with lifelong skills of analysis and induction. Or, in the Sarkar Committee’s words, to ‘teach him the fundamental principles and theories of engineering so that an individual student can apply these with confidence many years later.’ But why the assertion of a ‘broad human outlook’? This stemmed from the envisaged rounding-off of the IIT product: for the programme to ‘assist in the development of character, outlook and mental ability in a student so that he may become a useful citizen’. The IITs were to seek, then, to produce graduates alive to the social and economic milieu in which their professions were embedded. In this exhortation can be seen to lie the origins of the departments of Humanities and Social Sciences at the IITs – and of the requirement that undergraduates acquire a certain number of credits in these subjects towards earning their B.Tech. degree.

It was in this context – the broad-based curriculum proposed for the new Institutes – that the second note of dissent was sounded; it came from Brigadier R.D.T. Woolfe, Controller General of Inspection, New Delhi. He feared that the products of such a curriculum would feed mainly into industries which, in India, stood little chance against international competition. ‘No doubt large number of engineers and chemists will be required for post-war industries,’ he wrote, ‘but these are the very industries which come into conflict with overseas competition already developed on much more efficient lines than India can ever hope to achieve...What I am so afraid of is that the weakness of the present system will be continued and the market will be flooded with B.Sc.s whom no one will employ.’ Woolfe went on to provide an illustration of the kind of narrowly specialized rather than broadly contoured engineer he felt India needed, suitable for her
industries: ‘Give me a Fuel Technologist or a Dye Chemist and I know what to do with him but difficulties arise at once when I am asked to employ a B.Sc. with Chemistry or Physics as his special subject.’

A revealing sidelight surfaces when the committee seeks to impress upon the Institutes the need to provide basic workshop training as an integral part of the course. Here the committee remarks, en passant, on the predominant backgrounds of the students they foresee enrolling at the proposed institutions:

Since the bulk of the student body will be drawn from a population with an essentially rural and agricultural background, the question of a student’s workshop and practical training assumes an importance of greater significance here than in the West.

One need only cast one’s mind cursorily to the composition of the student body that the IITs have attracted all through their existence – preponderantly urban, non-agricultural – to see that this was one point on which the committee’s collective instinct served them less than well. The background-wise distribution of undergraduates registered in IIT-Bombay’s silver jubilee year, 1983, tell their own story: those who had had their schooling in cities were a dominant 58.5 per cent; the percentage from small towns stood at 33; while those from rural areas made up a diminutive 8.3 per cent.

Postgraduate research and training were as important in the Committee’s eyes to the IITs’ mandate as their undergraduate programmes. ‘In view of the fact that facilities for post-graduate study and research in Engineering and Technology are totally inadequate in this country,’ they observed, ‘it is also necessary that these institutions should produce research workers and technical teachers.’ Alongside, a quietly stated point of recommendation prescribed the ‘proportion of undergraduate to post-graduate students’ at 2:1.

We arrive here at a second point on which events proved their intuition fallible. The Sarkar Committee feared that places for postgraduate

\[\text{As did Ahmad’s, Woolfe’s observation raises an intriguing question. It merits pondering, in light of the fact that IIT graduates and Indian industry turned out to be mutually incompatible for decades together, if the model proposed by Woolfe might, if adopted, have shaped the course of Indian industrial development along lines altogether different than those that came about.}\]
courses would be in such great in-house demand that the IITs’ own graduates would monopolize them, leaving little opportunity for others to avail of an advanced IIT education. They went so far as to broach the tacit reservation of places for students from outside the IIT universe: ‘It is not contemplated that postgraduate students will be exclusively recruited from those who have graduated from the higher technical institutions. Places should be available for suitably qualified graduates from other institutions both in the region and outside.’

Turning these prognostications on their head, the typical IIT graduate proved a lot keener on leaving the Institutes (and the country) than on staying back, a trait that gave rise, as will be seen, to much soul-searching along the decades – and to the IITs’ postgraduate programmes being populated mainly with the products of lower-rung institutions.

TEACHERS AND TEACHING

The Sarkar Committee next trained their gaze on the subjects of ‘Efficient Instruction, Teaching Staff, Size of Classes’. Their first words were cautionary: ‘No matter how good the course of study and the training programme, the quality of the product of a college will depend on the quality of instructions; and this depends in the first degree on the quality of the teaching staff.’

One of the problems that has bedeviled faculty recruitment at IIT-Bombay, especially in recent years, has been the lure of the remuneration offered by industry and the corporate world, at times rising to several multiples of its academic counterpart. Nor did this peril escape the committee’s notice. ‘In order to attract the best men to teaching posts,’ they urged, ‘the salaries and prospects of technical men who devote themselves to teaching should be commensurate with those open to them if they followed an industrial career.’

Any comment, no matter how droll, on whether this parity has ever been attempted – leave alone achieved – will be superfluous here; other voices will, however, have their impassioned say on the subject in pages to come.

Every bit as critical as the competence of the teacher and the student to the success of an academic institution is the opportunity for quality interaction between the two, in turn governed by the numerical ratio
between them. In no top-ranking institution of higher education is that commonly cited figure, the ‘student : teacher ratio’, larger than 12:1, and is more often in the range 6-10:1. A suitably low ratio, essential to securing the individual attention each student deserves, was urged upon the Higher Technological Institutions by the committee, who proposed the following numbers: ‘The strength of the teaching staff (exclusive of laboratory assistants and demonstrators) to be provided should be fixed in the scale of one teacher per 10 students for basic courses and one teacher per 5 students for instruction in special subjects.’

Fortunately for IIT-Bombay’s students, the Institute has treated the matter of a healthy student-to-faculty ratio as near-sacrosanct, and has been largely successful over the first decades of its existence in limiting it to the magic figure of 10 or less. This is widely acknowledged to have played a large part in the success IIT-Bombay’s academic programmes have enjoyed. Recent developments, however, seem not to bode well for the health of this pivotal metric, and will claim our attention later.

Not only does a low student : teacher ratio potentiate student performance, it also frees up vital faculty time for them to pursue their research interests. The ‘leisure’ thus created for research, and adequate provision for its pursuit by way of financial support, were equally important to the committee’s mind: ‘The teaching load on a teacher should not be so heavy as to leave him no time for study and research,’ they enjoined, adding: ‘... teachers [should] be expected to do only so much teaching work as would leave them sufficient leisure for research work, for which they should be given all reasonable facilities.’

To no avail the best-drafted curriculum if there weren’t the teachers to impart it, the Sarkar Committee had asserted; likewise, the best laid plans on paper can come to nothing if sufficient freedom isn’t assured in the execution of those plans. One of the most profoundly cherished assets of the IITs has been their autonomy of functioning. While the degree of administrative autonomy granted them has been variable, buffeted from time to time by the politically scented gusts that blow outwards from Delhi, academic autonomy has been near-complete. It has enabled IIT-Bombay, for example, to imbue its academic programmes with their own homegrown flavour, and the capacity to adapt quickly both to innovations in pedagogic practice as well as to the ever-mutating world of science and technology.
The cornerstones of the IITs’ autonomy, too, are enshrined – if somewhat laconically – in the Sarkar Committee Report. It envisioned the control and management of each Institute to ‘be entrusted to a small governing body composed of persons with the requisite variety of qualifications and experience. Governing bodies should be appointed by the government in consultation with the council for technical education. Furthermore, ‘in order to enable these institutions to grant degrees and diplomas it may be necessary to establish these by statute as corporate bodies’: an idea that was given shape in the IITs Act in 1961, conferring on the Institutes the status of universities.13

IN PERSPECTIVE

Committee reports commissioned by governmental agencies are notorious for the neglect they suffer, for being condemned to collect the proverbial dust – in India, several congealing layers of it – in rarely visited vaults; not so, however, the Sarkar Committee Report. The IITs were created when they were, and imparted their distinctive stamp, for the simple reason that the Report was acted upon promptly, the spirit of its recommendations respected almost to the letter. Nor did it lose its relevance in later years, being invoked from time to time when, for instance, the IITs’ operations were reviewed. Indeed, the very first document that one of the early faculty recruits at IIT-Bombay remembers being handed to him by the then Planning Officer, Dr Kelkar, with the suggestion that he run himself through it in order to know what was expected of him (and no less of the Institute on the national scene) was the Sarkar Committee Report.14

Whether or not the IITs have lived up to the expectations with which they were conceived is a question that every now and again has stoked vigorous debate. Perhaps the most frequently raised questions have been these: have the IITs succeeded in producing engineers ‘on par with the best in the world’?; have these engineers gone on to serve the needs of industrial India, as they were meant to do?; have the IITs succeeded in conducting research and development at internationally competitive levels?

While this book is not the place to deal with these issues at length, they will nevertheless keep returning to visit us in some form or other in subsequent chapters, for IIT-Bombay’s own accomplishments have often
been titrated against the expectations envisioned in the Sarkar Committee Report. For the present, it should suffice to say that with the submission of the Report to Sir Jogendra Singh in 1946, a turning point had been reached. The IITs had been blueprinted, and it remained for the executive machinery of government (then the British, in time to come the Indian) to bring them into existence. In less than four years after Independence, in May 1951, the first IIT at Kharagpur had been inaugurated; its successor IIT-Bombay, as described earlier, was meant to have followed swiftly but had been held up until the mid-1950s. It had then come into an offer of assistance that promised to revive its fortunes; and we return now to the conversion of that windfall into reality.
ONCE THE SUCCESS of the 1955 Protocol Mission to Moscow became known, it wasn’t long before the Ministry of Education and Cultural Affairs, in whose exclusive charge the IIT-Bombay project had been placed, got into the swing of things.

The first exercise before them at this point, in 1956, was to identify a capable helmsman to steer the Institute’s fortunes in its nascent days, ideally a Director or, until such time as a Director could be found, a Planning Officer. The Ministry opted for the interim arrangement. The person chosen for the post was Dr P.K. Kelkar, one of the Moscow Protocol members, then Head of Electrical Engineering and Vice-Principal at the Victoria Jubilee Technical Institute (VJTI), decidedly Bombay’s premier engineering institute of the time. Kelkar, a man of intensely scholarly persuasion, was to go on to become a towering presence on the IIT landscape: in 1957 he would be appointed Deputy Director at IIT-Bombay and in 1959 Director of IIT-Kanpur, a post he would occupy with distinction for two terms before returning to IIT-Bombay for a term as Director between 1970 and 1974.

According to Brig. Bose, the alacrity with which the Ministry went about its tasks was a pleasant surprise, given the unhurried pace at which such bodies habitually work: ‘We look back in admiration,’ he recalls, ‘how soon they engaged Prof P.K. Kelkar as the Planning Officer of the new IIT.’ This appointment was made in October 1956. To join Kelkar in his work, the Ministry picked Prof N. R. Kamath, then at the Department
of Chemical Technology of the University of Bombay. Kamath, doubtless drawn by the challenges of shaping a mint-fresh Institute, was to sign up formally with IIT-Bombay in March 1959 as Professor and Head of the Department of Chemical Engineering and Chemistry. It was a position he was to occupy for several years until the Department split into its constituents in 1963, from which point he continued as Head of Chemical Engineering until his retirement. At this stage, over 1957-58, he lent his expertise to the Institute ‘from the outside’.

One brief before the first of IIT-Bombay’s custodians was to draft its academic programmes, a task to which, given their combined experience of running two of Bombay University’s flagship institutions, they were easily equal. There was a second, less straightforward brief: to spot and engage faculty for the Institute. For the time being, however, there was the comfort of having an operational cushion in the form of a number of Soviet experts (generally called UNESCO experts, in course of time to be drawn from a number of countries though largely from the USSR), who had started to arrive. Leaving behind the snows and inland chill of Odessa, Moscow and other Soviet cities, forgoing also their Christmas festivities (or perhaps having raised their toasts ahead of time), the first batch of experts flew into the sharply contrasting warm, coastal air of Bombay on Christmas eve, 1956. This first delegation numbered four; it was headed by Professor V.S. Martinovsky, Director of the Technological Institute of the Food and Refrigeration Industry at Odessa. With Martinovsky came experts in machine-tool building, fuel technology and the technology of iron and steel. They were to stay for nearly two years, until September 1958, long enough to usher IIT-Bombay into its first academic session. Within months they were joined by other UNESCO experts covering a wide range of subjects: a second contingent, five strong, arrived in early March 1957, while a third, also numbering five, arrived in April.

The team set themselves initially to studying the practical problems connected with the establishment of the new Institute. They went about familiarizing themselves with Indian conditions by splitting into three groups that fanned out to the five-year old IIT at Kharagpur, to the Indian Institute of Science at Bangalore and to the Department of Chemical Technology of the University of Bombay. Eight months were spent thus. The groups then met in Bombay where they pooled the knowledge
they had gained from diverse sources, including a delegation from the University of Illinois they met at Kharagpur.⁵

All through this, while setting IIT-Bombay’s wheels in motion, the Indo-Soviet team operated from IIT-Bombay’s first foster home: the Electrical Engineering department of the VJTI in Matunga, which Kelkar headed. ‘It was just one room,’ recalls Dr M.V. Hariharan, one of IIT-Bombay’s earliest recruits, signed on for its Electrical Engineering department in June 1958, ‘much smaller than this one.’ (He’s comparing the VJTI room in his memory to the recording studio where he’s being interviewed, measuring some 20 feet square.) ‘There we were, the Head of the UNESCO mission Prof. Martinovsky plus four faculty members, all of us in that one room.’

While at VJTI, IIT-Bombay was operating under the provisions of a Society registered as a Public Trust under the Bombay Public Trust Act, 1950. It began with just a handful of staff, fourteen in all, managed by an autonomous Board of Governors.⁶ At the planning stage, staff members appointed by the Society included two gazetted officers – Dr Kelkar, the Planning Officer (on a basic pay of Rs 1500) and Mr A. K. Panemanglor, the Stores Officer – supported by 12 non-gazetted ancillary staff. A few months later a committee comprising G.K. Chandiramani (Education Secretary at the Ministry of Education), A.V. Venkateswaran (Financial Adviser to IIT-Bombay from the Ministry of Finance) and Kelkar, who by then had been appointed the Institute’s Deputy Director, prepared the Conduct Rules for the Institute’s employees.⁷

It was during this interval, of fact-finding and planning, that the first meeting of the Board of Governors of IIT-Bombay was convened. Chaired by Mr Kasturbhai Lalbhai, it took place on Wednesday, 16 April 1958 in the hub of Bombay’s business district near Nariman Point, at Resham Bhavan. The first batch of posts created included just three academic and administrative functionaries: the Director, Deputy Director, and Registrar. A total of 79 faculty were planned to be inducted, of whom just 4 were to be professors and another 29, assistant professors. The majority of posts were slated for the position of lecturer, 46 being set aside for this level.⁸

The first departments to be organized at the Institute numbered four; these were the Departments of ‘Chemical and Metallurgical Engineering’; of ‘Electrical and Electronic Engineering’; of ‘Machine Building and
Mechanical Engineering’; and of ‘Structural and Civil Engineering’. In less than a year’s time, several changes to this organization had been effected: the first-named was split into separate departments of Chemical Engineering and Metallurgical Engineering; the names of the three others were cropped to Electrical, Mechanical and Civil Engineering, respectively; and three further departments were added: those of Physics, Mathematics, and the Humanities.

**GATHERING PEOPLE**

If there’s one thing that can make – or ‘unmake’ – an educational institution, it is the quality, or otherwise, of its academic staff. The team of experts went about selecting new faculty with care; but here too, circumstances partial to IIT-Bombay can be seen to have played their own part. The Institute, though it was yet ‘to exist’, enjoyed a position of advantage in the matter of attracting recruits of a certain minimum calibre on at least three counts. It was being set up with the help of Soviet technology and expertise, and the USSR was indisputably both a military superpower of the 1950s and a technological colossus of its own kind; there was UNESCO’s intimate involvement in the whole process, and public regard for United Nations organizations in the wake of the second world war was high; finally, the first of the IITs, IIT-Kharagpur, had already earned itself a formidable reputation, placing confidence in, and a certain demand for, what in today’s corporate-speak may be called the ‘IIT brand’.

Indeed a short roll-call of the faculty who joined in the early months reads, fifty years on, like a who’s who of IIT-Bombay’s leading lights in years to come. Dr A.K. De joined the Institute’s Mechanical Engineering department on October 1, 1958, from a position in industry in Calcutta; he was to become IIT-Bombay’s Director over two five-year terms between 1974 and 1984, save for an interregnum in 1980-1981. Dr R.E. Bedford joined the Electrical Engineering department after he’d cut his teeth for a few years at IIT-Kharagpur; he, too, was to become Director at IIT-Bombay for a brief spell, over 1980-81, during De’s absence. He was preceded in his department by Dr M.V. Hariharan, a top-ranker from Madras University then working at the Atomic Energy Establishment in Trombay (in 1967 to be rechristened the Bhabha Atomic Research Centre, or BARC), later to
become Dean of Research and Development at the Institute, and by Dr K. C. Mukherjee, a product of Imperial College, London. Dr G. S. Tendolkar joined the Institute’s Department of Metallurgical Engineering initially on deputation from the BARC. He was to play a key role in a series of academic reforms effected in the early 1970s; his memory is honoured annually in the form of a G. S. Tendolkar Memorial lecture. Prof R.P. Mhatre, already quite senior at Bombay University, was taken into Civil Engineering; he too was to serve as the Institute’s Deputy Director and Acting Director towards the late 1960s and early 70s. Meanwhile Dr R. K. Katti, fresh from his Ph.D., joined Civil Engineering and Dr R. P Singh, from Allahabad University, joined Physics, both in June 1958. While Singh was to enjoy the distinction of being appointed the first Dean of R&D at IIT-Bombay, Katti was to earn his feathers for his extensive research and consultancy work on soils, and would succeed Singh in the Dean’s chair. And the Institute’s first Dean of Planning of the future – Dr S. Narasimhan, of Civil Engineering – was also drawn over from BARC (IIT-Bombay appears to have siphoned off a good bit of this organization’s talent early on).

No small part in the recruitment of these pioneers was played by Dr Kelkar, in quick succession the Institute’s Planning Officer and its Deputy Director. He would seem to have been on a mission to attract the best possible talent to IIT-Bombay by using the device, amongst others, of painting an irresistibly beguiling picture of prospective work conditions at the Institute. Though the Institute’s move to its Powai campus wasn’t to happen until another year had elapsed, advertisements drafted by Kelkar in early 1958 emphasized both the enchanting setting and the promise of autonomy which awaited prospective recruits. Nearly 50 years on, Hariharan remembers vividly the wording of the advertisement to which he responded: ‘You are invited to come to the sylvan surroundings of Powai,’ he recites the text unhesitatingly from memory, ‘to do research and teaching with full academic autonomy.’ The words, he recalls with fondness, went to his heart, and he ‘immediately applied for the job’ – despite being employed at BARC already.

The prospect of operating with ‘full academic autonomy’, a luxury unthinkable then in the largest sector of Indian higher education, the University system (and conditions in that sector are little different today), was certain to entice independent-minded souls to the Institute. One of
those so drawn was Dr R.K. Katti. On June 3, 1958, while in the last stages of his stint at Iowa State University in the US, he had just returned from a field trip, carrying in with him the precious subject of his research – his soil samples – when the phone in his laboratory rang. To his surprise, he found G.K. Chandiramani at the other end (we recall that Chandiramani was Joint Secretary at the Ministry of Education and Cultural Affairs, and a participant in the UNESCO-India protocol to Moscow), introducing himself and – to Katti’s greater surprise still – asking Katti if he’d be interested in taking up an appointment at IIT-Bombay on his return to India. Chandiramani informed Katti of the about-to-start IIT-Bombay (Katti, away in the US, had no particular knowledge of it), of how it was planned to be developed along the lines of the best in the business, ‘MIT, or Caltech, or Imperial College, London’, and of how it had committed itself to evolving a science-based engineering curriculum. Furthermore, added Chandiramani, Katti should expect nobody to ‘guide’ him back in Bombay, he’d have to initiate his own area of work. Those were by and large the only terms of reference given him: and their latitude was reinforced when Katti arrived in Bombay. In his first meeting with Dr Kelkar, the latter gave him the fullest possible rein to develop ‘whatever area he felt he had expertise in’, on the sole condition that he keep uppermost in mind IIT-Bombay’s desire to develop a curriculum that was vigorously science-based.

This mix of freedom, flexibility, and approach to education could not have failed to tantalize: ‘It impressed me,’ says Katti, ‘it clicked with my temperament’. When he inquired about the premise on which the Institute had been conceived, Kelkar referred him to the Sarkar Committee Report, adding that although the recommendations of the report were to serve as a roadmap, no rigid plan had been drawn up for their implementation. ‘You plan,’ Katti recalls Kelkar advising him, ‘whatever you think is best for the country and for the Institute.’ ‘For a young man,’ reflects Katti, ‘it was a very challenging induction; and I took up the challenge, I started planning [my research and teaching].’

The quality of recruits in this enabling environment was certain to work positively on itself; and it did. Once some of the country’s finer talent had been attracted to faculty positions in its early days, they served to attract younger, equally able colleagues to occupy junior positions, such as the lecturer’s. Between May and July 1958 upwards of 30 lecturers and
assistant professors were taken on; in another spate of recruitment, be-
tween March and June 1959, 30 more academic and non-academic staff
were appointed. Consolidating this atmosphere of competency was the
presence of the well regarded UNESCO-sponsored teaching staff. It would
appear then that IIT-Bombay’s founders had succeeded commendably in
establishing an academic environment and a reputation for their Institute.
In no small measure, this would have supplied the early stimulus, so vital
to the growth of an institute in its infancy. Regrettably, because of a variety
of reasons only just beginning to unfold (reasons that will be explored in
subsequent chapters), IIT-Bombay was to lose some of the considerable
advantages with which it had begun, faltering observably on some fronts
over its next three decades (though at the same time building up other
strengths for itself), before staging a strong resurgence in its fourth.

But all that was yet to come; and for the time being, here was an Institute
that was in capable and enthusiastic hands, held out much promise, and seemed poised to deliver on it.

A ROOF, AN ADDRESS

By about the second quarter of 1958, a good number of staff had been se-
lected; they had either joined the Institute or were on their way to doing
so; and more than a dozen UNESCO experts had been here a year and
more. The question naturally arose as to when the Institute should open
its doors to those for whom this flurry of academic preparation was tak-
ing place: its prospective students. Both Humayun Kabir, who by now had
assumed office as Minister for Education and Cultural Affairs, as well as
the Secretary to his Ministry, Dr M.S. Thacker, were keen that the onset
of IIT-Bombay’s formal activities coincide with the start of the academ-
ic year in July 1958. It was important therefore to initiate the admissions
process at the soonest: with just a few months to go, the fear was that if
admissions were delayed, the Institute would lose the brightest students
to other engineering colleges.

Conditions for starting academic programmes at the Institute, how-
ever, were precarious. Curricula had been drafted; faculty hired; students
were to be admitted in a few months’ time; but where, in the starkest phys-
ical sense of the word, was one to teach? IIT-Bombay’s Powai campus,
though earmarked for some time now, had only just begun to be fitted out; it would be at least another couple of years before it was ready to receive its prospective occupants. The VJTI, from which IIT-Bombay was operating provisionally, was itself a fully functional establishment, and could hardly be expected to spare a full complement of classrooms and laboratories for a second technical institute on top.

Here at this make-or-break point it was the good offices, as they may be spoken of quite literally here, of M.S. Thacker and Shri Kasturbhai Lalbhai, that came to IIT-Bombay’s rescue. Thacker’s stature was such that as well as being Secretary to the Ministry of Education and Cultural affairs, he held the arguably weightier portfolio of Director-General, CSIR (and he had previously been Director of the Indian Institute of Science, Bangalore, between 1949 and 1955). The very fact that he was entrusted the reins of these positions simultaneously bespeaks the esteem in which he was held. In Brig. Bose’s words Thacker, a graduate of Cambridge University, brought to the Ministry ‘a liberal and broad outlook in the management of technical education’, traits which apparently ‘remained with the Central Government’ for some time to come,13 doubtless benefitting the nation’s science and technology campaign.

Thacker and Lalbhai, on account respectively of heading the CSIR and being a leading stalwart of the textiles industry, were privy to a handy piece of information: that the Silk and Art Silk Mills Research Association (SASMIRA), a textiles R&D organization formally recognized by the CSIR, was constructing a smart new 3-storied building for itself – about one half of it had already been completed – in the suburb of Worli. The Association, however, had as yet been unable to recruit the staff they needed; nor had the equipment for their work been procured.

These circumstances, set beside those of IIT-Bombay’s, made for a happy complementarity of deficits and assets. Where SASMIRA possessed built-up space but was short on staff and equipment, IIT-Bombay had recruited a substantial crew, had equipment in the form of the Soviet consignments sailing in, but had no buildings in which to deploy either its men or its goods. Indeed, the Soviet equipment was fast becoming cause for concern. It had started accumulating in the open at Bombay’s dockyards, and if it was to be saved from the battering of the impending Bombay monsoon, needed clearing at the earliest.
Sasmira’s main block was modeled after a bird with outstretched wings, sporting a central protruding body radiating two long arms (see chapter frontispiece). Thacker and Lalbhai succeeded in persuading Sasmira’s first Director, Mr D.N. Shroff, that IIT-Bombay be taken on as a tenant in the right-hand wing of its building (the so-called ‘Technology Wing’) – this was three floors’ worth of space – while Sasmira retained the left. A portion of Sasmira’s out-houses, too, were let out to IIT-Bombay; these to house the Soviet equipment. The arrangement was understood to be firmly time-bound. It was to end in two years’ time, by when it was presumed the buildings at Powai would be up and running. In the interim, the Institute could look forward to launching its academic pursuits in July 1958 in a modern, spacious building in the heart of Bombay. It now had a roof over its head, and an address rightfully its own. Its letterheads proclaimed the transition: from having been ‘C/O VJTI, Matunga’ thus far, it could now declare its station as ‘18 Annie Besant Road, Worli, Bombay-18.’

As if in celebration of the fact, the second meeting of IIT-Bombay’s Board of Governors was held at the Institute’s new premises in Worli – and on the very day on which its first batch of students was admitted, on 25 July 1958. In this meeting the post of Planning Officer was formally abolished: Kelkar had already begun functioning as the Institute’s first Deputy Director and was present at this meeting in that capacity.

The meeting pondered the construction programme recently begun at the Powai campus, the first phase of which had been sanctioned a sum of Rs 32.20 lakh. The programme included the following. In the south-central chunk of the campus were to rise six high-ceilinged, capacious workshop sheds, each sprawled out over nearly 10,000 sq ft, and two less capacious, yet imposing in themselves, ‘teaching-cum-storage’ sheds, each about 6,000 sq. ft. in spread. To the north and the west of these were planned a hostel for 200 students (the future ‘Hostel One’) and further west, fringing Powai lake, a hostel for 40 officers (the future ‘Staff Hostel’); south of the workshops were to come up an assortment of ‘Staff Quarters.’ The teaching-cum-storage (TCS) sheds were later to stand in as the very first classrooms at the Powai campus, and the workshops to house the departments while they awaited their permanent buildings.

While this first clutch of structures was being put up, though, life would have to go on at Sasmira; IIT-Bombay would have to strike transient
roots in the locality. As vividly chronicled in the black-and-white cinema of the time, those were gracious times for the city. Bombay was still largely uncongested, and the Institute was able to rent out a good number of flats in and around Worli and Napean Sea Road (and some, farther away, in Santa Cruz) to house its teaching staff within reasonable commuting distance of the Institute – useful in particular for the UNESCO experts, who couldn’t be expected to fend for themselves in unaccustomed surroundings. Kelkar was able also to locate, in Worli, two empty buildings to serve as hostels for IIT-Bombay’s first students. With these makeshift arrangements in place, the Institute could apply its mind to questions of a more academic nature: such as the numbers of students to be admitted that July, and the procedures for their selection.

THROWING OPEN THE DOORS

Though very generously extended, SASMIRA’s Technology Wing made for rather limited space; and since the IITs had been mandated to be fully residential institutions, IIT-Bombay was compelled to exercise modesty in the number of students it would admit for its inaugural batch. The optimal number, under these constraints, was settled at exactly a hundred.

The entrance procedure for the Institute’s first batch was simplicity itself – and surely the envy of those who, in subsequent years, have had to contend with the ever more gruelling Joint Entrance Examination (JEE) for admission to the IITs. IIT-Kharagpur had already instituted an entrance exam on an all-India level (a forerunner, as we shall see, of the JEE). For IIT-Bombay to consider a similar test for itself was out of the question, given the dearth of time in which to carry out its selections. The only workable alternative was to issue advertisements in the press. These called for applications for admission to the Institute’s four-year B. Tech. programme, the qualifying criterion being the Intermediate Science (I.Sc.) examination of the time, taken after twelve years of education (most often, eleven years of school and one of college). The response to the advertisements was encouraging: many times more than the admissions target of 100 students – around 3,400 – applied.

A quota for each state was evolved based on the numbers of students appearing in the I.Sc. exams in the state that year. Students were
summoned for interviews on the strength of their I.Sc. marks; the best performers were asked to state the department of their choice; admissions were made to the first year of undergraduate programmes in five disciplines: Chemical, Civil, Electrical, Mechanical and Metallurgical Engineering. The hundred students welcomed to the Institute were drawn from as many as 37 universities; they could look forward to benefiting from the knowledge and experience of more than 30 Indian faculty already on the Institute’s rolls (the team of UNESCO experts, numbering about a dozen, were to confine themselves to post-graduate courses, which were to start later in the year).

IIT-Bombay’s first lectures were delivered on 25 July 1958. With these, the Institute was finally on its feet; its academic life had been flagged off. In the fitness of things, it was formally inaugurated at its SASMIRA premises the very same day by the person without whose timely intervention the Institute might still have been little more than a vision frozen in ink and paper: Dr Humayun Kabir.

Dr S. Narasimhan, of Civil Engineering, remembers the first lectures in Physics being given by Dr R.P. Singh, those in Mathematics by Dr M.N. Vartak and Dr M.N.L. Narasimhan; and in Chemistry (which was then subsumed under Chemical Engineering), by Dr N.R. Kamath and Dr Hira Lal. The first-year labs and workshops, too, were organized in the provisional spaces of SASMIRA. The engineering departments would start teaching their undergraduates after the Institute’s move to Powai, once students had gone through their science and humanities courses. Who gave the very first ‘proper’ humanities lectures is unclear, but it would seem the first batch might not have taken any, as the first faculty recruits into this department do not make their appearance until around 1960. As part of humanities a certain language was, however, being taught: Russian, this being handled by some of the Soviet experts. Russian was apparently quite popular for several years, especially with the Institute’s teaching staff themselves, since it eased their passage to the USSR where many early faculty could look forward to stints of training under the bilateral agreement. ‘It was a big incentive for them,’ recalls S. Narasimhan, ‘and in those days, of course, Russia was a prestigious and much desired destination.’

For IIT-Bombay’s first ever students, the educational environment wasn’t quite what they’d expected. ‘We were supposed to join an engi-
neering college,’ said alumnus B. Dias, from the first batch, ‘but here we had just a few classrooms in a rented building.’ Narasimhan agrees: ‘With SASMIRA still under construction, we didn’t have proper lecture rooms. All the operations, including teaching and meetings, were conducted in general purpose rooms. And faculty sat four to five in an office.’

Likewise with the ‘hostels’: outstation students lived at the rented flats in Worli, five to a room. ‘But it was absolute fun,’ remembers J.K. Tandon, also of the first batch, ‘and great bonhomie was created.’

The seven months between July 1958 and the day we’ve already visited, Foundation Day on 10 March 1959, witnessed several important developments, one of which culminated in the appointment of the Institute’s first Director.

Although Kelkar had steered the Institute in its earliest stages with unflagging industry and resourcefulness, he was not to enjoy this distinction: the Ministries in Delhi had another in mind for him. Seeking to profit elsewhere from the breadth of experience he had gained in setting IIT-Bombay up, they detailed him to head IIT-Kanpur, then in its neonatal stages as IIT-Bombay had been over the previous year or so. Kelkar was to leave for Kanpur in the second half of the following year, 1959; accordingly, someone else of matching experience and stature had to be found to lead IIT-Bombay.

Not far from Bombay, an exquisitely picturesque five-hour journey eastwards across the ridges and ravines of the Western Ghats, while Kelkar was giving shape to IIT-Bombay, Brig. S.K. Bose led a settled and productive existence in the township of Khadki, near Poona, posted there as Commandant of the College of Military Engineering. Now and then, his academic pursuits (he was a civil engineer by profession) took him to conferences around the country; at one of these – the meetings on irrigation research held annually in Simla – he used to run into the illustrious M.S. Thacker. Thacker, we have seen, had by now been closely involved with IIT-Bombay, helping to anchor it in SASMIRA; he knew also that the Institute was on the lookout for a director. Bose must have caught his eye as a potential ‘catch’; Thacker had sounded Bose on the possibility and had arranged for him to be interviewed by the then Minister for Education, Humayun Kabir’s predecessor Maulana Abul Kalam Azad, at the 1957 Indian Science Congress. While Azad found Bose suitable, the
latter confided in Thacker that he was unsure ‘if he would succeed in this new responsible assignment’. Eventually Bose was persuaded; but although he had been selected by around mid-1958, his appointment hung fire while it awaited the completion of negotiations between the Ministry of Education, which needed to secure his release from the College of Military Engineering, and the Ministry of Defence, which needed to agree and act upon it.

The paperwork would not be completed, nor Bose formally appointed, until January 1959. The Ministry, however, decided for the time being to accord him the privileges of a ‘Director-Designate’ – an improvisation which was to work to IIT-Bombay’s advantage in a second development being set into motion: that of equipping its laboratories.

UNESCO’s assistance to IIT-Bombay, running to 10 million roubles ($2.5 million), was on the face of it a handsome endowment, but in one significant respect smaller than it appeared. As previously indicated, it was not all meant for equipment: it was given also to defray the expenses of the UNESCO experts, and the costs of deputing the Institute’s younger faculty to train in the USSR. Once these ‘manpower’ costs – which were substantial – had been deducted, the sum left with the Institute for technical equipment was nowhere near enough for the many laboratories planned to be established: nearly a hundred. Some idea of the shortfall may be had from the figures in question. In 1956, out of a total of $40,166 released by UNESCO, experts’ expenses took away $39,630, leaving a laughable $536 for equipment; the next year, in 1957, the numbers read: total, $153,400; experts, $126,240; equipment, $27,000 – again a negligible sum when set against the millions of dollars worth of equipment foreseen to be deployed eventually.

Only in subsequent years did the equipment component of the annual subventions from UNESCO grow to become the dominant part of the total (and the annual installments themselves were rapidly to grow); but for the time being, with IIT-Bombay’s academic life having started in July 1958, a concerted effort was needed to seek further assistance exclusively towards equipment. UNESCO couldn’t reasonably be touched for a second grant while the first, five years in duration, was less than halfway through. Since the USSR had willingly underwritten the IIT-Bombay project through the UNESCO programme, a logical recourse was to approach the Soviet
government directly for bilateral aid, without bringing UNESCO into the picture. By this time the Indian government, too, had come to realize that establishing the IITs with its own strained resources would protract the project unacceptably. It had decided to seek international co-operation to help set up each of the Institutes; in the end, the USA came forward to aid the IIT-Kanpur project; Germany took IIT-Madras under its wing; Britain, IIT-Delhi; and as for IIT-Bombay, its antecedents kept it hitched to the USSR.

The proposal to seek bilateral aid was approved by Nehru; presently, in mid November 1958, a compact two-member protocol, consisting of G.K. Chandiramani and IIT-Bombay’s newly selected Director-Designate, Brig. Bose, left for Moscow. The outcome was a happy one. In the heart of the Russian winter, on 12 December 1958, a bilateral agreement was signed between the governments of India and the USSR. Crowned by a rather long-winded title, it declared:


Tagged on, helpfully, was the clarification that these monies were ‘in addition to the equipment being supplied for this Institute from out of the Soviet contribution to the UNO Fund under the Expanded Programme of Technical Assistance of UNESCO.’ The 3 million roubles (about Rs 36 lakh or $750,000) were understood thus to be quite distinct from the 10 million simultaneously being channeled through UNESCO. The laboratories listed in the agreement afford a glimpse of the fields on which IIT-Bombay’s attentions were focused at the time: while Physics and Electrical Engineering

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\[\text{a} \quad \text{The title reads: ‘Agreement Between The Government Of India And The Government Of The Union Of Soviet Socialist Republics On Delivery As A Gift To India From The Soviet Union Of Equipment For The Indian Institute Of Technology, Bombay, And On Rendering Of Assistance By The Soviet Union To India In The Training Of Engineers (12 December 1958)’. DRR, IIT-Bombay.}\]
are expectedly broad areas, noteworthy here for their relative narrowness are ‘Radio engineering and Television’, ‘Electronic devices’, and ‘Geodesy’ (while the cryptic ‘Central Scientific and Technological techniques’ resists any simple interpretation). The agreement also included ‘publication in India of Soviet text-books in certain fields of knowledge for higher educational institutions of India.’

While all this bonhomie was being played out, though, one particular observer on the sidelines watched the developments with growing suspicion and unease. The US, never other than skeptical of the USSR’s actions and motives, was incensed that what had started off as a ‘multilateral’ programme, as all United Nations mediated aid was agreed to be, had been ‘swamped by bi-lateral aid’, subverted into a bi-lateral programme: which to its eyes was tantamount to a breach of faith. It took every opportunity to make its displeasure vocally known; fortunately the ripples caused were small, and limited to the floors of United Nations fora. Meanwhile, although the IIT-Bombay project had become the focal point of this unsolicited attention, both Indo-Soviet bilateral programmes and UNESCO-mediated aid continued concurrently and in harmony to nurture the Institute in its formative years.

A third leading development to take place before the Institute’s first Foundation Day was the commencement of its postgraduate programmes. These started in December 1958, just six months in the wake of the undergraduate programmes. Their breadth, in comparison, was limited. Only two postgraduate courses were initiated, both by the Electrical Engineering department: one in Electronic Devices and Electronic Engineering, another in Vacuum Technology and the Production of Electronic Devices. The advertisement for these was placed in the press in the last week of August 1958; 137 applications were received; a total of 13 candidates were selected, 5 into the Vacuum Technology programme, 8 into Electronic Devices and Electronic Engineering. In this way, as noted in one commentary, ‘one of the main objectives of establishing the Institute, which was to develop facilities for studies in a variety of specialised engineering and technological sciences, was given concrete shape in the very first year of its existence. All through the subsequent period of development, the need for establishing adequate facilities for postgraduate studies and research was kept uppermost in mind.’
The Institute’s first few months, after taking in its debut students, were also a phase of intensive academic planning and organization. The apex academic body of the Institute (initially conceived as the Academic Council, later to be termed the Senate), was yet to be formed – this would happen in 1961, following from the provisions of the IITs Act. As a provisional measure, a Staff Council was constituted, and charged with steering the Institute’s academic course. Consisting of the Institute’s Deputy Director, its professors and assistant professors, and half the lecturers, it met once in the first year. Members included many of those we have encountered already, such as Drs. K.C. Mukherjee, R.E. Bedford, A.K. De, Hira Lal, R.K. Katti, R.P. Singh, and G.S. Tendolkar. The first Syllabus Committee was set up with Dr N.R. Kamath as its Convener. Also constituted in the very first year were a Scholarships Committee, a ‘Freeships’ Committee, an Examinations Committee and a Library Committee.

By the time Foundation Day in March 1959 dawned, then, this is roughly how the Institute’s report card would have read. It had been receiving UNESCO-mediated assistance for a couple of years; its Indian staff and UNESCO experts had been exerting themselves to give it shape and substance; sheltered in SASMIRA, its academic programmes, both undergraduate and postgraduate, had sprung off the blocks; its first Director, Brig. Bose, had taken charge; and there was the definite prospect of bolstering its holdings of equipment through another block of Soviet aid. Much had fallen into place, much was happening; yet, as we have seen, March 10, 1959 found Brig. Bose a worried man. It was a state of mind which was to dog him over the ensuing months; and we return now to the root of his troubles, and the ill they boded for the Institute’s immediate prospects.
CHAPTER 5

WITH FRIENDS LIKE THESE...

Of the Institute’s first Foundation Day itself (in today’s computer-flavoured parlance, the ‘zero-eth’), surprisingly little is available by way of formal record. More surprisingly, equally little seems recorded in people’s memory. Part of the reason for the apparent amnesia has to do with the fact that while the ceremony was held in Powai, the Institute was functioning entirely at Worli. The Powai campus was only sketchily laid out; indeed, as Brig. Bose recounts, approach roads to the site inside the campus had to be hewn through the rocky grounds in preparation for Nehru’s visit. Water and electric supply lines were just being laid. Where the Institute’s Main Building now stands was the site earmarked for the occasion; this was leveled, and it was here that Nehru dedicated the Institute to the nation. But most of the Institute’s staff were unable to attend: they were preoccupied all day long with the myriad arrangements needed to be seen to. Some, like De, were busy ‘ferrying people to and fro’; others had been placed in charge of equally unexotic matters. Katti, being a civil engineer, took responsibility for roads and transport while Hariharan, an electrical engineer, looked after power supply and lighting: he recalls having had to do ‘a lot of running around’ on the day.¹

At the conclusion of the ceremony Nehru, Kasturbhai Lalbhai, and the two representatives from the ‘Soviet Goodwill Delegation’² who had accompanied Nehru for the occasion, boarded an open jeep. Nehru and Lalbhai took the front, the Soviets the rear seats with an interpreter. Brig. Bose preferred to take the wheel himself, and drove Nehru ‘across the campus on rough roads’ to show him around. But for Nehru, apart from the campus’s outspread, uneven terrain and its arresting surrounds,
there couldn’t have been much to see. He was shown ‘the locations’ of the buildings under construction: one students’ hostel, the floors of three workshop blocks (for the floors were all that had been built) and two ‘teaching-cum-storage sheds’ under construction.

This was in March. June 1959 found Brig. Bose, if anything, even more concerned than he’d been three months earlier – and with good reason. The Institute’s academic work, we have seen, had started about a year ago, with its first batch of a hundred students. In a month’s time the second was to march in. Ideally the strength of this intake should have outstripped the first’s, but conditions weren’t right: there wasn’t room enough at SASMIRA to permit another equal-sized batch. A two-pronged compromise was arrived at. One was to cap the number of students admitted in July 1959 to a hundred again; the other, to have their instruction start not at Worli but in the Powai campus. Arrangements were made for them to shuttle between Worli and Powai for their classes while the first batch continued in SASMIRA for the second year of its programme.

July 1959 onwards, then, one half of the Institute was functioning at Worli, catering to the students admitted in 1958, while the other half, tending to the fresh undergraduate intake, worked at Powai. All postgraduate students continued at Worli. On campus in Powai, only a few cavernous halls existed: the workshops and the teaching-cum-storage sheds (these had thankfully been completed since Nehru’s visit). The teaching-cum-storage sheds were deployed to host the classes while the workshop bays housed the departments. ‘Electrical Engineering started in N5 bay,’ Hariharan recalls, ‘and Chemistry in S2’ (the letters in these alphanumeric names refer to the workshops’ locations – N for north, S for south). These ad-hoc arrangements were to continue for a good two or three years, until the last of the departmental buildings came up in 1962. Most staff were scattered all over the city, travelling in assorted directions to and from their places of work.

While these exigent measures helped tide over the immediate crisis, the larger question remained: for how long could the Institute afford to continue this atomized existence, prejudicing the quality of its work? No less importantly, IIT-Bombay had been housed at SASMIRA on the firm understanding that it would vacate the wing extended to it by July 1960. Unless exceptional measures were taken, and taken fast, IIT-Bombay
would be left well and truly marooned; Brig. Bose had something of a cri-
sis on his hands.

THE GREAT PAPER CHASE

One of the main causes for the tardiness plaguing the building proj-
ect at Powai was that the works had been entrusted to the monolithic
Central Public Works Department (CPWD), chief executor of all Central
Government projects of the time; and the CPWD, hobbled by its own pro-
cedural idiosyncracies, was taking its time over the whole affair. Indeed
if the CPWD’s track record in putting up the buildings for IIT-Kharagpur
was anything to go by, Brig. Bose’s fears were only too well founded: ac-
cording to Bose, the Department had taken a leisurely seven years to raise
that campus; here in Bombay, there was hardly the luxury of that kind
of time.

The CPWD’s slackness in turn had much to do with the time-honoured,
excessively centralized mode of functioning government departments
subscribe to. Highly circuitous routes had to be taken to come to the sim-
plest of decisions, or carry out the merest alterations to plans. From the
documents of the period the tortured path taken by official commu-
nication between customer and service provider appears to have been the
following. IIT-Bombay would draw up a proposal for, say, a building such
as a student hostel or a faculty apartment; these would be mailed to CPWD
Headquarters in Delhi. CPWD-Delhi would then compose architectural
designs and communicate these to CPWD-Bombay, also giving it the go-
ahead for construction. CPWD-Bombay would set course on executing
the project at Powai; some way through this, IIT-Bombay would almost
inevitably find some detail or other of the construction to be at variance
with the way it had been conceived. The Institute would then write to
CPWD-Delhi setting down its observations (direct communication with
CPWD-Bombay, which would have been the efficient and sensible thing,
seemed disallowed). CPWD-Delhi, taking note of these, would work on
amending the plans, entering at the same time into an extended dialogue
with IIT-Bombay to evolve and freeze the modifications; finally they
would write to CPWD-Bombay detailing the alterations and advising the
latter to implement them.
Witness, as an example of this daisy-chain of paperwork, one arc of it beginning with Kelkar’s letter directed to CPWD-Delhi, written in his capacity as Deputy Director (Kelkar seems to have borne the brunt of the infructuous dealings with the CPWD: this letter is dated December 3 1958, a couple of months before Brig. Bose took over, and was but one of the many of its kind he wrote). The letter expresses Kelkar’s concern over the number of bathrooms installed in the wings of the student hostels then under construction. Addressed to ‘Shri J.M. Benjamin, Senior Architect, Western Zone, Central Public Works Department, New Delhi’, it solicits his ‘immediate attention please’, going on to detail the plain arithmetic of the problem:

For 200 students there are only twenty bath rooms, which means there is one bath room per ten students. Giving an average of fifteen minutes per student this will mean two full hours will be required before all the students have had their bath assuming that they all queue up for the two hour period. This seems to me quite unreasonable and lack of bath room facility might result in our having to change the time-table of studies which, you would agree, is not at all desirable.

(The letter would appear to have been ghost-written, given the evidence in other places of Kelkar’s unaltering elegance of expression, a contrast to the somewhat clumsy constructions here.) It continues with a proposal that the CPWD ‘add nine more bath rooms at least’ per hostel, and closes with another set of plans in the interests of efficient personal hygiene:

I enclose here a drawing with the proposed changes, showing the arrangement of lavatories, bath rooms, urinals and wash rooms … May I request you once again to treat this matter as very urgent.

To this, CPWD-Delhi’s ‘reply’ was addressed not to Kelkar, but to one Mr Mathur at CPWD-Bombay, instructing him on corrective action:

I have received the blueprint plan from Dr Kelkar, Deputy Director, IIT-Bombay, requesting that one additional W.C. should be added in each bathroom unit, since the number of students will be quite large and also the College time for all will be early morning. The extra cost involved is the additional W.C. pan, which will be taken up with the additional chief engineer and superintending engineer, if necessary.
(While on the subject, it’s food for passing thought that concerns as basic as these—numbers of bathrooms servicing numbers of students—continue to be live problems today, fifty years on, in IIT-Bombay’s hostels.)

And so it went: coupled to the CPWD’s inherently sluggish pace of work, IIT-Bombay had to contend with their incapacitatingly roundabout modes of project execution. Top this with the uncertainties of, for example, the postal services of the time (the Institute’s records are peppered with letters from one or other vertex in this triangle recording their ‘regret’ at not having received the missive one of the other vertices had sent them, and could they please send it again…), and one had on hand a perfect recipe for extravagant delays.

With forces as unfavourable as these at work, it’s no surprise that the smallest of matters should have taken inordinately large amounts of time. Meanwhile, one tangle of paperwork that had been hanging fire had been seen through; Brig. Bose, released from the Defence Services, took up the reins of the Institute on January 27 1959, only to be greeted by another tangle of paperwork: the IIT-Bombay–CPWD carousel. The situation he inherited was no less intractable than before. A series of letters flew now from his hand, ‘negotiating’ with the CPWD. The issues continued to be matters of niggling, yet all-affecting detail; looking back, one can only sympathize with the predicament of the Director of an institute meant to be among the front-runners of its time having to expend prodigious quantities of time, better spent elsewhere, in ironing out some architectural or constructional irritant or other. We have as an example a letter dated 19 February 1959 – just days before Pandit Nehru was to lay IIT-Bombay’s foundation stone. It’s addressed again to Benjamin of CPWD-Delhi, imploring the CPWD to revise their plan on a perfectly elementary front: the direction in which the balconies of the students’ hostels should face.

‘In studying the layout of the various buildings at Powai it is observed’, Bose began, ‘that the Students Hostels are facing south. The verandahs of the hostel rooms are on the north side and the balconies are on the south side of the buildings’. (He is pointing here to the small balcony each of Hostel One’s room enjoys.) ‘As the students’ rooms are not fitted with fans, they will have to depend on the prevailing evening breeze during the summer months in the warm moist climate of Bombay.’
Civil engineer by training that he was, Brig. Bose drove home his point with supporting meteorological facts:

‘From the climatic data of buildings design (Bombay Region) published by the National Buildings Organization, the prevailing breeze in the evenings during the months of March, April and May and also during October and November is north-west. This information is also confirmed from the records of the observatory at Colaba.’

‘To ensure comfortable living’, Bose argued, ‘the balcony side of the rooms should preferably face the north-west direction.’

Closing on a politely oblique note, he wondered: ‘Could you kindly let me know the considerations that were responsible for locating these balconies in the south direction.’

By the middle of 1959 the situation was in essence no different than at its start. Things had come to such a pass that there appeared to be just two alternatives left to the Institute. One was to let the CPWD construct the buildings at their own languorous pace – and for the Institute to suspend further admissions until construction was complete.9 The other was for the Institute’s Board of Governors to take upon itself the responsibility for the project, and engage a private architect’s services for the design and construction.

It was during these troubled times, on July 19 1959, that a meeting of the Board took place that was to prove momentous in more ways than
one. The Chairman of the Board, Mr Kasturbhai Lalbhai, had been kept abreast of developments in Powai – or the near-absence of them – by Bose. Lalbhai raised with the Board his unhappiness with the CPWD’s painfully slow pace of work, and asked them to choose between the alternatives.

The first was evidently too unappetizing an option for the Board to contemplate. In effect it would oblige IIT-Bombay, just two years into its inception, to suspend student admissions and retract into an embarrassing academic hibernation while it waited for its campus to be built. In defiance of government norms of the time, the Board elected in favour of the second option; quoted below is the pertinent ‘clip’, minuting the resolution:

In view of the long delay which has already occurred in the completion of the various institutional and hostel buildings in hand and the consequent difficulties experienced in getting these buildings ready for occupation before the commencement of the next academic session in July 1959 and especially in view of the commitments with regard to the entire academic work of the Institute, the Board take over the entire responsibility for the construction program of the Institute and that all future planning and construction of various buildings be carried through the architects, Messrs. G.M. Bhuta & Associates.

(The mention of the firm of architects, Messrs. G.M. Bhuta & Associates, is significant: for it is to them that the Institute owes the architectural effects of its early buildings, including the Main Building’s elaborately grilled façade, the low-lying Convocation Hall, folding-fan roofed, and the departmental buildings with their signature open-worked concrete lattices at one end.)

In many ways the Board’s decision to ‘take over the entire responsibility for the construction’ was a historic departure. In the subsequent construction of the IIT-Madras and IIT-Kanpur campuses, following IIT-Bombay’s in quick succession, it was the precedent set by IIT-Bombay that is said to have been followed, benefiting the younger institutes in terms of both time and cost of construction.

Another issue, meanwhile, clamoured for immediate attention: the housing of the equipment streaming in from the USSR. It was July; Bombay’s monsoon was in force; and though the smaller of the Soviet
boxes had been removed to SASMIRA’s outbuildings, Bombay harbour’s wharfs ‘were littered with heavy wooden crates containing heavy equipment dispatched from USSR ports’ meant for IIT-Bombay. Since these were gifts from UNESCO, Customs clearance wasn’t a problem; the real problem lay in moving them to Powai and there to provide them the necessary protection from the elements.

‘A stupendous problem’ is how Bose remembers it to be; and to address this as well as to speed up the construction, he decided to take fittingly drastic action. Earlier that year, the Government of Bombay had made a gift to the Institute of an old country house that had existed on the campus grounds, a relic of the times when ownership of the estate had rested in private hands. This was the ‘Chintan Bungalow’, as it has since been known. Leaving Kelkar to oversee the running of the Institute at Worli, Bose moved to Powai, setting up home in the Chintan Bungalow. The only person living on campus at the time, in the mornings he absorbed himself in the relocation of Soviet equipment and in the erection of the buildings (now catalyzed by their transfer to the Institute’s chosen architect); while each afternoon, he drove to and from the Institute’s offices at SASMIRA, 25 km away. This split daily existence, mirroring the Institute’s own, was to continue until the time the Institute moved entirely to Powai, in April 1960. Alluding to the energy and determination it must have required for Bose to take on the punishing schedule, Dr A.K. De, himself
A northward view from the same vantage, IIT-Bombay's tree-lined main avenue receding into the students' hostels.
to take on IIT-Bombay’s directorship in years to come, wrote: ‘Prof. Bose was also the first person to shift to the Powai Campus and resided in an old country house... so that he could personally stimulate the construction activity. Slowly the other faculty members and students also came to the campus which was till then a completely isolated place. Prof. Bose looked after every comfort and essential requirement of the students and the faculty members and other staff. Work was his sole passion and he truly lived the life of a Karmayogi.’

GUILE AND COUNTER-GUILE

Little might he have anticipated it, but Bose’s resourcefulness was yet to be put to its sternest test. The ‘examining body’ was again the CPWD, but with a new poser up their sleeve. When the Institute arrogated to itself the charge of its Powai works the CPWD, in Brig. Bose’s temperate, somewhat forgiving words, ‘did not take this decision in the proper spirit’.

For the mighty CPWD not to take the Board’s decision in the ‘proper spirit’ was, of course, bound to have less than happy consequences. There are two talents for which many of our government departments have become legends in their own lifetimes: one, their blithe openness to corruption; and two – when displeased at not being propitiated – the inventive ploys they can conjure up to make their victims’ lives miserable. It was this latter sentiment that kicked in with force when the CPWD found they had been sidelined from a project which was, to their thinking, theirs by right.

Taking umbrage at the Board’s move, they struck where it would hurt most. The most telling of their blows fell on the supply of steel required for the reinforced concrete for IIT-Bombay’s buildings. Once every quarter a fixed tranche of steel bars, then a controlled item, were allotted to the Institute by the Calcutta-based Steel Controller of India; what mattered critically was that these rations were routed through the CPWD. The CPWD began their counter-offensive by diverting the Institute’s quarterly quota of steel bars to their concurrently running project at the Government Printing Press in Nasik. Likewise, all cast-iron and steel pipes allotted to IIT-Bombay were ‘intercepted before they could reach Powai,’ diverted to other CPWD projects in their western zone. It was as if the CPWD’s
officers were on a mission to render it impossible for the Institute and its newly appointed architect from executing their project. Without steel bars, the reinforced concrete frames for the buildings could not be fashioned; without pipes, water supply and sewage lines couldn’t be laid; campus development was effectively, and decisively, stalled.

Faced with guile of such calibre, what could IIT-Bombay’s functionaries do, but rally their wits, deploy guile of a finer water still? In his usual old-worldly way, alluding to himself unfailingly in the third person, Bose observes:

The Director of the Institute had to find ways and means of obtaining steel bars outside the Government sources as the supply from steel quota to the Institute was already diverted by the CPWD. The Director rushed to see the Steel Controller in his office in Calcutta and found the Steel Controller (an engineer from Poona University) quite sympathetic and helpful.

The rush to Calcutta was rewarded. At their meeting Bose and the (fortunately sympathetic) Steel Controller arrived at the sort of inspired solution the impasse called for. The latter, it was agreed, would divert all ‘unrationalised’ steel bars to IIT-Bombay’s account (these were bars manufactured in conformity with erstwhile imperial units, in inches and feet, and at odds with the metric sizes lately introduced). The largesse extended by the Steel Controller was certainly a succour: it did help the Institute nudge the languishing project ahead: but it wasn’t help enough. IIT-Bombay’s buildings for that quarter alone required some 25 tonnes of steel, and this route supplied no more than five.

Somehow, somewhere, more steel had to be found. A search by the Institute’s team identified Bombay’s Central Railways as the next prospective supplier. The Railways held a surplus stock of steel bars in their store-yard in the Matunga-Dadar area; this stock as it stood, however, was unserviceable for concrete structures, consisting as it did of odd-sized bars heavily coated with old engine oil and grease. These agents, applied as ‘preservatives’, would keep the bars from bonding to the concrete. Although nowhere near ideal, the bars were accepted gratefully by IIT-Bombay and hauled over to Powai – where swift remedial measures were taken to render them construction-worthy again. By bathing them in hot water and caustic soda, they were divested of their offending coatings
– ‘an operation which made onlookers laugh,’ confesses Bose, ‘but was undertaken to expedite construction efforts’.

A parallel stroke of luck resulted in the loan of 12 tonnes of steel bars, returnable in two months, by the Atomic Energy Establishment in Trombay to the IIT-Bombay project. Steel on the order of 22 tonnes had in this way been begged and borrowed (if not stolen) from Calcutta, Matunga, and Trombay; IIT-Bombay’s architect was now in a position to translate drawings on paper into living, breathing structures. The buildings started to rise.

The UNESCO report of 1966, reviewing IIT-Bombay’s progress over the period of UNESCO-mediated support, summed up with impressive economy the flurry of construction activity following Bose’s arrival: ‘At the beginning of the year,’ – the pointer here is to 1959 – ‘the Institute had come under the vigorous direction of Brigadier S. K. Bose … Administrative and logistical hindrances were overcome or by-passed.’

A statement, again, that conceals more than it reveals. The episodes portrayed here should suffice to illustrate an impression I’ve formed time and again in the course of researching this book: that of the fierce loyalty to the interests of the Institute of those who have been at the helm of its affairs. In a higher education landscape where positions of authority are all
too commonly tainted by apathy and a cynical exploitative ness – witness the decline of many of our once-celebrated universities – these qualities have been in regrettably short supply. While the judgement exercised by IIT-Bombay’s governing functionaries – its Directors or Deans – on certain issues might be questioned by some, or proved fallible with the passage of time, what has remained unassailable is their commitment to what they felt was best for the Institute. This trait, echoed in and amplified by an equal commitment to the Institute’s cause by its staff, both academic as well as ancillary, have been pivotal in helping IIT-Bombay chart for itself a relatively robust course. The incidents also serve to illustrate how the Institute has made use of its gift of autonomy not just, as seen earlier, in the matter of shaping its academic curricula, but also in taking unorthodox administrative measures to move things along (initiatives that have not always been viewed kindly in bureaucratic and political circles); and we shall be seeing other examples of these attributes as we go along.

**HOME AT LAST**

Once the last impediments to the programme of construction at Powai had been ‘overcome or by-passed’, there was no looking back. Buildings, in not much time, ‘shot up all around’. The ground floor classrooms in the Main Building were ready to receive their first students in July 1960. Meanwhile the two high-ceilinged, spacious halls of the teaching-cum-storage buildings, which had valiantly stood in for the bona fide classrooms while the latter were being readied, were turned over to meeting a separate, escalating requirement. They also provided the shelter needed for the fast accumulating crates of Soviet equipment awaiting their commission. Departments, meanwhile, continued to function from the workshops.

On the residential front, those of the Institute’s students who had been braving it out in hired houses in Worli could now move to where all students should rightfully find themselves: their own hostel. The ground floor of IIT-Bombay’s first hostel (since known in offi cialese, unexcitingly, as ‘Hostel One’, though its residents have preferred to think of their home as the ‘Queen of the Campus’) was now ready, complete with its own Dining Hall and recreational areas. Brig. Bose paid due tribute to the resilience of the first batch of IIT-Bombay students in trying times: they
‘deserve all praise,’ he wrote, ‘for the way they faced all physical discomfort and in coping with the trials and difficulties ... at Worli and Powai during those difficult days.’

April 1960 was a landmark in the Institute’s early history: it was over this month that the move to Powai was completed. This enabled the third academic year to take off, in July that year, with a substantially enlarged intake of undergraduates (at 296, it was nearly three-fold larger than in the previous two years). Postgraduate entrants for the Master of Technology programme, too, shot up to 76; yet more striking was the fact that they were admitted to 16 different specializations, testifying the rapid expansion and diversification of the faculty’s academic interests despite their patchy conditions of work.

IIT-Bombay’s race against time – as also some of its battles with government departments not entirely sympathetic to its cause – had been won. Its peripatetic phase drawing to a close, it was all set to welcome its students and staff into its permanent home at Powai. Which for this book means that as we follow the history of the Institute into the 1960s and beyond, our gaze will no longer be obliged to drift to other locations such as Worli and Matunga; it will remain riveted instead on the Powai estates. Before attending to the Institute’s trajectory in time, however, we disengage ourselves from the events themselves, and take a tour of the physical setting in which they unfolded. This is not least for the reason that IIT-Bombay’s campus, in no uncertain way, has permeated and shaped the very spirit of the Institute. An institute can of course exist without a campus; in cities many do, operating from buildings without so much as a ribbon of open ground skirting them. But for anyone who has experienced IIT-Bombay, its ‘campus’ has been no less than an alter-ego to the ‘Institute’, and wholly inseparable from it in their memory. Here, the intellectual exertion that is the daily vocation of an academic institution has gone on as much in the Institute’s buildings as in their expansive, picturesque setting: a setting that has animated and fortified these exertions.

Indeed over the five decades of IIT-Bombay’s existence, its campus has loomed just as large, if not larger, in the public imagination as the Institute’s academic programmes or its research and development have done. Visitors to the Institute have returned with the splendour of its hectares imprinted enduringly on their minds, while those who have lived here
have spoken of the ‘picture-postcard’ existence they have enjoyed, and of
the wealth of nature – be it the lakes, the hills, the prolific flora and fau-
na – they have had the privilege of sharing their space with. We turn our
attention in the next section, then, to the charmed locale in which IIT-
Bombay’s academic business has been conducted: to the history of its
campus, to its geographical and natural riches, and to these attributes of
its immediate surrounds.

WITH FRIENDS LIKE THESE...
PART II

THE BEJEWELLED SETTING
CHAPTER 6

THE BEJEWELED SETTING

Mid-1990s; seven in the evening, or eight. You’re aboard a BEST bus labouring along Mumbai’s eastern artery, the Lal Bahadur Shastri Marg, back towards IIT-Bombay. Turning left from the LBS Marg at Gandhinagar, your bus creeps up the steep slope on Powai’s eastern fringe. Merely to think of IIT-Bombay’s gates just a stone’s throw away is a huge relief: the last hour has been an ordeal. Mumbai’s roads, as is their wont at this time of evening, are choked with traffic; and you’ve been treated to the sort of bouquet only they can serve up.

Lurching past eastern Mumbai’s industrial units, you were trapped in a bubble of sensory overload – one that reeked of acid baths, metal forges, industrial grease. The colour green was as if rendered extinct: on the occasional tree or shrub that swayed past, every leaf and branch was coated in soot and dust. And there had been the multiple traffic snarls along the way, your ears assaulted by the roars of the milling engines, your lungs by their fumes, your skin by the pressure of packed bodies. A tormented eternity later your bus had taken that long awaited turn, and now you’re on the home stretch – but its so near and yet so far. The traffic coagulates yet again, here on the steepest part of the rise. What should have taken another minute or two takes a giddying forty-five… and the pounding of your senses is profound and complete.¹

¹ Ask anyone who’s had a taste of Mumbai’s eastern suburbs and their traffic during the 1990s, and you’ll be assured that journeys of this description were a daily affair (distressingly enough, they still are). No matter what Mumbai’s many other virtues, this was still how the city expressed itself over much of its terrain: as a difficult, messy city to live and move about in.
Finally at the end of a second eternity, IIT-Bombay’s Main Gate pulls into view. You shuffle, numbed, into the Institute’s campus: and the first sensation you register is one of acute disorientation. It’s as if you’ve been catapulted from one universe into another, completely an antithesis to the first.

Instantly, magically, the air has been purged of its excesses. Rather than shutting out the world around, you find yourself thirstily drinking it in. First the vista before you: of the avenue narrowing into the distance, lined by gently waisted bottle palms. You discern the scent of foliage: of a profusion of vegetation that revels in its native green. In the sudden, vast silence, broken only by the odd scooter or car, you can hear yourself breathe. And far from holding your breath against the air here, you fill your lungs with long, deep draughts of it. From the air’s damp touch, you sense the nearness of water, evoking an inner vision of a lake you know lies close by.

Passing further into the campus, your skin detectably cools. Deep inside the Institute, it’ll be a good 4-6 degrees cooler than the teeming city beyond the gates. So overwhelming is the falling away of all that grime and smoke that your whole journey, concluded just a minute ago, seems to have been an elaborate hoax.

Like a trusted balm, IIT-Bombay’s campus never fails to soothe, to revive. Had it been daytime, a baking afternoon in April or May, and had you entered from the Institute’s second principal entrance, the ‘Y-point’ gate, you’d have been greeted with dappled shade and streets strewn with crinkled gold – the fallen petals of copper pod, yellow cassia, amaltas. Or, had you turned into the third entrance, the Lake-side gate, you’d have had the grand glistening spread of Powai lake before you, rolling green hills at its back.

Countless the times one has heard this sort of experience narrated, from many a generation of staff and student: of how, in a city that is daily more populous, daily more exasperating, the campus is a haven, a sanctuary – not to say a ‘paradise’, as some have spoken of it. Indeed it’s probably true to say that many of those who work at IIT-Bombay wouldn’t

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b So much so that the front page of a website proposing to catalogue the Institute’s natural heritage begins with the memory-jogger: ‘Remember the sigh of relief heaved every time you stepped into IIT-Bombay after an arduous visit outside? The divine feeling, as we enter our campus, is just one aspect of the lush green environment we’re bestowed with.’ http://www.geocities.com/ashwin_thegreat/our-heritage/index2.htm
be here were it not for its campus. Here’s testimony from two such: Drs M. Sohoni, of Computer Science and Engineering, and A. Chatterjee, of Aeronautical Engineering, both of whom earned their B.Tech.s at IIT-Bombay in the early 1980s. ‘The campus was without doubt the principal reason,’ they say, ‘why we returned to IIT-Bombay to do our Ph.D.s here.’ Like many others of their time, Sohoni and Chatterjee flew to the US for higher degrees – but stayed there only for their Master’s. ‘This was such an amazing place, and we had such a strong sense of belonging here,’ says Chatterjee with visible fondness, ‘we simply couldn’t stay away.’ So strong was the campus’s pull – and doubtless it was as strong on academic scales as it was on others – that they elected also to stay on as faculty in their respective departments.

To live in IIT-Bombay’s calamine surrounds makes up for a lot, including the humblingly modest salaries that are the lot of the academically inclined. Infatuated with money and real estate as the city is, visitors to the campus are often heard translating living conditions here into raw monetary worth. You may not have a fancy salary, they remind you, but what of this crystal air, this forest setting, this jade serenity? Worth a crore in itself, they declare knowingly – and help you forget, for a while, the frailness of your bank balance.

Clearly IIT-Bombay was fortunate in the extreme, at the time of its inception, to have come into a campus as elegantly located as this, amidst lakes, hills, and forest. By what stroke of chance was such prime property – the kind that would do a tourist parkland proud and that, to switch to a modern-day context, developers would eye with envy and avarice – chosen to house an institute of technology? For an answer we turn briefly to the history of the precinct – Powai – in which IIT-Bombay is settled, and of the gift of a portion of its estates to the Institute.

In the summer of 1965, a walker pottering about the dried-up bed of Powai Lake stumbled upon a stone inscription dating back to the 10th century AD. The inscription recorded the gift of the surrounding terrain as agricultural land for the maintenance of a Shiva temple. The donor was recorded as being a Mahasamant (a military and administrative commandant) named Simhapa, the deity depicted on the slab was named Nagajeshwar, and a village called ‘Poumvi’ was mentioned on it. Drawing an analogy from the derivation of Mumbai from ‘Mumbadevi’, ‘Poumvi’
was conjectured to be a rounded-off form of the name of the village’s presiding deity, Devi Padmavati; and Poumvi itself, in course of time, was to be rounded off into ‘Powai’.c

The stone inscription is apparently the oldest known reference to Powai; five centuries later the place is said to have surfaced again in the medieval Marathi historical record, Mahikavatichi Bakhar.1 This chronicle records the tanks and temples of Powai as being under the occupation of the sovereign Pratap Bimb, headquartered in Thane, with a certain Rakhamji Rao as the officer in charge of the area. The list of villages includes the three from which the IIT-Bombay campus was carved out, easily recognizable as they bear the same names today: Powai, Tirandaz, and Paspauli.2 Another five centuries on, towards the end of British rule, the area was known popularly as the ‘Powai Estate’, much of it held by Sir Mohammed Yusuf, scion of a prosperous maritime family of the time.

The first moves to acquire land for IIT-Bombay can be traced to as early as mid-1953, predating the fateful UNESCO General Conference in Montevideo by a year and a half – distant days in which IIT-Bombay still went under its birth-name of the Western Higher Technical (and in some documents ‘Technological’) Institute. In the Bombay Government Gazette dated 11th July 1953, under the ‘Land Acquisition Act I of 1894’ pertaining to ‘District Bombay Suburban’, taluka ‘South Salsette’, came the notification:3

... It appears to the Government of Bombay that the lands specified in the schedule hereto are likely to be needed for a public purpose viz., for establishment of the Western Higher Technological Institute.

If the Government of Bombay is satisfied that the said lands are needed for the aforesaid purpose, a final notification to that effect under section 6 of the said Act will be published in the Bombay Government Gazette, in due course.

The ‘said lands’ in the schedule indicated included the ‘Villages Paspoli, Tirandaz, and Powai.’ The Government of Bombay was in the event ‘satisfied’ about the stated need for the lands; two years later, in the issue of the Gazette dated 3rd November 1955, came the fateful notification, topped with a stern admonition:

c The inscription discovered in 1965 also had a Shiva linga carved into it. This was installed with due rites performed by the then Director, Brig. Bose, outside the Devi temple within IIT-Bombay’s precincts. S.K. Bose, op. cit., p. 96.
The said lands are needed to be acquired at the public expense (or at the expense of a local body or corporation or company as the case may be) for the purpose specified above… All persons interested in the said lands are hereby warned not to obstruct or interfere with… the said acquisition.

It was now just a matter of time. Shortly afterwards, a land acquisition officer was appointed. Through the months of 1956 the Gazette records notices for the acquisition of various plots of land by the government of Maharashtra (the state had now come into being, following the reorganization of Indian states in 1956), which donated it to the government of India which in turn transferred it in the name of the Institute.4

Although officers of the Western Higher Technical Institute started visiting and developing the land late 1957 onwards (these included the Planning Officer, Dr Kelkar, officials from the Ministry of Education, and some of the Soviet experts including Dr Martinovsky),5 the estate was formally handed over to the Institute only in late 1959, well into its initial construction phase. A letter to this effect titled ‘The Handing over of Land, Temporary Structures and Pucca Structures’, signed by the Assistant Engineer, Bombay Central Sub-Division x, CPWD, dated 7 November 1959, was addressed to the Director, IIT-Bombay, and read:6

The land for W.H.T.I at Powai so far taken over from the Special Land Acquisition Officer has been shown around to the Registrar, IIT Powai and his staff as desired. Further the outer boundary of the entire land with fixed boundary lines has been shown. The plan was personally handed over to the Registrar… The Watch and Ward staff for the land and structures are being withdrawn as the entire possessions have been handed over… The Chintan Villa (the pucca structure) was officially handed over in June 1959.

With this long run of ‘handing over’s done, IIT-Bombay was now the legal owner of its new campus, to shape and sculpt it as it pleased. (The ‘pucca structure’, the Chintan Villa, was none other than the bungalow on the estate into which Brig. Bose first moved in mid-1959, with a view to accelerating construction on campus.)

Generous as the bequest of the 550 acres was, the terrain granted to IIT-Bombay couldn’t by any stretch of the imagination have been regarded as prime property at the time. Until as recently as the late 1990s Powai
was barely regarded by the rest of the Mumbai as an interwoven part of the city; to most, it was an out-of-the-way place with nothing much going for it, none of the throb and thrust of the city’s other suburbs. Forty years previously, back in the 1950s, it can only have been viewed as a remote outpost of civilization – if it cropped up in anyone’s thoughts at all. Powai still didn’t fall within the Bombay proper of the time, being placed instead in the contiguous ‘Bombay Suburban’ district, South Salsette taluka; it became part of Bombay only in 1957. The terrain was inhospitable: mainly marshy jungle, undulating and rocky, home only to a handful of hardy prospectors. There existed an ‘Annapurna Farms’ cultivating the land where the Hiranandani Gardens now stands; and there was the fledgling Larsen and Toubro established in 1938 on Powai’s western rim, and little else besides.

So unfrequented – nearly desolate – was the region that for a good twenty years after IIT-Bombay came up, it wasn’t without peril to travel to and from the Institute after dark on the stretch of road (the Adi Shankaracharya Marg) out westwards towards the Larsen & Toubro junction. The conduit was lonely and deserted; hold-ups were common; for the odd killing to happen along the route was not unknown. It couldn’t have been difficult, then, for the Bombay Presidency of the early to mid-fifties to part with a tract of land tucked away into a corner of a place as little frequented as Powai, notwithstanding its scenic beauty; only time would prove it the peerless asset it really was. For IIT-Bombay’s early residents, its location enforced a cloistered existence on them for decades together, at a large remove from the city and the world, cut off from both its charms and its tumult (more on this in Chapter 16). Indeed, IIT-Bombay itself was somewhat ambivalent about some of the land under its command. Not long into its existence, the Institute parted with a good chunk of its prized campus, partly because it was reckoned unmanageable. The reasons for this notion lay in the origins of the lakes that cradle the campus, and to an unusual structure associated with one of them.

THE AQUATIC CLADDING: TWO LAKES AND A PIPELINE

Both the lakes bracketing IIT-Bombay’s campus are man-made. Vihar, bounding the campus to the north, is the oldest of Mumbai’s water sup-
ply reservoirs, its completion dating back to nearly 150 years, in 1860. At the north-eastern tip of Vihar lake lies a water treatment plant. From here emerges a pipeline that winds along the western rim of the lake en route to the city of Mumbai, to parts of which it supplies potable water. Over its initial stretch it runs well within the northern, roughly cricket bat-shaped outcrop of the IIT-Bombay campus; and in so doing the pipeline happens to have been of no little historical importance to the Institute. The word ‘pipeline’ itself gives nothing away of its scale. It is a cavalcade of five massive cylinders cutting a broad meandering swath through Mumbai’s landscape (so broad that it encloses a protected service road); and each pipe is so tall you could walk along comfortably inside it – with inches to spare for the occasional jump.

By virtue of its size and protected status the pipeline forms a more effective bisector of IIT-Bombay’s northern territory than any rampart ever could. The only access between the larger southern body of the campus and the smaller northern part is a narrow pass beneath the pipeline, leading to the embankments of Vihar lake. An unfortunate outfall of the barricade is the way the campus has been caged in by it, forced to squeeze its ever-growing activities into its southern lobe. The cut-off territory to the north, meanwhile, has been difficult to manage, and has fallen into neglect over the years. It has suffered the fate that overtakes any unattended plot of land in the city of Mumbai: it’s now encroached by a couple of hamlets, a dargah, and a country distillery, all firmly entrenched. This is no small amount of land lost to use: something like 90 acres have lain thus in forfeit.

To add to this ‘virtual’ depletion there has been a very real one: early in the Institute’s life, some 45 acres were bequeathed to an associate organization. In August 1961, just about a year after IIT-Bombay had settled into its Powai home, Brig. Bose received a letter from the Ministry of Scientific Research and Cultural Affairs, apprising him of a new development and requesting him to share some of the Institute’s estate towards it:7

The Govt. of India has decided to establish a National Institute for Training in Industrial Engineering [NITIE] at Bombay... It is proposed to locate the institute on the present campus of the Indian Institute of Technology, Bombay. A plot of about 35 acres land would be required for this purpose.
In its meeting held on 29 Nov 1961, IIT-Bombay’s Board of Governors agreed to make the land available to the upcoming institution. The Director did consider the plea ‘that giving up a part of the campus could jeopardize its eventual growth’. But cognizance had to be taken of the Ministry’s prerogative; and in any case there was a portion of the campus, on its north-western periphery, that wasn’t exactly prized by the Institute. Indeed in Brig. Bose’s reasoning, it seemed the Institute had more land on its hands than it could easily manage. In his memoirs, he was to write:

This area had no direct approach through the forest area beyond the students’ hostel. Because of [this], several unauthorized activities were going on there all the time, including felling of trees, and particularly the erection of several unauthorized cow sheds. This area... was handed over for the establishment of NITIE.

Although only 35 acres were mentioned in the Ministry’s letter of 1961, further requests were made – and granted – over ensuing years, such as for residential buildings, bringing the total to about 45 acres. A much smaller pocket of the campus – 7.5 acres – was given over to the TIFR nearly two decades later, in 1978-79, to set up ‘SAMEER’, the Society for Applied Microwave Electronics Engineering and Research, in the hope that this might stimulate applied microwave research at both the Institute and at the new organization. Thus, although the official figure for the area of the IIT-Bombay campus stands at 550 acres, only about 420 acres have been at the practical disposal of the Institute’s planners over these first fifty years, cramping the canvas at their disposal on which to sketch out its growth.

Flanking the campus to the south, Powai lake, like Vihar, is a legacy of British times. Completed near the turn of the twentieth century at a cost of Rs 6.5 lakh, it was created by constructing two stone dams across a rivulet, each dam rising to a height of about 10 metres. The water body thus formed spread over about 370 acres (some two-thirds the size of the Institute’s campus), its depth varying from about 10 feet off periphery to about 40 feet at its deepest. Though Powai lake was meant to augment the water supplied to Bombay by Vihar, it wasn’t to function in this capacity for long. Studies on the lake’s water indicated, repeatedly, that it was unfit for human consumption. The idea of supplying drinking water was eventually abandoned; but Bombay, and Powai, were left the legacy of a good-sized, graceful lake implanted in a fine setting. Easy to reach from
the city’s eastern and western suburbs, it offered a refreshing getaway for picnickers and anglers. When in the early sixties the IIT-Bombay campus was set up along the lake’s northern contours, the Institute had the privilege of its delectation and use virtually as its own private frontage (legally the lake belongs to the BMC, IIT-Bombay’s jurisdiction extending no further than its shores).

UNGREENED, RE-GREENED

The science and technology micropolis of IIT-Bombay was the first ‘modern’ township to rework the Powai landscape. Modernization on a wider scale started twenty years later, around the mid-70s and early 80s, when the suburb’s first tower blocks came up. The first lines of Powai’s contemporary face were etched in 1985 when the Hiranandani real estate group converted erstwhile agricultural land into a residential and commercial complex. Within 15 years, Powai’s skyline had undergone a wholesale makeover. It now sports a modish new township crammed with skyscrapers, fitted out with shopping malls, entertainment hubs, a hospital, call centres and no few multinational corporate offices and banks.

Over the past several years Powai has been arguably the fastest growing – and mutating – suburb of Mumbai, and it shows. Its newfound vibrancy has changed life for campus residents beyond recognition from just a dozen years ago. Gone are the days when long distances had to be travelled to satisfy the simplest indulgences or needs – to eat out well, or fit yourself out in a set of readymades, or hunt out the book or cassette you had long wished to add to your collection. Now it’s all available at the Institute’s doorstep; students or staff who sign on at the Institute today will find it hard to picture the hermetic, islanded existence their predecessors eked out not long ago.

Burgeoning at breakneck speed, the rest of Powai has had to pay the predictable price for its urbanization, rapidly losing its mid-century green cover. IIT-Bombay’s campus, by contrast, continues to wear a lush mantle of verdure. And yet, though it might have started off as virgin forest, and today resembles a man-made one, there were times when the campus was not as verdant, not as beautifully shaded and cool as it is today. Present-day campus residents are astonished on hearing this (as was I when first
apprised of it by Dr A.Q. Contractor, of Chemistry) – but to believe it, you need only look at two pictures taken some thirty years apart, in 1970 and in 2003, each a sweeping view of the Institute captured from atop its north-eastern extremity, the ‘Temple Hill’.
The panorama, looking out west and south, is instructive. The picture taken in 1970, ten years into IIT-Bombay’s life at Powai, shows the campus at the end of its first phase of development (see Plate A). Its upper half is monopolized by the many-lobed expanse of Powai lake, glinting with overexposed intensity. Two attributes of the picture strike the eye with force. One is the character of the lake. It is all water, unencrusted and uninvas-
ed, not the whisper of a weed to be seen to its nearest or farthest margins, telling of the lake’s once pristine state. Second, towards our cameraman, the buildings thin rapidly away: but they’re not the only things thin on the ground. On the patches of ground between them there is practically no tree cover to speak of. All we have is bare, undulating earth spreading to all sides – good stretches of it unadorned by a single tree. Here, truly, is a landscape exposed cruelly to the elements: the scorching tropical sun in summer, the lashing rains in the monsoon. It’s a far cry from the teeming jungle the campus was said to have been just fifteen years before the picture was taken, or the well wooded enclave it was to become again.

When alumni across the years were asked about their enjoyment of the ‘greenery on campus’, Hari V. Sahasrabuddhe, batch of 1964, Electrical Engineering, responded incredulously: ‘Greenery? What greenery?’, adding: ‘It was a construction zone in our time. We often trudged through ankle-deep or more rainwater to go from hostels to labs. Sometimes our gumboots were not high enough.’ Parag Rele, Chemical Engineering 1969, confirms the impression: ‘The campus was not green in those days of the late sixties. It was sweaty business walking or cycling around the Institute. The lakes were the best part of the campus.’

Had IIT-Bombay’s frontiersmen been overzealous in the matter of ‘clearing the ground’ for the Institute’s settlement, stripping it down to the bone? In people’s memory the campus before it was settled is washed in varying shades of green. Some feel it was near-forest; others contend it was partially arable wasteland, none too heavily wooded. Be that as it may, today the campus is vibrantly leafy once more – as it has been all along the last couple of decades, and as the 2003 panorama of Plate B attests. Here, you can barely tell the buildings for the trees. The Institute has greened itself again; and the fact that its leafy carapace was fashioned within a matter of fifteen years (between the early 1970s and mid 1980s) is a tribute to the prescience of those who took it upon themselves to do so. Given the splendid variety of trees and shrubs present on campus (summarized below), IIT-Bombay would seem to have had an enlightened horticulturist on its rolls; the records say the post that existed was that of Horticultural Assistant, occupied by a certain Mr D.C. Purohit. From all accounts there was a band of faculty, too, who set themselves to the greening with the zeal of crusaders. Foremost amongst those credited with the effort are Dr G.C.
De of Electrical Engineering, Dr A.S. Mahajan of Physics, and Dr B.S. Jagadish of Mechanical Engineering. De in particular (to be distinguished from former Director A.K. De) was an avid bird-watcher and is said to have personally planted, or seen to the planting of, many of the avenue trees on campus; he is also recorded as having undertaken the afforestation of the campus’s pockets of woodland, Kol Dongri and Sonari Baug. Credit is also given to the Directors during this spell, Drs P.K. Kelkar and A.K. De, for generously supporting and facilitating the task. The dense and varied tree cover today is a succour to campus residents, keeping them from overheating as they stroll or pedal or drive their way around – and it is of course the primary reason why the township is a world removed from the one that starts just outside its gates.

But the virtues of IIT-Bombay’s campus don’t end there. The solace and idyll it offers are merely the most visible of its many-layered riches. Scratch the surface a little, and nothing short of a treasure trove is flung open.

AN ECOLOGICAL HOT-SPOT

Take the time out to dip into its biological holdings, and IIT-Bombay proves itself a veritable hothouse of life-forms, sustaining a catalogue of flora and fauna so diverse they would do a wildlife reserve proud. Many of these species are endemic to forests and are rarely, if ever, encountered in urban settings. A ready reckoner of this biodiversity might run as follows.

More than a hundred species of trees are domiciled on campus (a comprehensive list was once hosted on the website of the IIT-Bombay Wildlife Club). Of these, some twenty odd species, including the kumbhi, karaya, and kate-asan, are true forest trees; others, like the karnikar, the kailashpati (cannonball tree) and the sausage tree, are unusual cultivars; yet others, like the gulmohar, coral tree, amaltas and kanchan, are ornamental, and paint our treetops a brilliant scarlet, gold, or mauve at their preferred times of the year.

Wild flowers abound. The campus boasts more than 60 of the 240 species listed in an authoritative text on Indian wild flowers. This is evidently a sizeable proportion – a striking quarter of the nation’s stock of these

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d The figures for the campus are based on the author’s observations. The book is Isaac Kehimkar’s *Common Indian Wild Flowers*, BNHS, Mumbai, 2001.
flora on one relatively small arena alone. Interestingly, of these 60-odd species, some 30-35 are found chiefly in hilly ranges and forests such as those of the Sahyadris. They include rarities like the evanescent and outrageously showy glory lily and the pink-striped trumpet lily, the weirdly constructed dragon stalk yam, and the sweetly fragrant Krishna kamal.\(^e\)

IIT-Bombay’s bird life tells the same tale; around 150 species are said to have been recorded. It’s notable that Salim Ali’s *Book of Indian Birds* lists some 300 commonly observed species: thus, about half of these, again a remarkably high proportion, have been spotted here. The more flamboyant of their number include – to name just three which, seen but once, become etched unforgettably in memory – the paradise flycatcher, the golden oriole, and the snake bird. Then there are the songsters, largely invisible, suffusing the air with their piquant – and at times confoundingly raucous – notes: the iora, the koel, the crow-pheasant, the fantail flycatcher. And a truly staggering variety of insects flourish in the Institute’s waters, air and soil – so many as to defy enumeration. Drawn to the campus by its wealth of flora, they in turn make a movable feast for its birds, reptiles, and amphibians.

Finally there are the bigger, but more secretive, residents. Forest-dwelling reptiles and mammals such as monitor lizard, Indian rock python, langur, fox and jackal are to be found here; even the furtive, nocturnal civet is said to have been sighted. And how could one leave the most exotic of our denizens – though it might be an itinerant one – till the last? There’s also the most elusive of the prowlers of the neighbouring forests, the keeper of their secrets, their spotted ghost…

And when this, the panther, comes visiting, the campus goes on high alert, cloaks itself in a curfew-like air. Streets and lanes wear a deserted look after dusk; if people move about at all, they move in groups. Yet the panther is as much a badge of pride for the campus as it is cause for dread: for how many academic campuses can boast a visitor as exalted as this? And in which other campus are the more intrepid of their tribe known to steal right into the heart of their academic corridors, padding inspectingly along them in broad daylight?

\(^e\) A further striking statistic is that as many as 30 and 35 species have been observed on the lower slopes of IIT-Bombay’s Temple Hill alone, over an area no more than a couple of hundred metres square (author’s observations). These foothills appear to be a veritable hot-spot for these flora.
The lakes for their part sustain a wealth of aquatic and peri-aquatic life. Both shelter crocodiles, fish in plenty, turtles, crabs, insects, and water snakes. Powai lake, ironically by virtue of its polluted state, is also encrusted with marshy banks of weeds and floating rafts of water hyacinth; these conspire to attract an assortment of water birds from near and far, some of them migratory, including cormorant, jacana, snake bird, and purple heron. Little wonder, then, that Powai lake – in particular its campus shoreline – features regularly on nature trails conducted by organizations such as the Bombay Natural History Society and the WWF, which look upon it as one of the Mumbai region’s most valuable repositories of avifauna.

Given these many-splendoured riches, one begins inevitably to wonder what it is about the IIT-Bombay campus that has allowed it to host and foster them. Its secret has much to do with the geographical location of the Institute: and we ponder once again its setting as seen from high in the sky, but in this instance from much higher than any bird could soar, and with man-made eyes.
IIT-Bombay occupies a special and possibly unrivalled ecological niche among academic campuses in India – or for that matter among academic campuses pretty much anywhere. This singularity is best conveyed through the satellite images reproduced in Plate C, and by a somewhat odd attribute of topography in them.

In the constricting embrace of the megapolis of Mumbai, in its northern quarter, lies an anomaly of landscape. As if in defiance of the concrete sprawl that shuts it in, it is all hill and forest, glade and stream; and among its colonizers are panther, boar, python, racquet-tailed drongo, and moths so spectacularly painted and patterned they defy belief. This is the Borivli National Park (the large green expanse in the upper centre of Plate C), an enchanted realm that enjoys the distinction of being the largest wildlife park located within city limits anywhere in the world. The Park, named the Krishnagiri National Park in the pre-independence era, rechristened the Sanjay Gandhi National Park in 1981 (and known more popularly as the Borivli National Park), has been a haven for wildlife right from the time Mumbai’s urbanization began in earnest. Until 1969 it enclosed a mere 20.26 sq km; subsequently, tracts lining the park were acquired, gradually swelling its area to about 100 sq km.¹³

As can be seen in Plate C, on the Park’s southern rim lies the large water body of the Vihar lake. In Plate D, which shows a closer view, slender fingers of the Park can be seen to snake round the lake (white arrows), spilling over into a horseshoe-shaped expanse of land sandwiched between Vihar and Powai lakes – the expanse of the IIT-Bombay campus. In these images the Institute stands out as one of only two patches of woodland that are direct offshoots of the National Park (indeed, it was more or less a part of this forest before it was given over to the cause of technology). The only other tract in the city so favoured is the Institute’s near neighbour to the west, the Aarey Milk Colony – but without the advantage of the lakes.

The Park itself is a marvel of tropical ecology. At a hundred square kilometres, it is really only pocket-sized when compared with its cousins like the Kanha National Park at nearly 2000 sq km – but it’s a pocket that runs amazingly deep. Bursting at its seams with life, it shelters an estimated 800 species of flowering plants alone, 280 species of birds, and a scarcely believable 8,000 to 10,000 species of insects (there’s been no real census).
share it with 36 types of mammals, 50 varieties of reptiles and amphibians and perhaps 150 species of butterfly. Some sense of the real scale of these numbers can be had from the fact that in its 150 species of butterfly alone, this dot on the map hosts some two and a half times the number (60) found in the whole of the United Kingdom. An allied family of insects that will keep taxonomers busy for some time to come are the moths, estimated to outnumber the butterflies at least four-fold; such are the Park’s riches that it also boasts the world’s largest moth, the gorgeously coloured Atlas, whose wing-span can stretch to a bird-like 28 centimetres.

With a forest so exuberantly stocked as an immediate neighbour, and linked to it by corridors of woodland and the waters of Vihar lake, it’s no surprise that IIT-Bombay’s campus is murmurous with the trees, vines and animals of the infiltrating woods. The connection to the National Park links the campus in turn to the mightier hills and forests beyond: the ecologically luxuriant Sahyadris and Western Ghats.

As already noted, the campus lies cradled between two major lakes. It is remarkably privileged, then, in being situated both near two large water bodies and on the immediate margins of a protected tropical forest. It is this setting that makes IIT-Bombay’s estate a very special – and rich – ecosystem; so rich that it comes close to qualifying for the status of what naturalists call an ‘ecological hot-spot’.

LIKE ‘NOWHERE ELSE IN THE WORLD’

It would be the rare soul who has passed through the Institute’s acres whose memories of it aren’t bathed in the warmest of tints. There is an unvarying baseline of affection, passing at times – such as when tempered with nostalgia – into near-reverence. Countless must be the paintings made, the photographs clicked, the verses penned, on the banks of either of the lakes, atop one of the hills, or while propped against a giant tree in one of the thickly wooded remnants of the original forest, Sonari Baug or Kol Dongri.

f These are areas, relatively small in size, which may not harbour the diversity boasted by large tracts of forests and reserves but, because of the special features of their topography and climate, are yet ecologically prolific, able to support an astonishingly extensive stock of flora and fauna.
Numerous, too, the romances that have blossomed on these grounds, abetted by the bejewelled surroundings (their numbers limited only, the disconsolate might mutter, by the Institute’s woeful gender imbalance). Parul Gupta, Class of 2002, B. Tech. Electrical Engineering, has this to say: ‘The ubiquitous presence of nature filled the mind with so much peace and serenity, it made for a beautiful experience. Not to discount the role the walk-the-talks by Powai lake played in bringing me and my husband (also an IIT-Bombay alumnus) together’. And Mangesh Patankar, who graduated with an M.Tech. in Biomedical Engineering the same year, pays tribute to the locale as well as the draftsmen who chiselled it into shape: ‘Ask anyone about what you miss the most, and the campus would top the list. I was seriously thinking of a Ph.D. or an MBA in IIT-Bombay for the fun of staying on at the campus. I don’t know who exactly had the vision to make the campus the way it is but it must have been someone exceptional.

Only rather faint glimmers of information now exist on the identity of the campus’s exceptional landscaper. It’s known that he come form far away. The Institute’s Third Annual Report, for 1960-61, states, ‘A master plan for the landscaping of the Institute Campus and residential areas was prepared with the help of an Expert obtained from M/s Tata Iron and Steel Co. of Jamshedpur’. Elsewhere he is named in passing as a certain ‘Shri Nairodi’; all documents after this fall silent on the ‘Expert’ and the work that artful mind did.

And the campus has exercised a tenacious hold on people’s imaginations long after they’ve gone away. Eleven years after he left IIT-Bombay, Brig. Bose was invited back to give an address on the occasion of the twentieth anniversary of the Institute’s inception, in 1978. ‘It is an inspiring experience to recall to mind the early days at Powai campus,’ he said in that address, ‘which was then an attractive forest on the verge of Powai and Vihar lakes with two small hills within the campus.’ After which he cast his vote: ‘I have no hesitation in saying that Powai is the finest campus I have come across in this country.’ These words wouldn’t have been spoken lightly, nor could they be put down to want of experience: Bose, an army man before taking charge of IIT-Bombay, had seen a wide world, and he’d have travelled no less well during his Directorships of IIT-Bombay and IIT-Kharagpur.
But perhaps the most rousing salute comes from an even better travelled man; one who has ranged not just the country but the world. Sharad K. Saraf, who graduated in 1969 with a B.Tech. in Electrical Engineering, went on to notch up remarkable success as an entrepreneur in Indian manufacturing industry, and is now a Distinguished Alumnus of the Institute. He had this to say when asked about the campus’s natural surrounds:

‘Oh, they were just fantastic. Powai lake of course everybody knew. But what we really enjoyed was going over the back hill, walking along the pipeline, over to the other side of Vihar lake. This was the side tourists never saw, it was like a very private area – we would maybe have a dip in the lake there or just enjoy the phenomenally beautiful view. And I think nowhere else in the world have I enjoyed that kind of scenery.’

Nowhere in the world – isn’t that taking it a bit too far? Saraf concedes that having been an impressionable age at the time may have something to do with it, but in the same breath downplays the idea: ‘Maybe the young mind was receptive, but though I’ve been to Switzerland, to Norway and to most other parts of Europe, though I’ve been to the most scenic spots in Alaska, Australia, or New Zealand, I still think there is nothing to beat the ‘other side’ of Vihar lake. The lakes were really very pristine [in the 1960s], very clean and to my thinking they served a purpose akin to today’s Feng-shui or Vaastu. The lakes have played a great part in giving soul to this Institute, that’s how I’d think of them.’

Need any more be said?

On second thoughts, keeping up a hoary tradition, let a short-stay guest at the Institute have the last word on the matter. Sunita Williams, NASA astronaut of International Space Station fame, visited the Institute on 6 October 2007. After her stirring talk, when asked about her impressions of IIT-Bombay, Williams responded unhesitatingly: ‘The beautiful campus you have here, with this wealth of trees and shade, like a forest. It’s wonderful that you have this in an institute of technology, and that it’s been preserved like this…and I’ve only been here three hours.’ It’s true: no visitor to the IIT-Bombay campus, no matter how long or fleeting the sojourn, goes back unmoved.

Having made the acquaintance of IIT-Bombay’s alter ego – call it sanctuary, ecological hot-spot, or Feng-shui hideout – we return to the business
the Institute was set up to conduct: of producing ‘engineer-scientists’ of the highest achievable calibre and of conducting high-end research in science and technology. In the next section, we take a chronological look at how the Institute’s ‘life of the mind’ has evolved over the years of its existence.

When treating the history of an institution about to complete half a century of existence, a natural temptation is to divide the 50 years on hand into five equal decadic intervals. A wide-angle view of IIT-Bombay’s history, however, offers compelling reasons to split it into four, not five, parts, and not quite equal in extent, each lasting between 11 and 13 years. These roughly dodecadic intervals appear to mirror more faithfully the natural fault-lines that partition the Institute’s evolution into distinct phases; they happen also to coincide with significant transitions in the nation’s history, as should emerge in the chapters that follow.
EXAMPLES OF IIT-BOMBAY’S FLORA AND FAUNA

Lesser white mallow (left)
Hill turmeric (right)

Balsam (left)
Pink-striped trumpet lily (right)

Unidentified spike (left)
Fringed flower vine (right)
PART III

TIME CAPSULE: IIT-BOMBAY
ALONG THE DECADES
The institute had cruised into the sixties on a high note, completing the move to Powai in time for the start of the academic session in July 1960.

A chain of events of overarching significance was to take place over the next couple of years. Most notable of these was the enactment by Parliament, in 1961, of the IITs Act. And the most notable of the edicts of this Act was to declare the IITs ‘institutes of national importance’ – no small matter of pride for the IITs, and an epaulette used ever since to preface any document introducing the IITs to the world.

Vital to the internal functioning of the Institute was the empowerment, through the Act, ‘to provide for instruction and research and to hold examinations and grant degrees, diplomas and other academic distinctions or titles.’ When the Act came into force on April 1, 1962, the clause came as heartening news for many. IIT-Bombay’s first batch of undergraduates were nearing the completion of their programme – their four-year course was to come to a close in June 1962 – but had no assurance yet of an IIT degree. For the Institute’s postgraduates, the situation was more tenuous still. Three batches of M.Tech. students had completed the work to earn their degrees, but the all-important scroll had eluded them. For these students and alumni-to-be, the enactment came just in time for them to receive their IIT-Bombay degrees late in 1962.

a The Indian Institutes of Technology Act (IITs Act) 1961, and Amendment, 1963. IIT-Kharagpur had already been declared an institute of national importance. The Act extended the distinction to the other IITs.
The IITs Act made itself felt in a variety of other ways. Under its provisions the President of India, then Dr S. Radhakrishnan, was to be the Institute’s Visitor. This ceremonial association with the Head of State was, and continues to be, another badge worn by the IITs with much pride.

It was through the auspices of the Act, again, that the IIT Council was established. Set up under the chairmanship of the Minister of Scientific Research and Cultural Affairs, the familiar Dr Humayun Kabir, its stated purpose was ‘to coordinate the activities of the four Institutes of Technology and to lay down policies in matters of common interest.’ This apex body, today headed by the Minister for Human Resources Development, includes the Chairmen of the Boards of Governors and the Directors of all the IITs.

For IIT-Bombay in particular, the Act ensured the continuation of an existing arrangement that had served the Institute well. Though the Institute’s Board of Governors stood reconstituted, Kasturbhai Lalbhai was given the nod to continue in its Chair. The Institute’s Annual Report for 1961-62 remarked: ‘His continuous holding of the office as Chairman of the Board of the Institute since its very inception has been a matter of profound satisfaction.’

Indeed it had; for Lalbhai, a ‘stalwart industrialist’ of his day, had devoted himself to the cause of the Institute’s interests in its infancy, bringing his vast experience and acutely nationalist vision to bear on the task. Having risen from small beginnings to establish an industrial empire ranging from chemicals to textiles, one that included the iconic Arvind Mills, and having founded an engineering college in Ahmedabad, he had keen insight into both the academic and the industrial worlds. Described by Brig. Bose as ‘a man of quick decision believing in utmost punctuality, who used to speak little and expected others to speak to the point’, Lalbhai chaired the Board for a good seven years, making way for G.L. Mehta in November 1965.

Another academic body of sovereign importance came into being in the wake of the Act, one that had so far been functioning under an alibi. The old wine of the Institute’s Staff Council was poured into a new bottle: April 1962 onward it went under the more august name of the Senate.

Thus the IITs Act also etched into stone IIT-Bombay’s governance framework. To this day, the IIT Council concerns itself primarily with
laying down broad guidelines on matters of policy, such as on cadres, recruitment, standards to be maintained, and plans for development, while the Board of Governors concerns itself with the general superintendence, direction and control of the Institute. In the Senate is vested control and responsibility for all academic matters, including the maintenance of standards of instruction, the shaping of curricula, and the conduct of examinations. The Senate is mainly constituted of all the professors of the Institute with the Director as its Chairman; its actions are subject to review by the Board of Governors.5

At around the same time, early sixties, the Institute picked a song to call its own – an incantation translated from the Bengali, its original credited to Rabindranath Tagore. By whom it was chosen to be the Institute’s official song is unknown. It was well chosen, however. Devotional in nature, in it the worshipper asks the ‘Infinite One’ to grant him the virtues, among others, of enlightenment, diligence, and fearlessness: arguably the prime ingredients of the academic spirit. The reproductions here are in the Devanagari and in its transliterated form.

 Antar mama vikasit kar
 Antaratar hey

 Nirmal kar ujjwal kar
 Sundar kar hey

 Jagrat kar udyat kar
 Nirbhay kar hey

 Mangal kar niralas kar
 Nihsanshay kar hey

 Yukta kar hey sabke sang mein
 Mukt kar hey bandh

 Sanchar kar sakalkarm mein
 Shaant tumhara chhand

 Charan-kamal se mera man
 Nispandit kar hey

 Nandit kar
 Nandit kar
 Nandit kar hey.
In a rough translation the first few lines would read:

Let my soul / Blossom and sparkle / Oh! infinite one,
That I may be unsullied, radiant, beauteous.
Enlighten me, grant me diligence and fearlessness
Bless me / Make me unwavering and strong
Unify me with the whole / Emancipate me...

**UNCOMMON TEST, COMMON BEGINNINGS**

The first flush of the decade saw the birth of a measure of worthiness which, while lying low over the sixties and seventies, was to assume tyrannical proportions eighties onwards.

It all started as an innocuous enough challenge posed by the **IITs** for students who wished to sample their offerings. At the meeting of **IIT-Bombay**’s Board of Governors held on 25 November 1960 came the resolution that ‘admissions to the first year class of the five-year integrated course be made on the basis of a common entrance examination to be organized jointly by IIT-Bombay, IIT-Kharagpur and the other two institutes at Madras and Kanpur if they agree to join.’

With these words was announced the arrival of the first full-fledged Joint Entrance Examination (the **JEE**) in 1961 – going then under the name of the ‘Common Entrance Examination’ – involving all four Institutes in existence (for IIT-Kanpur and IIT-Madras did ‘agree to join’, and IIT-Delhi was yet to be formed).

The previous year too, in 1960, the Common Entrance Examination (the **CEE**) had been conducted – although in a limited edition, catering only to the eldest siblings of the IIT brood, IIT-Kharagpur and IIT-Bombay. But the genesis of the **CEE** went back two years further, to 1958, when the **AICTE** recommended that all applicants for admission to engineering courses in the country be subjected to a single entrance examination and that such examinations be organized on a regional basis. The matter was considered again by the **AICTE** in April 1959, when it was felt that further study was required on the holding of omnibus examinations for admission to all engineering institutions country-wide. However, the scheme of holding a common examination for the Higher Technological Institutions, already suggested in 1958, was given the go-ahead.
Meanwhile, the AICTE had already recommended the introduction of the five-year integrated B.Tech. at the IITs to supplant the four-year undergraduate programme. G.K. Chandiramani, Joint Secretary in the Ministry of Scientific Research and Cultural Affairs, wrote to Brig. Bose in October 1959 to ‘take necessary steps to introduce the five-year course from July 1960’. Thus by July 1960 the three IITs then in existence – at Kharagpur, Bombay, Kanpur – were to introduce the five-year ‘Integrated Course’, and it was only logical to coincide it with the introduction of the new Common Entrance Examination.7 IIT-Madras in due course joined the fray, thus prompting IIT-Bombay’s Board of Governors to deliberate, in its November 1960 meeting, the holding of the first full-fledged CEE. It was conducted eventually in May 1961; and the rest, as they say, was history.

IIT-Bombay, for its part, enjoyed the distinction of organizing the second nationwide Common Entrance Examination, on the 1st and 2nd of May 1962 at 100 centres spread out all over the country. Of the 22,000 and odd students who applied for admission approximately 19,500 appeared in the examination and a little over 1,000 candidates were offered admission to the four Institutes.8

Impatient perhaps with the pedestrian connotations of the word ‘Common’, the CEE’s organizers soon decided to give its name a face-lift, tweaking it to ‘Joint Entrance Examination’ – and as the years went on, the examination proved to live up handsomely to the uncommonness it aspired to.

Yet in the years immediately following its change of name it remained little more than a benign, avuncular sizing-up of students in terms of their academic ‘suitability’ for the IITs’ B.Tech. programmes. There were no signs of the ogre-like visage it was gradually to assume in the minds of prospective students – to become, to use an expressive colloquialism, the mother of all entrance examinations, not just India-wide, nor just Asia-wide, but virtually across the face of the planet.

For Dr Juzer Vasi, now the Deputy Director of the Institute and in 1964 a ‘sitter’ for one of the early JEEs, ‘it was an exam you took almost as a lark; and you prepared for perhaps a week or two for it.’

But the likelihood of your getting through, even if you did put in a week or two of preparation, kept diminishing with the years. No wonder that a UNESCO document in 1966 was moved to remark on the ‘marked-
ly keen requirements’ that students had to meet in order to be ‘admitted on a strictly competitive basis.’ The keenness of competition established in the 1960s has been maintained ever since, no more than one in 50 or 60 hopefuls filtering through the sieve today, making it one of the finest the world over.

The JEE soon became unshakably entrenched, its pattern solidifying. It was held in the first week of May each year, in about 150 centers across India in the 1960s; a counseling session and medical examination were held at each IIT before admitting the qualifying candidates. Minimum qualifications for admission, age limits, health standards and the subjects of the JEE were announced individually each year.

While these wide-ranging facets of corporate restructuring and empowerment were being wrought, 1961 also found the Institute’s pocket run heart-warmingly deeper.

The first UNESCO assistance programme, supplemented by bilateral Soviet aid, had helped bring in a diverse fleet of equipment. The Institute, however, had plans afoot for no small number of laboratories – ninety-eight in all – and was hungry for more. And the assistance so far, amounting to some Rs 1.5 crore, went only so far in fitting out its laboratories as well as it would have liked.10

Aided by the recommendations of the early UNESCO experts – who by this time had acquainted themselves with the Institute’s work over its first three years – IIT-Bombay tendered a request for further assistance to UNESCO. Those recommendations must have been warm: 1961 saw yet another influx of monies from UNESCO, amounting to a further 3.6 million roubles (around Rs 43 lakh), as much as a third on top of the original grant. IIT-Bombay’s track record thus far, too, played its own part: it was the energetic utilization of the first assistance programme that paved the way for the supplementary tranche. It helped the Institute overcome deficits in equipment for its suite of laboratories; it also provided for an extension of the services of UNESCO experts beyond December 1962, in the first instance to December 1964 and then, on re-extension, to December 1966, at which time the programme of assistance came to a close.

To have all this capital and equipment cascading in was all for the good, save for a logistical hiccup in the way. In the early 1960s, IIT-Bombay’s buildings and laboratories into which they were to be deployed weren’t
ready to receive them. If the Institute wasn’t to squander the opportunity of a quick start offered by the assistance, it had to rise to the challenge of matching UNESCO’s assistance programme with its own groundwork: putting in place buildings to house the equipment, people to operate them. This called for an all-out effort on the construction programme, recruitment of Indian staff, and outfitting the Institute with an ensemble of auxiliary services – not least its administrative and estate management machinery – essential to the intensification of its academic pursuits.11

The first phase of the building programme at Powai was formidable in scale, the more so in view of the short span into which it had to be compressed. It included the construction, in the academic area, of the administrative block (the ‘Main Building’, as it came mysteriously to be called; that stark name, sadly enough, has stuck); the chain of departmental buildings pointing to east and west along the north-south axis of the long corridor; and the familial clusters of workshops, heavy laboratories, and pilot-plant installation buildings. Infrastructure development called for installation of water, electricity and sanitary services for the campus, serviced by a grid of roads; and there was the housing to provide. Apartments for some 350 teaching staff and for administrative and ancillary staff numbering about 700; hostels for over 2,000 students. Capping these were the other amenities that the campus community required: a hospital, a self-contained, if modest, shopping zone, a club, a guest house. Put all this together and the magnitude of the undertaking becomes apparent. Even as all this brick and mortar was being patted into place, the Institute forged purposefully on with its academic sessions; not a single term of study was allowed to be ruffled.

While acknowledging the key part played by the UNESCO-mediated aid in raising the Institute, it would be a travesty to lose sight of the handsome contribution – in volume easily overshadowing the external aid

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b The Institute’s annual report for 1961-62 gives a good idea of the frenetic pace at which construction was undertaken: ‘One departmental building for Electrical Engineering, Annexe of the Civil Engineering Department Building, two hostels (No. 4 and 5), Library Building and also 36 Asstt. Professors’ and 8 Professors’ quarters were completed during the year. The Lecture Theatre, Central Garage, and connecting corridor from workshops to Mechanical, Civil, Electrical and Metallurgical buildings were also completed. Construction works were taken in hand during this year for the Physics Department building, Gymkhana building, 2 more hostels (No. 6 and 7) and staff quarters of Types II A, II C and I.’
– provided by the Indian government. The total investment in IIT-Bombay, including buildings and equipment but leaving aside expenditures on UNESCO experts and local staff, came roughly to Rs 7.5 crore ($16 million). Of this, some Rs 2 crore (just over $4.5 million) – clearly the slighter share – came from the UNESCO-USSR combine. All the rest – nearly Rs 5.5 crore, or $11.5 million – was in fact supplied by the Indian government (not counting the cost of the land, in itself enormous and in some ways, given its superlative setting, incalculable). Of this sum, construction of the Institute’s buildings cost Rs 4.2 crore. Of special note is the fact that the Indian government also provided laboratory equipment worth Rs 80 lakh: a sum comparable to the bequests from the Indo-USSR bilateral agreement and the second UNESCO tranche put together, which came to Rs 79 lakh. Another Rs 16 lakh was given for the library, and Rs 30 lakh for furniture.12 Notwithstanding its smaller share, the salience of the UNESCO-USSR aid lay, of course, in its coming about at a time when it was most sorely needed, hauling the Institute out of the financial cul-de-sac it was mired in.

CEREMONIAL HAPPENINGS

In early 1962 the Board of Governors turned its attention to giving the Institute its symbolic identity, and advised the Director to obtain designs for a crest and logo for IIT-Bombay.13

From this followed the twin insignia on which the wider world’s eyes – and no less those of IIT-Bombay’s own staff and students – come to gaze and ponder when beholding its ambassadorial documents: its letterheads or web pages. Gyanam Paramam Dhyeyam, rings out the motto: Knowledge, the Supreme Goal: and on campus finds itself embossed in bold Devanagiri script on the frail, echoic arch visible directly from the Main Building. The logo sports those timeless emblems of learning, the lotus and the open book, haloed around with that equally timeless symbol of motion and of engineering, the gearwheel: these the ceremonial markers of the Institute.

Late that year, enabled by the provisions of the IITs Act, came another ‘first’ for the Institute: the first of its annual ceremonies that have meant so much to its graduating legions. IIT-Bombay’s premiere convocation was
held on December 22, 1962. Though many other buildings were ready by this time, the Institute’s Convocation Hall wasn’t; the event was therefore held out of doors. The site was the tract between the Main Building and Mechanical Engineering, where now reposes a lawn and in its centre, the Institute’s frontispiece sculpture. There in the Bombay-winter air, sunny and balmy, 70 triumphant students received their Bachelor of Technology and 101 their Master’s degree. The 70 qualifying for the B.Tech. formed part of the first batch of 100 admitted to the four-year degree course in 1958 (the rest having either moved into early employment, or drifted into other pursuits, or simply failed to stay the distance), while the 101 M.Techs represented three graduated batches.

The chief guest on the day was Dr S. Radhakrishnan, Visitor of the Institute. In his address the President held up IIT-Bombay as an example of the growing inter-dependence among nations. To his thinking technologists, scientists and engineers were all working towards a ‘Republic of Science’ – a world of free communication in which humanity lived as one family.

Convocations are, by their very nature, solemn affairs; doubly so if the one in question happens to be an Institute’s first. The President, however, tried to lighten the air with a gentle dig at a certain section of the audi-
ence, recollects Dr K.P. Madhavan. Madhavan had begun his days at the Institute in 1960 as an M.Tech. student; he was to stay on to first do his Ph.D. here and then – over the next 35 variously productive years – to serve as faculty in Chemical Engineering, as Dean of R&D, and as one of the chief planners of the Institute’s Shailesh J. Mehta School of Management. What’s the difference, asked Radhakrishnan, retelling a well known joke, between capitalism and communism? Capitalism, he answered himself, is man exploiting man, and communism ... well, it’s the other way round. Polite laughter broke out; but the Soviets in the audience hadn’t quite caught the quip, and asked Madhavan sitting to their side if he’d paraphrase it for them. Unsure of the Soviets’ sensitivities – the Cold War was at its peak, this had been the year of the Cuban missile crisis – Madhavan remembers having had a hard minute ducking the request, mumbling evasions and obfuscations until the moment passed.

Earlier that year the Institute’s Board had approached the Ministry of Scientific Research and Cultural Affairs to seek the President’s approval on instituting a President’s Gold Medal\(^{15}\) for the best performance by an undergraduate student cutting across all five years and all disciplines. This had been granted, and IIT-Bombay’s first ever Gold Medal was draped by
Radhakrishnan on R. Bhambhani of the Mechanical Engineering department. A tradition of Silver Medals was also begun, these being given to the top-ranking undergraduates in each of the engineering disciplines.

THE MISNOMERED MONUMENTS

In the months surrounding the gaiety – and no less the sense of fulfillment – afforded by the Convocation, anyone tracking the Institute’s departments would be forgiven for thinking they were amusing themselves playing snakes and ladders along its corridors and staircases. The move from SASMIRA hadn’t signalled an end to their peregrinations: more was in store within the campus. Mathematics, along with Humanities and Social Sciences, led a truly gypsy existence for a good few years. Mathematics’ first equations on campus were squiggled on blackboards in the Main Building, in an eyrie all their own up on its third and topmost floor, offering commanding views of the entire campus. Humanities operated from a location undivulged in the records (the department cannot have taxed the Institute’s spatial resources much, manned as it was by just two teaching staff until 1962). A chain reaction of movement presently
took place, in 1962, triggered by the relocation of Electrical Engineering. Huddled until then in the teaching-cum-storage shed ‘No. 2’, it moved now to its permanent abode a hundred metres away – at which Maths darted down from its turret to fill the void in the ‘shed’. Humanities, in turn, eased themselves into the rarefied spaces of the Main Building vacated by Maths. Maths, having already sampled the delights of Sasmira, the Main Building and now the teaching-cum-storage shed within the space of three years, was only to strike firm roots in 1965 – moving one last time when its own building was commissioned. Upon this building devolved a dual role in its first many years: it housed both Mathematics and the Institute’s Computer Centre, the latter made a reality in 1967 by the gift – again from UNESCO and the USSR – of IIT-Bombay’s first computer, the Russian-engineered Minsk-II. Humanities, meanwhile, bided its time in the Main Building until its own came up a few years later, part of which it would eventually share with a wing of Aeronautical Engineering.

Similar shenanigans took place into and out of teaching-cum-storage shed ‘No. 1’, so that, thinking of IIT-Bombay in the early sixties, it is difficult not to conjure up images of the academic area of the Institute in a state of continual physical foment, equipment, furniture and personal effects being shuffled about without pause, men and machines being

Where it all began in Powai. A part of the TCS complex, first home to IIT-Bombay’s departments, its library, its administrative offices, and the ‘face’ of the Institute presented to the visitor entering the campus from the Y-point gate.
transplanted like so many saplings in a nursery from bed to bed, before being patted down each in their own garden lot.

In all of this, one fact shines through above all others: the foster-home role played by the TCS sheds. Impartially they sheltered department after department in their itinerant phases; and no less generously did they host the first incarnations of other units of the Institute. Dr Vijaya Punekar of Humanities and Social Sciences, chronicler of the weave of social life on the IIT-Bombay campus, has paid rich tribute to their large-heartedness, correcting certain misimpressions along the way, and warrants being quoted in full:

The first to be constructed on the campus in 1959 were two Teaching-cum-Storage (TCS) buildings (‘sheds’). It is a misnomer to call these strong granite structures ‘sheds’, simply because initially part of these buildings was used for storing equipment received from Russia. In this prosaic name, TCS, is hidden the early history of IIT. Apart from holding classes and storing equipment, as indicated by the name, these buildings housed at one time or another Director’s Office and Administration, drawing hall, laboratories, departments of Physics, Electrical Engineering, Mathematics, Library, and State Bank of India; some say the first Ganapati festival was held here.

She goes on to lament the casual disregard into which these colossi had fallen:

The existence of such a monument is known to very few people on the campus. Even to those who know, TCS stands for ‘Temporary Construction Shed’!

Dr Madhavan, taking another view, pays an equally heartfelt tribute to ‘TCS’. He recalls how for some time they were IIT-Bombay’s first ‘face’ for its visitors: ‘The TCS buildings have a lot of significance,’ he reminds us, ‘because at that time the Main Gate hadn’t been built. You could enter IIT-Bombay only through the Y-point gate, and you came right through until you reached the TCS area. So the TCS buildings used to be a sort of entry point for IIT-Bombay – a fact which may have been forgotten by now. You first saw the TCS buildings and from there you moved to other campus areas.’

Quite truly, if any of IIT-Bombay’s buildings deserve to be enlisted, and commemorated, as its ‘heritage structures’, it is these gentle giants, the teaching-cum-storage sheds, the Institute’s misnomered monuments.
‘Our noses too much to the grind stone’

The final year of the UNESCO aid programme saw a visit to IIT-Bombay – on 30 January 1965 – by Mr. Rene Maheu, UNESCO’s Director General, who ‘lost no opportunity, whenever possible, of expressing his satisfaction on the working of this Institute’. Maheu, remarking that the ceremony symbolized the ‘coming-of-age of the Institute’, unveiled the plaque that today watches stonily over the comings and goings at the entrance to the Institute’s Main Building. For those that care to return its ebony gaze, it reads:

UNESCO Assistance to the
Indian Institute of Technology, Bombay
Stands Unique as the
First Venture of Generous
Assistance in Establishing
an Advanced Centre of
Learning and Research

By mid-1963, most departmental buildings were up and running. Of these, Civil and Mechanical Engineering at the northern end of the core academic area were the first to be populated, Physics and Chemical Engineering at the southern end the last. And by the end of the UNESCO project in 1966 – which marks our mid-way point in the first phase of the Institute’s life – although some building work was still under way, the Institute had a complete range of well-equipped buildings at Powai to house its activities and afford accommodation for students and staff to the number of some 5,000. All this had been done on a site that was markedly inhospitable only ten years before.

Such were the demands of the ceaseless construction-linked activity until the mid-sixties that it appears to have circumscribed considerably the time available for academic cogitation. When Dr M.V. Hariharan, for instance, was asked about the shaping of course curricula in the early years, ‘We all of us had our noses too much to the grind stone,’ he said, ‘we hardly had time to look around. The buildings had to be readied, infrastructure prepared, cables laid, the power station and power distribution organized. The emphasis all through Brig. Bose’s tenure was not so much on curri-
cula; this was the Institute’s construction phase. Academics,’ Hariharan felt, ‘started warming up in the late 1960s. One could say the academic infrastructure was laid down at that time, when courses and syllabi were formulated, codified.’

Under Brig. Bose’s ‘vigorous direction’, then, a good part of the first decade in the life of the institute had been given over to laying down its infrastructure and getting its essential systems and processes in place. The UNESCO report, recognizing this, lauded IIT-Bombay on the mammoth effort:

They have been hard-working, productive years – the more so since the work had to be concentrated effectively into the eight years since the Institute actually got to work after agreement on the aid it should have.20

THE HARDWARE AND THE SOFTWARE

As noted earlier, five departments of engineering were established at the very beginning, in 1958: Chemical, Civil, Electrical, Mechanical and Metallurgical Engineering. Amongst the sciences, Physics and Mathematics started at the outset; these continued to be the only two basic science departments for five years.

The first ‘new’ department to come into being was Chemistry. New only in name, for though a discipline in itself, it had been subsumed within Chemical Engineering all this while. Then, as in an alliance ill-forged from the first, the itch to break away asserted itself, and the day came when Chemistry cleaved off into an independent unit, in November 1963.21 Chemistry and Chemical Engineering’s common origin continues, however, to find physical expression. Where other departments function each in their own building, the two departments to this day share one, albeit in amicably demarcated corridors and pockets.

In 1965-66 came the next of the Institute’s engineering departments, its sixth: that of Aeronautical Engineering, though in nature of provenance it differed wholly from Chemistry. ‘Aero’, by which name it affectionately goes, was set up at the instance of the Ministry of Education. The Board of Governors had already approved the establishment of the department in 1965; it started its academic operations from the academic session of July 1966, 38 students being admitted to its undergraduate programme.22
The tail-ender in the Institute’s first phase was the Industrial Design Centre, set up in 1969. Its initial offering was a fifteen-month diploma of the IIT (the DIIT) in Industrial Design, a course that emphasized product conceptualization and its planning, design and costing; in 1979-80 the programme was elevated to a two-year Master’s in Design (M.Des.).

Complementing the multiplication of buildings and equipment – the Institute’s hardware – was a spurt in what could be said to be the software needed to breathe life into its material assets: its human resource and academic programmes. Around 1962-63, teaching staff totalled about 120; four years on, by 1966, their numbers had more than doubled, to 250.

Today IIT-Bombay is known for its remarkably flat faculty structure. Just three tiers exist: those of the assistant, associate and ‘full’ professors. Early to mid sixties, by contrast, the teaching cadres boasted as many as eight rungs. Not even as a Professor could you revel in the thought that you were top-gun: eclipsing you were the ‘Senior Professors’; and as for the lower ranks, even as Assistant Professor you could congratulate yourself on being well clear of the bottom of the heap. Toiling below you were two ranks of faculty – the lecturer and associate lecturer – and two ranks of those one might consider ‘faculty-in-training’, for many of them did make it to that cadre in due course: the senior research assistant and junior research assistant.

In contrast just as vivid, while the faculty profile at the Institute today is distinctly top-heavy – no less than 50% are professors, while professors and associate professors together make up 75% of faculty strength – the first decade saw populous lower orders and thinly peopled upper ones. Indeed most departments set up at the beginning began their working lives with an assistant or associate professor at the helm.

One reason for the thick-set base was that there simply weren’t enough adequately qualified professionals going around to fill the senior posts with. There were scarcely any Ph.D.s being produced in India, especially...
in engineering; indeed to produce more of these was one of the IITs’ principal charters. No wonder, then, that the ranks of IIT-Bombay’s faculty in the sixties comprised large numbers of recruits with at most a Master’s, and at times no more than a Bachelor’s, degree, taken on board on the understanding that they’d train themselves on the job.

IIT-Bombay’s B.Tech. had started in 1958 as a four-year programme, admitting students after 12 years of education: 10 years of schooling followed by two years of Intermediate in Science (I.Sc.). As noted above, shortly afterwards in 1961 the programme was converted into an integrated 5-year programme; but it was bifurcated into two streams in order to keep alive the four-year option. The entry point into the programme could be either the first or the second year. Admission to the second year was open to those who had gained an I.Sc.; those with a Higher Secondary School Certificate (after 11 years of schooling) took admission to the first year. The former option was discontinued within a couple of years. It’s noteworthy that during the 1960s, a three-year B.Tech. was also run, into which students were admitted after their B.Sc.\textsuperscript{27} For the greater part of the Institute’s first phase, therefore, it was the five-year B.Tech. programme.
that held sway. (The pattern was to change again in 1981, the B.Tech. reverting to its four-year edition as part of a national policy decision.)

Determined not to be outdone by their engineering counterparts, the science departments fired up their own suite of offerings. Two-year M.Sc. programmes in Physics and Applied Geology were started in 1964, while plans were made to offer M.Sc.s in Chemistry and Mathematics. These soon followed, in 1965. The enrolments to start with were modest: the intake in 1965-66 for the four courses together totalled twenty-eight.²⁸

A notable development during this period was the beginning of the doctoral programme. As improved laboratory and library facilities, and more faculty to supervise research, became available, it became possible to offer registration for the Ph.D. in science and engineering. The programme began in 1962 when the first student was admitted, in Metallurgical Engineering. In the same year, 19 others enrolled for the programme. The numbers swiftly grew: by mid-1963, 37 had enrolled, and by the end of 1966 the Institute had 135 students registered for PhD programmes in Engineering, Basic Sciences and Mathematics.²⁹

The distinction of winning the first Ph.D. of the Institute went to Dr V.R. Koteswara Rao of Chemical Engineering, who submitted his thesis in May 1963³⁰ and was examined in September that year³¹. While Rao proved difficult to trace for his memories, it was possible to contact the IIT-Bombay’s fourth qualifier for the Ph.D., Dr S. Rama Iyer, who defended his thesis a little over a year after Rao, in November 1964. Iyer, also of Chemical Engineering (and now a Distinguished Alumnus of the Institute), had done his M.Tech. from the Institute, finishing it in late 1961. He decided to stay on for his Ph.D., which he completed between 1962 and 1964. In 1962, he recalls, he was one of a mere sprinkling of doctoral students across the Institute, no more than 10 or 15. When asked why he enrolled for the Ph.D. at IIT-Bombay, one of the reasons – other than the deeper pursuit of knowledge – was, Iyer confesses, the relatively ‘handsome stipend’ that went with it: Rs 400 a month. It was the slender outgoings that made the sum taller than it seemed. Doctoral students were exempt from tuition fees, recalls Iyer, the hostel room cost a mere Rs 10 a month and the messing between Rs 50 and 60, leaving the best part of the scholarship untouched. The M.Tech. stipend, in comparison, had been a slim Rs 150 (out of which there were fees to pay), making for rather deeper
pockets for Ph.D. students. And the highest-paid job one could get those days – with Union Carbide – fetched no more than Rs 650 a month.

So, says Iyer, Rs 400 a month was no worse than a corporate salary, and left you plenty of cash for shots of indulgence. Prime among these for him and his friends, he remembers with pleasure, was a jaunt to the Mahalakshmi racecourse every Sunday. Leaving after an early lunch at 11:30 am, they’d spend the afternoon at the races, returning early evening in time for the last trains and buses to Powai. The whole outing accounted for Rs 50 a week. And what about facilities at the Institute for that other gamble he’d taken – his research? ‘They were very rudimentary,’ Iyer says. ‘A great deal of fabrication had to be done in order to carry out one’s research, since the Soviet equipment available at the time was often unsuitable for the work one had planned. Availability and access to information was the other big hurdle, with the Institute’s library still building up its collection and communication with the outside world being very limited.’

An arresting statistic involving the Ph.D. programme of the 1960s is the proportion of internal candidates in the fray. In mid-1963, of the 37 registered, 20 were from amongst the Institute’s own staff. By 1969, as many as 100 faculty were working for their Ph.D. at the Institute. Clearly a good number of IIT-Bombay’s faculty, while not highly qualified at the outset, hadn’t shied away from the challenge of training themselves on the job. A much lower proportion, but in themselves a significant number – nineteen – staff members had submitted themselves to the M.Tech. programme: figures that bespeak the paucity of pre-qualified professionals IIT-Bombay could draw upon to recruit its faculty from.

And this, surely, must glitter as the real jewel amongst the numbers. Not knowing quite what to make of this data point, the Institute’s annual report for the year 1962-63 simply released it into the world, alone and unembellished: *The total number of women students has risen from 1 to 6.*

Which meant that, overnight amongst IIT-Bombay’s students, the ratio of girls to boys had pole-vaulted from the somewhat unnerving 1:875 to the far more bearable 1:190. Whether or not this caused jubilation to break out in the corridors of the boys’ hostels has gone unrecorded.

d Iyer’s recall is roughly correct. The M.Tech. stipend was indeed Rs 150 per month until the time that he started his Ph.D., but was in fact raised to Rs 250 a month the very same year. (Minutes of the 17th meeting of the BoG, 27 June 1962).
The intrepid ‘one’ of the minority gender, who had spent two years entirely on her own amongst the boys before she was joined by five others, was a girl who had discovered an early proclivity for engineering when she started to tinker with the radio set in her home. Tejaswini Saraf, who took up electrical engineering in 1960, admitted that her first week as the only girl at IIT-Bombay was ‘awkward’ but then she ‘encountered no problem at all’… not even in shop courses, where she did black-smith work, welding and fitting alongside the boys.33

The years 1962 to 1965 ushered in a period when a gradual expansion of student intake took place. Although initially planned for an intake of 200 postgraduate students and 320 undergraduate students, undergraduate admissions were augmented from the academic session commencing in July 1963, prompted by the nation’s enlarged requirement of technical personnel; in 1966, the intake crossed the 400 mark.34 The intake in postgraduate programmes was also gradually increased during the period.

In broad terms, most significant academic developments for the phase under review (until 1970) would appear to have taken place by 1966. All departments and centres, but for the Industrial Design Centre, had been flagged off; so had all academic programmes, including several M.Tech. specializations and M.Sc. programmes; the Ph.D. programme had attracted a fair number of candidates.

In the academic year 1971-72 came an occasion for an appraisal of the effectiveness of the Institute’s exertions. Thrice in its 50 years, at roughly equal intervals, IIT-Bombay has been examined at close range for its performance, its problems and its prospects through the agency of a review committee set up by the Union Government. The first review was conducted separately for each IIT, the other two were common to all. Serving as periodic report cards on the Institutes, the reviews are valuable for the insights they afford into their perceived strengths and weaknesses, and we’ll be turning to them time and again along these pages.

IIT-Bombay’s first (and only exclusive) review, brought out in 1972, was essentially an evaluation of its attainments over the 1960s. All in all, the document was warm without being congratulatory, critical without being cold. The reviewers were happy with the way the Institute had handled its undergraduate academic programmes. ‘In the context of the continuous
and rapid innovation in technology and additions to knowledge taking place all over the world,’ they said, ‘the Institute has maintained a dynamic approach to the undergraduate curriculum. The committee has noted that the faculty is well aware of the need for constant review and change.’

They were less happy with IIT-Bombay’s performance in the research sphere and its postgraduate programmes. In the course of their assessment ‘it became obvious that there are too many areas in which too little effort is being expended.’ Research, in their view, was being organized around individuals depending on their particular interests, unrelated to the plans of their departments or of the Institute as a whole. There seemed to be little sign, therefore, of well-formed group or inter-disciplinary activity. Further the emphasis on research needed to be reoriented towards what the reviewers called ‘useful projects’ directed towards ‘specific needs relevant to national objectives’ – a clear indication that they felt that faculty research interests, where they existed, tended towards the esoteric.

Those, then, are the unadorned facts and figures of the Institute’s growth through its first phase. What, however, was the mood – call it the academic climate – behind the veil of these data and events of the 1960s? It’s instructive, here, to consider the impressions gained by someone coming into the Institute’s fold in mid-decade: as in the case of a young man who, on the 11th of October 1965, staying with his uncle in Colaba, asked the latter how he should proceed to get to IIT-Bombay, in Powai.

**FIRST IMPRESSIONS**

The young man’s uncle was vague: Powai for him, he said, summoned pictures of Powai Garden – a municipal picnic spot on the shores of Powai lake – and little else. The young man, asking around, made his way: and so found himself alighting at Vikhroli, the suburban railway station then the nearest to Powai. Out in the concourse, uncluttered then by shops or vendors, stood a solitary taxi awaiting its custom; agreeing on the fare of Rs 2 for IIT-Bombay, he climbed in.

The previous year, in 1964 – when still working in the US, at the Massachusetts Institute of Technology – he had written to a number of institutions in India, prospecting opportunities for jobs. Letters had flown
to, amongst others, the Directors of IIT-Bombay and IIT-Delhi, and to Dr Homi Bhabha at the Atomic Energy Establishment. The Institute that first replied was IIT-Bombay, in a short letter signed personally by Brig. Bose. Welcoming the applicant’s interest in the Institute, it said that at his level IIT-Bombay would probably take him on as an Assistant Professor. Could he write back stating his plans, and it could be taken from there? ‘A short letter,’ recalls the youth of the time, now approaching a richly lived seventy, ‘but what I appreciated was that Brig. Bose took the time to reply to me immediately.’ The other organizations, by comparison, were indecisive, dilatory; and so it happened that on that day in October, alighting from the taxi at IIT-Bombay’s Main Building, brief-case in hand, he was making his way to its first floor, there to present himself before Bose.

On the strength of its promptness to his enquiry, the Institute had gained a recruit who’d go on to prove himself one of its most committed, scholarly, and versatile faculty, in time to become the Institute’s Director, win the nation’s highest academic honours, and be decorated with one of its highest civilian honours, the Padma Shri: the man IIT-Bombay came to know as ‘SPS’.

Arriving in the mid-sixties, seven years into IIT-Bombay’s existence, what were Dr S.P. Sukhatme’s first impressions of the Institute? There were three.

‘The first thing that struck me,’ he says, in his unfailingly categorical, yet unfailingly smiling, way, ‘and that stayed with me over the years, was the dedication of faculty here. They were very dedicated.’ His earlier impression of teaching faculty in India stemmed from his years at the Banaras Hindu University (BHU), from where he’d graduated. There, too, especially in his final year, this quality had been in evidence in his teachers, but here at IIT-Bombay it evinced itself on a higher order. ‘The dedication was very noticeable,’ he says. ‘Everyone took their job very seriously.’

The second trait to strike Sukhatme with an equal impress was the academic autonomy enjoyed by the Institute and its faculty. ‘I hadn’t expected it,’ he said. ‘Because I had been to BHU as a student and there we had the traditional university system. There was a rigid syllabus, you were taught it throughout the year, and at year-end you had exams. Your answer scripts were sent to people you had never seen. Here, in contrast, everything was internal.’
Sukhatme had expected, moreover, the effect of the Soviet presence to have rubbed off on IIT-Bombay, watered down the autonomy of its internal functioning; but was glad to be proved wrong. ‘It was a pleasant surprise that though we had a Soviet influence, the autonomy given to the faculty was complete. An instructor decided everything about his course. What one finds today existed from the very beginning. Syllabi were broadly written, and could be altered or designed according to an instructor’s wish. Papers were set and corrected by the instructor. Only for B. Tech. Projects and for M. Tech. theses was there an external examiner.’

The third impression Sukhatme formed wasn’t, compared with the other two, the most enthusing. ‘I would say in 1965 the teaching programmes IIT-Bombay had were already probably the best in India,’ conceded Sukhatme, by way of a cushioning preamble. ‘The course work and course content were fairly up to date. But research wise,’ and here came the nub, ‘IIT-Bombay was nowhere. That was very obvious.’

‘Well, many people were aware that research had to begin at the Institute: that was very clear in their minds. But we were really not doing worthwhile research even in terms of the output of students’ projects.’

Thus, while academic programmes at IIT-Bombay might have gained impressively in strength, and much infrastructure had been invested in the robust running of those programmes, one particular dimension of the Institute’s persona, meant to bloom equally vigorously, had proved recalcitrant.

This must have caused Sukhatme and others like him at least some surprise. On the face of it, IIT-Bombay had been plentifully stocked with equipment from a technological giant – the USSR – and the monetary worth of the equipment ran to a good Rs 2 crore ($4 million; an abundant sum at the time), and yet – with the Institute ‘nowhere’ in research – it was as if the Institute’s bounty of equipment was like a rich ore that had been left untapped.

The absence of something that ought to exist is more difficult to tackle than is its presence; from the surrounding clutter of detail, one has to try to prise out the reasons for the absence, piece together the void.

The reasons turn out to be numerous as well as interconnected, and consequently a matter for analysis; they are deferred therefore to a later
chapter tracing the evolution of research and development at the Institute (Chapter 12). Suffice it to say here that, for one thing, the Soviet equipment with which the Institute’s laboratories were brimming was not all it seemed to be. In fact on reflecting upon it, most faculty from the era were agreed that it was in greater part a hindrance to research than a help. Second, again for a variety of reasons, prominent among them the dearth of governmental funding for research throughout the crisis-ridden 1960s, coupled with the encumbrance posed by the Soviet equipment, what could be termed a ‘culture’ of research hadn’t taken root at the Institute.

Sukhatme’s three primary impressions – of vigorous academic autonomy, of unstinting dedication, and of an underdeveloped atmosphere of research – these, by and large, would have not just shaped the day-to-day working of the Institute, they would also have defined the atmosphere prospective faculty would have expected to find. What, then, about the prospects that awaited the consumers of the goods faculty had to offer: the Institute’s students?

‘ALMOST AS ORDINARY AS THAT’

Perhaps the most remarkable thing about being an IIT-Bombay student in the 1960s was how utterly unremarkable it was to be one. For a start, it was more a stroke of chance than an act of will that brought you to the Institute’s gates. For prospective students, the IIT-Bombay name wore none of the resplendent plumage it was to don in later years; nor, as we’ve seen, was the JEE the monstrous wall, unscaleable except by the most remorselessly drilled, it would grow into.

Indeed, institutes other than the IITs – some of them sporting a confoundingly similar acronym – appeared to be lodged more prominently in the public mind. In the dying years of the decade, as late as 1968, recalls Dr U.N. Gaitonde of Mechanical Engineering, who strolled in as an undergraduate that year, very few people other than those from major cities knew what an IIT was. ‘When I cleared JEE and entered IIT, ITI was more famous than the IIT as a brand or as a symbol,’ he says. (He’s referring here to the Industrial Training Institutes, certificate-awarding polytechnics that impart training in technical trades – the electrician’s, the fitter’s, the plumber’s). ‘Now, I think,’ he adds underhandedly, ‘it’s the other way round.’
This was in the late 1960s; as can be imagined, the IIT-Bombay of the early years of the decade (in common with other IITs) would have made even less of a dent on the lay consciousness. Not even in its immediate environs – the city of Bombay – did it make its presence felt. Parag Rele, a ‘Bombay boy’ from the start, and today a Distinguished Alumnus of the Institute honoured for his outstanding contributions to Indian industry, came up to IIT-Bombay in 1964. He certainly wasn’t drawn here because IIT-Bombay exerted a magnetic pull of any kind: ‘It was just another place to go and get an engineering degree.’ What worked on him was entirely the personal influence of an elder cousin already at the Institute. Through him, Rele ‘knew a lot about the IIT campus, which he thought was a great place, and about people like Dr N.R. Kamath who were already here; I was influenced very positively by this. I guess it was owing to his influence that I joined.’

The recollections of Dr Juzer Vasi, who came up the same year as Rele, corroborate his batch-mate’s. ‘We did know, many of us graduating then from high school, that IIT-Bombay exists and it’s a good place to do engineering. But that was all. My friends and I also took admission at a couple of local colleges like St Xavier’s.’

And IIT-Bombay was no greatly prized destination: ‘It didn’t really matter if you didn’t get this (admission to IIT-Bombay),’ said Vasi, ‘you would go there (St Xavier’s). There was really no big deal about it.’ And added a contemplative afterthought, ‘I think that’s important because when coming in as students we didn’t see ourselves as the crème de la crème. We were just people who came here rather than went to Xavier’s. It was almost as ordinary as that.’

Once you had arrived at the Institute’s fee counter, whether by accident or design, you paid next to nothing for your education; the fees, through the sixties, ranged from Rs 200 to Rs 400 per year. Added to this you paid the modest charge of Rs 100 annually for your hostel room.36 Even at that, only half of the students paid tuition fees; the other half came on scholarships. Little wonder, then, that only two per cent of the Institute’s revenue in the sixties came from students’ fees.37
‘Education @ IIT-B’ might have been cheap – but it could claim high standards for itself. And if as a student you had a pattern of education in mind based on what you’d heard about other engineering colleges of the time, that image was soon to be taken to pieces.

Some of the points of difference were slight, such as the duration of periods of instruction being 60 minutes, against the prevailing standard of 45 at engineering colleges. Others were more substantive, such as the fact that academic staff were generally readily available, even outside the usual working hours, for help and guidance: the inestimable advantage of a fully residential campus.

At greatest remove from traditional practice, though, was the academic curriculum. If as an incoming undergraduate you believed you’d walk out a specialist engineer at the end of your programme (the traditional pattern kept students straight-jacketed in a narrow specialization), you’d be in for a surprise. IIT-Bombay’s bachelor’s course, though a good five years in duration, did not set itself the task of turning out specialist engineers. It was left to the two-year M.Tech. programme to apply the sharpening touches.

In the first stage of your B.Tech., the two-year ‘common programme’, you would cover the scientific background needed by the higher cadre engineer – maths, physics, chemistry, the technical arts – to a much greater depth than elsewhere. More unusually, you’d also be asked to come up to speed on English, and then to dive deeper into it – one course each in the first two semesters. And if you were impatient to get on with your core engineering subjects, you’d have to cool your heels from time to time. For in the second year, this would be followed, in the first and second terms respectively, by edification in the subjects of Logic and Economics.

The second stage – the ‘engineering sciences programme’ – would cover the engineering background needed for all branches of engineering. Thus if, for example, you were a civil engineering student you’d learn about electronics and the theory of machines, while your electrical engineering compatriots would learn about the strength of materials, fluid mechanics and heat transfer. Blended into this, in your third year, would be another dose of social sciences – now in the form of Economics and Ethics. It was only in the third stage of your programme – the ‘departmental’ part over
the last couple of years – that you finally got the chance to dive deep into
the discipline of your specialization.

For the numerically inclined, the catholicity of the curriculum can best
be appreciated by considering the percentage–wise break up of the credit
structure of the B.Tech. programme. As much as 37 per cent of your time
in the classroom would be spent in absorbing the basic sciences and the
humanities and social sciences, another 24 per cent each in broad ‘engi-
neering sciences’ and ‘applied engineering’, leaving no more than 39 per
cent for ‘courses in the field of specialization’ – hardly, you might mut-
ter under your breath, amounting to much specialization at all. And yet,
as we’ll see in the following chapter, even this distracting dollop of the
humanities would in the early seventies be judged inadequate for a truly
broad-based programme, and be nearly doubled in volume.

What you mightn’t have cottoned on to, of course, was the premedi-
tated educational experiment being carried out on you. IIT-Bombay had
striven to keep faith with the urgings of the Sarkar Committee to pro-
duce engineers with a ‘broad human outlook’, equipped with enduring
skills rather than specialized knowledge vulnerable to obsolescence. You
were being plied with subjects like ethics, logic, and economics in order
to make a better chiseled professional of you; they were meant to acquaint
you with the social milieu of the era, sensitize you to the uneasy relation-
ship with technology of a poor country marked by tremendous disparities
in wealth and access to resources.e

Compensating somewhat for the thinness of the specialized engineer-
ing curriculum, you were required to spend 8 weeks in industry to gain
first hand experience in design and techniques of production on the fac-
tory floor. And in your final year, you’d take on a design or engineering
project for independent study. This – the ‘Home Paper’ of its time, since
renamed the colder ‘B.Tech. Project’ – was conceived as an important ex-
ercise in weaving together the various strands of knowledge and skill you
had gained so far. Required to study and solve an individual problem,
you’d present a ‘paper’ – that is, a report – at its end. This might have dealt

e The lineage of the experiment deserves to be acknowledged. IIT-Kharagpur had
already implemented a broad-based curriculum for its B.Tech. programme, in turn
modelled upon, but incorporating some departures from, the MIT model. See P.V.
– if you were an Electrical Engineering student in your final year in 1963-64, for example – with ‘Modification of Bandwidth of a R-C Transistor Amplifier’, or ‘Magnetohydrodynamic Generation of Electrical Power’. Finally, you’d have to subject yourself to ‘cross-examination’ by an external examiner, members of the staff and fellow students.

While the JEE served as a progressively fine-meshed filter for undergraduate admissions, the criteria for entry to Master’s courses remained an overall assessment based on a number of indices. These included an in-house written test, technical interviews, the preceding degree examination, and practical experience (if you had any). The M.Tech. programme lasted a year and a half for the first four batches, until 1961; on adoption of the Thacker Committee’s recommendations, it was expanded into a two-year programme onwards. It comprised one year of course work followed by one devoted to a dissertation project which, as in the case of the undergraduate home paper, the student had to defend before a group of external and internal evaluators, staff and students.

From its earliest years, the Institute went to elaborate lengths to ensure that this defence shouldn’t be a walk-over for the student. It was conducted ‘in a hall open to all students, staff members and outsiders,’ with the ‘Examination Committee’ consisting of no less than ‘five to six members including a Chairman unconnected with the department, at least one external examiner, and two internal examiners and the guide.’ Many of these features were novel for their time; some, such as the open defence of theses, owed their existence to elements of the Soviet academic tradition introduced by the UNESCO experts at the Institute.43

The ritual-like elaborateness had a stern purpose to it: to elicit originality of exposition and expression, and deter casual technical writing. Faced with the prospect of being scrutinized by no less than six experts ranged before them, it was hoped that the student ‘would not, therefore, include in his dissertation any remarks which he cannot defend when cross-examined in public.’ Students were in addition expected to gradually prepare themselves for their defence through a series of seminars. A further, and no less vital, benefit of the rigour exercised was the ‘considerable self-confidence’ it engendered in the students.44

This keen attention to detail, this wealth of time and energy lavished on each individual B.Tech. or M.Tech. project, is but one example of the com-
mitment of the Institute’s staff to the cause of education that struck many with such force. Coupled to the equally committed classroom teaching (on which there will be more in later chapters) and the autonomy granted in the formulation of courses and methods of instruction, this made for a truly potent recipe for turning out graduates that would one day do IIT-Bombay proud.

And the skills imbibed here have been deeply cherished. Alumni from the 1960s, when asked what they thought was the Institute’s biggest contribution in shaping them into what they are today, paid moving tribute to these abilities. For Dr A.L. Ravimohan, who graduated in 1967 in Chemical Engineering with a President’s Gold Medal, it was ‘the confidence to hold my own in an international technological society, against the best in the world.’ For T.R. Dalvi, B. Tech. Civil Engineering, 1969, it was ‘How to think quickly on your feet. How not to be afraid of making decisions. Even if wrong not to be scared of taking decisions in future.’ And for P.K. Vichare, B. Tech. Electrical Engineering, 1968, what mattered most was the ‘training in logical thinking – on our feet.’

A PREFERENCE … A CRAZE

A nagging trend, in time to become a positive canker in the Institute’s flesh, surfaced over these early years. It had to do with which kind of aspirant was applying for the Institute’s M.Tech. programme, and – really the crux of the matter – which kind wasn’t.

The first murmur of discontent was heard in the Institute’s Annual Report for 1963-64, just 5 years into its existence:

A tendency has, however, been noticed in the students to go abroad for master’s degree courses, particularly to the USA, in preference to the two-year program at this Institute, where entrance is by severe competition.

Seeking to address the reasons for this efflux – other than the escape from the ‘severe competition’ it afforded – the report noted, empathisingly:

The students attribute their preference for a degree abroad to the fact that they can get it in a shorter period and the standing of the foreign universities might help them in securing better appointments in the industry, apart from the knowledge and experience naturally gained in traveling abroad and
in coming in contact with the developments taking place in the industrially
advanced countries.

Forgivable, then; but the predisposition of the forgiven showed no
signs of waning. So irksome was the trend that Brig. Bose couldn’t keep
himself from airing his unhappiness again just two years later. From the
Institute’s Annual Report for 1965-66:

Although the growth of master’s degree courses in engineering is satisfac-
tory, it is disconcerting to observe that facilities created in this country for
studies in the master’s degree in engineering are not fully exploited by tal-
ented students.

In a tone distinctly more peeved than on the previous occasion (note
the staid ‘preference’ being elbowed out by the shrill ‘craze’):

This is because of the craze for foreign degrees which is still unabated. During
the last two years, one-third of the graduates of this Institute have gone abroad
for foreign degrees.

No amount of fulmination, however, was going to subdue this migra-
tory instinct; and as to what it might mean for the health of the Institute’s
exertions in the arena of research and development, it’s an imponderable
that will engage this narrative from time to time.

‘JUST TO KILL THE BOREDOM’

That’s the shape things took in the Institute’s classrooms and laboratories
of the sixties. As for the pastoral side to students’ lives, outside the aca-
demic area’s sphere of influence, it seemed to have been brush-stroked by
three defining features. One, a huge overdose of potatoes; two, a huge un-
derdose of pre-fabricated entertainment; and three, such vast oceans of
time on your hands, empty of distractions, that it could drive you to your
wits’ end trying to figure out what to do with it.

That’s the operative phrase here: empty of distractions. Consider the
scenario. TV signals were yet to criss-cross the skies (not even the terres-
trial, Doordarshan-monopolized kind had come to Bombay); the word
‘personal’ was still two decades from wedding itself irreversibly to ‘comput-
er’; and as for phones, even a land line was a distant dream. Nor were you in any danger, should you have strayed out of the campus, of being ambushed by diversions. Outside IIT-Bombay’s gates, all was still and quiet; nothing to ‘see’, no malls – why, not even a clutch of shops – you could fritter your time away in. One just had the campus, and its retiring surrounds.

And here was the clincher. Nor any more was there the distraction that can grow to become the most consuming of all: the company of the opposite sex. That all-defining number, the girls : boys ratio, though it might have spiralled relentlessly upward from 1:875 since 1960, yet remained pitifully low; on the IIT-Bombay campus, days together could go by without the chirp of a female voice carrying to a male student’s ear.

In this complete and utter absence of distractions, what was one to do once one’s classes were over, and one’s private time – great swathes of it, in comparison with today – had started ticking? Quite simply, you did whatever was humanly possible to fill it up; to distract yourself. (There was always the homework, of course, but it came at an amenable trickle; indeed for undergraduates it was probably lighter than it is today, the programme being a leisurely five years in duration, not four.)

Where it’s difficult to get distracted it is, as a natural corollary, just as easy to get bored. And so you had to work hard at dispelling the pall of boredom, or be very inventive at it. Bravehearts of the time recall that the most common avenues that offered relief were work, sport, socializing (with your own gender, of course), and – with impressive vengeance – hobbying.

The way the surfeit of time drove students willy-nilly into their books is evocatively sketched by Dr U.N. Gaitonde. ‘UNG’ belongs to a select group that’s been tenaciously a part of the IIT-Bombay scenery over entire decades, having spent practically all their adult lives here. Not content with having done all or most of their education here – including their bachelor’s and doctoral degrees, and often their Master’s too – they’ve enlisted themselves as faculty at the Institute. Gaitonde has thus seen the Institute, often with a wryly cocked eye, from a variety of angles – and we take his spin on the vicissitudes, and the subtle charms, of student life in the late sixties:

‘Because of the lack of entertainment, the only source of diversion in the hostel was maybe a radio set or a record player. TV was installed in my hostel in 1972-73, in my final year. There was hardly anything to do.
From 8:00 in the evening till 10:30 absolutely nothing to do and I’m sure, many of us during the weekdays – and also during the weekends – studied just to kill the boredom. Some must have studied for the sake of studying but I think, quite a few must have studied just to kill the boredom. There was no other entertainment available. I don’t think it was a very good idea, but that was what we ended up doing.’

How well drilled this curious work ethic left some of the students, what masters of their territory it made of them, is evident from this: ‘Today, it might seem an absolutely mad idea, but many of us solved the whole of Kreyszig, the whole of Thomas, the whole of Resnick and Halliday’ during our second years. We studied all there was to study in Physics, Chemistry and Mathematics and I think in every wing, two or three students would have done this, either together or individually. We had so much time on our hands.’

What about those, never too few in number, with books the last thing on their minds?

Expectedly, there was sport. Many recall having spent entire evenings, daily until dark, sharpening their skills in a range of sport, including basketball, volleyball, cricket, athletics, hockey, tennis, badminton, bridge, chess… you name it. Conspicuous by its absence throughout the decade, though, was swimming. To the chagrin of many, IIT-Bombay was perhaps the last of the IITs to get its own swimming pool (it arrived finally, many years too late, in 1979). An early red-letter event for IIT-Bombay’s sporting enthusiasts was the hosting by the Institute of the first ever inter-IIT sports meet, from 27 to 30 December 1961, for which 200 students from its sister institutions travelled long distances to take part.

If not too drawn to sport either, the battle against vacancy became a stimulus for the deepest absorption in some or the other chosen activity. Since you really were at your wits’ end to kill time, those wits got relentlessly sharpened and honed. Passions could be pursued with single-minded intensity, so that they ended up taking on an astonishingly accomplished hue.

There were those who, fascinated by the art of rocketry, obliterated themselves (quite literally, for one of them dropped out of his B.Tech.)

f Voluminous, exacting textbooks in, respectively, Maths, Calculus and Physics.
to the making and launching of their own rockets. There were others who, fascinated by the dynamics of private enterprise, went about floating public limited concerns in the marketplace of their own hostel wings and corridors – with resounding commercial success (for more on this, see Chapter 15).

Yet others, possessed by the spirit of electronics, set up their own HAM and radio broadcasting stations – that again at the height of Indo-Pakistan tensions in 1965, arousing the consternation and the suspicion of the local police, causing them to move into campus to nip the misguided enterprise in the bud. One restless soul, votary of the epicurian life, fabricated his very own Coke dispensing machine: state-of-art technology for the time, and no doubt a useful status symbol to have in your room.

The lure of the arts was no less strong. There were the numbers who plunged themselves into theatre, film, writing. Student magazines of the sixties and seventies – *Technik* is a prime example – carry writing of sometimes astonishing assurance, elegant and informed, peppered with literary allusions. A film society flourished; the very first screenings took place, early sixties, in the Civil Engineering building, moving next into the Lecture Theatre and finally into the Convocation Hall.47 And the films shown were often whimsically offbeat, including those by the European masters of the medium. ‘Often the guy who was organizing the movies would decide,’ recalls Vasi, ‘that such-and-such movie by, say, Bunuel or Bergman, was something we simply had to see – and because there was nothing else to do, 500 people would troop along to see the movie.’

Again the ‘nothing else to do’ syndrome, resulting in its own tangential edifications: here, in the finer points of cinema.

It would appear, then, that much of the extra-curricular vitality of student life in the sixties (and it was to be true right into the eighties) owed itself to the availability of time in which to nurture it – aided on one hand by a stimulating academic environment and on the other by the company of some of the nation’s best young talents. Further on in the book, we’ll see that these circumstances bred some truly fertile minds and foreshadowed, in many cases, success stories on a national and on a global scale.
RETURN OF THE PATRIARCH

The sixties came to a close on a note of departure, of new beginnings. Brig. Bose, who with unbounded energy and fortitude had helped transform an amorphous sprawl of land into a strikingly laid-out, vigorously functioning Institute, had come to the end of his two terms as Director in 1969. The Ministry of Education now asked him to take charge of IIT-Kharagpur, and until such time as IIT-Bombay’s new Director joined, asked Prof. R.P. Mhatre, of Civil Engineering and the Institute’s Deputy Director at the time, to stand in – which he did, from June 1969 to April 1970.

Ten years ago, IIT-Kanpur had reaped the benefits of the experience in institution building of IIT-Bombay’s Planning Officer and first Deputy Director, Dr P.K. Kelkar, gaining him as their first Director in 1959. In 1970, the favour was graciously returned. The Ministry chose Kelkar to succeed Bose, and Kelkar’s ten years of experience in setting up IIT-Kanpur and kindling its academic flame (which by the time he left was burning bright) were carried over to IIT-Bombay. Accomplished and vastly experienced, asked to lend his services even though already retired, Kelkar commanded the respect of a patriarch on the Indian engineering scene. For IIT-Bombay it was a happy homecoming for a ‘son’ – now really a ‘father’ – who had seen the Institute through its birth pangs but had missed being its first Director. He was sure to be welcomed back into the fold.
Looking back on IIT-Bombay’s activities, I think some of the most creative, almost magical transformations were effected during the period of Dr Kelkar’s directorship of IIT-Bombay from 1970 to 1974. What he did was something quite extraordinary.\(^a\)

Dr R.E. Bedford

In the first phase of its life the Institute had fashioned its academic programmes, built up extensive infrastructure in its departments, laboratories and residential units, and settled into the rhythms of its intellectual pursuits.

Over the first part of its second phase – between 1970 and 1974, when Dr P.K. Kelkar held office as Director of the Institute – there was little, in comparison, by way of major new construction; nor were any new departments founded. One new centre for research – the Radar Project Centre, later to be known as the Advanced Centre for Research in Electronics (ACRE) – did take off in 1972, at the behest of the Ministry of Defence. And a few new academic programmes took wing: in 1971-72 the five-year integrated M.Sc.s in Physics, Chemistry and Mathematics, and the following year the diploma of the IIT (DIIT) in Computer Science, a novelty for the time. And that was more or less all.

A cascade of developments on these fronts was in fact to follow in the second part of this phase, between 1974 and the early eighties, after Kelkar handed over charge to his successor, Dr A.K. De. De's tenure would see sponsored research undertaken on a wider scale, a proliferation of in-

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\(^a\) Bedford said this in a panel discussion on IIT-Bombay’s history recorded in 1994, DRR, IIT-Bombay.
terdisciplinary programmes, and the establishment of several centres of research to promote interdisciplinary work.

But all that lay ahead; and on the face of it the years 1970-74, compared with what had preceded them and what was to follow, give the impression of a lull in the Institute’s activities, as if it were taking a hard-earned breather between two spells of greater exertion.

What, then, were the ‘magical transformations’ during Kelkar’s time, ‘creative’ and ‘extraordinary’, that Bedford is referring to? b

A number of religious orders – and, in today’s world, corporate firms no less – subscribe to the notion of a retreat: a removal of the self from the world, the better to plunge into reflection and meditation. Part of its purpose is to peer deep within oneself, examine one’s weaknesses, pinpoint strengths, and emerge from the exercise reinvented. By common consensus amongst the Institute’s senior faculty asked to relive the times, the transformations Bedford had in mind bore the stamp of just such a retreat.

What resulted from the extended contemplation was a complete restructuring of the academic organization and working of the Institute, touching and penetrating all corners of its being – all its programmes, both undergraduate and postgraduate, their curricula, and their teaching and evaluation systems alike. (It bears noting, though, that no institute can allow itself to go into a complete retreat at the cost of its worldly commitments; even as the cogitation went on, IIT-Bombay’s academic sessions proceeded uninterrupted.) A foremost target – and intended beneficiary – of these reforms was the Institute’s undergraduate curriculum, and makes for an instructive case study symbolic of the changes that were rung in.

But why the need for change? The Institute’s academic programmes had by this time earned a fair bit of renown for themselves. They were recognized for the quality of their products by a wide spectrum of employers, both private and public, no less by universities abroad to which a number of graduates had proceeded. The Institute could therefore derive legitimate satisfaction from these triumphs; but Kelkar had no intention of allowing its academic staff to be lulled into complacency. He came

b It needs to be noted here that Bedford wasn’t, in making his allusions, speaking in the warm glow of the moment. His statement came nine years after he had retired from IIT-Bombay, when invited back to reflect on the Institute’s evolution: a good two decades after the era to which he was casting back. Clearly, the years had not dimmed the reverence and affection in which he held the events of the time.
convinced that what was already good could, through remodelling and polishing, be improved upon.

Indeed there would seem to have been some danger of an air of complacency setting in before Kelkar’s arrival on the scene. Bedford again: ‘I personally remember that we used to think we were all quite wonderful, that our education system was marvellous. That you couldn’t find fault with what we are doing. Dr Kelkar challenged this feeling so strongly that it made us uncomfortable. We began to ask ourselves, is our education really all that good?’

And Kelkar was a man in a hurry. Barely had IIT-Bombay’s faculty welcomed their former Planning Officer back into their fold, than Kelkar set about challenging their settled professorial ways. Taking over as Director at the end of the academic year, on 14 April 1970, he convened a meeting of the Senate at the first possible opportunity: immediately after the summer vacation, on 22 July 1970. There he spelt out his views on what he saw as the shortcomings of the existing system, and the antidotes they called for. From this meeting, historic in many eyes, sprang a whole fleet of committees whose labours were to recast completely the academic functioning of the Institute; and it might be best, here, to let the committees Kelkar appointed speak for him. Each came to be known, as is common and perhaps questionable practice, after its convener rather than by the work it did. The first of these, asked by Kelkar to conduct a broad survey of IIT-Bombay’s academic terrain, was the Tendolkar Committee, headed by Dr G.S. Tendolkar of Metallurgical Engineering, one of IIT-Bombay’s earliest recruits and its first professorial head of department.

The team went about its business methodically. As a first step, through a series of meetings and a comprehensive questionnaire, it polled the views of a wide range of staff and students. Satisfied that it had ‘had a fairly good opportunity to elicit the complete cross section of opinion and information at all stages,’ the committee bent to its task in earnest. Subjecting itself to ‘thirty five sittings in all’ (over a period of some six months, this translates into some six ‘sittings’ a month) it submitted a report which the Senate considered at a run of special meetings in early March, 1971.¹

Outlining first the objectives of a sound undergraduate programme, the report presented an appraisal of the Institute’s existing programme in three intersecting spheres: the curriculum, the teaching system, and
the evaluation system. It then made its recommendations for revisions to each.

In its analysis of the curriculum, for example, on the subject of ‘Flexibility’, the Tendolkar Committee commented on the deficit of this very quality:

In the present programme, there is very little flexibility in the choice of subjects except at the fifth year level. Out of the thirty five subjects taught in the undergraduate curriculum, a student has a choice only with respect to two subjects.

‘This,’ pronounced the Committee softly but firmly, ‘is inadequate.’ In the common programme, while the content of chemistry and physics was found to be ‘satisfactory’, mathematics was judged excessive to the point of ‘spoon-feeding’ the students; its strongest words, however, were reserved for the non-science, non-engineering part of the curriculum. The humanities and social sciences component, which comprised seven per cent of the entire lecture programme, was felt to be grossly under-represented.

‘This is certainly inadequate as a common programme’, was the Committee’s verdict, ‘in every respect. The role of Humanities in engineering education hardly needs emphasis, specially in the present day social environment and impact of technology on society.’

The teaching schedule itself appeared stiflingly crowded. ‘The present thirty five hour per week schedule is somewhat excessive,’ ruled the committee, ‘and does not leave any time for the students to "think".’

Nor even did the existing practices of evaluation escape their reproach. Remarking on the year-based system of promotion where students who had failed a certain year were required to repeat all subjects for that year, irrespective of their having cleared many of them, they lamented the psychological problems this bred, of an ever-present pool of ‘repeaters and failures’ languishing at the Institute, growing disgruntled with its harsh dispensations.

At this point came the sternest indictment: its survey had indicated that, notwithstanding the success the Institute’s undergraduate programme had enjoyed so far, ‘most students and faculty’ were ‘totally dissatisfied with the present system of examination.’
The Tendolkar Committee’s ensuing recommendations were tied closely to its critique. In brief, it proposed that greater flexibility in the curriculum be provided in the form of elective courses; that the Humanities component be boosted; that a vigorous move be made toward course-based, not year-based, evaluation; and that a scheme of continuous assessment be introduced.6 At the March 1971 meetings, although there was criticism on some points, the report received the broad approval of the Senate,7 and the stage had been set. The baton was passed on to a band of other committees to delineate and fine-tune the changes to be effected. Kelkar immediately constituted two separate teams to work out the details: one to frame the new curriculum, a second to frame the rules and regulations that would govern its operation. The first came to be known, after Prof. A.K. Mallik of Metallurgical Engineering, in 1986 to become Director of IIT-Kanpur, as the ‘Mallik Committee’. The second was the ‘Hira Lal Committee’, after one of the prime movers of the establishment of Chemistry as an independent department, its first Head, and ‘a leader, fair and reasonable in all his dealings, and always brilliant in his presentations and arguments’.8 Since the work of the two groups was intimately related, Kelkar devised a bridge between them – of the flesh-and-blood kind. Picking Sukhatme, of Mechanical Engineering, for the part, ‘These two committees can’t work separately,’ he said to him. ‘One must know what the other is doing and you will be the link between two – you’ll be on both.’

The committees weren’t given much time. Appointed in April 1971, they were advised by Kelkar that he’d like the new systems up and running from the oncoming academic year starting in July, barely three months away; he requested them to submit interim reports in good time for this to happen.

The committees needed to work every bit as hard as their progenitor had done, and they did. Meeting twice or thrice every week over the summer (and forgoing that jealously guarded privilege of the academic life, the long vacation),9 they were able to adhere to the deadlines given them; their reports came up for deliberation by the Senate at its meeting on July 7, 1971.

The Mallik Committee concurred, and complied, with the Tendolkar Committee’s views. It framed a curriculum with an amplified Humanities component, stepping it up to as much as fifteen per cent; tempering
the programme’s former rigidity, it introduced provisions for electives throughout the five years; to encourage ‘thinking’ in students, the number of contact hours was brought down to a maximum of 30 hours per week.

It devolved, next, on the Hira Lal Committee to set down the rules governing the programme. They first brought into focus what they saw as the principal limitations of the prevalent regulations. IIT-Bombay’s academic year was divided then into two terms. For each course you took, a mid-term and an end-term examination, carrying weights of 40% and 60% respectively,10 decided your fate in the course; and your overall performance in the course decided your fate for the year. And ‘the use of the performance of an year as the basis for promotion,’ noted the Hira Lal Committee, ‘places the student under considerable pressure – this being particularly the case in the final year which carried more than half the weightage for the B.Tech. programme as a whole.”11

It was altogether an outmoded, schoolish regime for evaluation and promotion; and there were other problems too. Under the year-based system the pace of study expected of all students – brilliant, average or below average – was the same. Again, having only a mid-semester and a semester-end examination in a course, rather than encourage ‘continuous scholarly study on the part of the student’, required instead ‘only a few bursts of concentrated effort under heavy pressure.”12

Its diagnosis done, the Hira Lal Committee went on to propose with clinical care the remedies it thought would ‘remove or at least alleviate’ the limitations. The key features of the new system mapped out were its adaptability and flexibility; and they are sure to set loud bells pealing in the minds of the many generations of students who have passed through the Institute early seventies onwards.

‘A certain quantum of work measured in credits,’ the Hira Lal Committee elucidated, ‘is laid down as the requirement for the B. Tech. degree. The student acquires the credit by passing courses every semester; the student must pass each course; at the same time, he is not required to repeat any course which he has passed.’

This meant, in practice, that students could now complete the course work each at their own pace – and though they might have to repeat courses they had failed, they never need repeat a whole year, lock, stock and
barrel. In this way all students – the brilliant, average, or below-average performers – were no longer judged on the same plane. ‘The subject as the basis of assessment’ favoured by the Tendolkar Committee had been given tangible and explicit form. Sounding a death-knell for the dominance of the solar calendar, ‘The term “year” itself,’ declared the committee, ‘will lose its present significance for purposes of evaluation.’

The recommendations that will set the bells of remembrance chiming the loudest, however, for they weren’t without controversy, concerned the new methods of evaluation. Confessing that ‘the only feasible method for measuring performance’ it could think of was ‘through the medium of examinations’, the committee felt that ‘to encourage continuous study, these must be evenly spread over the semester.’ In practice, this translated into a series of quizzes, tests, and assignments spread over the semester to replace the mid-semester assessment, with equal weightage being given to in-semester and end-semester assessment. Thus came into being the ‘continuous evaluation’ regime: one that obliged students, habituated until now to getting by with a ‘few bursts of concentrated effort’, to be on their toes each week of the semester, each day of the week: for you never knew when a ‘spot’ quiz might be sprung on you. As can well be imagined, not all students took to the new pattern with relish; but there were others who saw the good in being stung out of their earlier state of ‘lazy bliss’.

Finally, the Hira Lal Committee wished to remove the anomalies that arose from an instructor’s innate bias in marking. IIT-Bombay’s faculty weren’t proof to the universal weakness: some were compulsively miserly in awarding marks, others compulsively liberal. As a partial remedy, a scheme of letter grades was introduced. Five grades, letter-based, were proposed; each grade, A through E, would denote a range of marks rather than an absolute percentage. Grades would be awarded on a relative rather than an absolute basis – thus removing the bias inherent in the exact marks – and a detailed scheme, supported by numerical examples, was drawn up to demonstrate how percentages might be converted into grades.

The Mallik and Hira Lal Committee’s interim reports met, ‘after considerable discussion’, with the Senate’s approval. The new curriculum and evaluation schemes were implemented without delay, that very July, in 1971 – Kelkar was indeed a man in a hurry – even as the committees worked further on finalizing their interim reports.
COMMITTEES, COMMITTEES

With such all-embracing changes in the curriculum in prospect, and in order for the new regime to function effectively, Kelkar had anticipated that the Institute’s academic organization would also need a complete reshuffle.

With this in mind, and firm believer in committees that he was, Kelkar had at the outset – in the Senate’s July 1970 meeting itself – appointed one to reorient the Institute’s academic bodies. Convener of this group was none other than Dr R. E. Bedford, on whom the Kelkar-inspired ‘transformations’ were to leave such a lasting mark. Bedford’s committee went about wreaking a few renewals of their own: where earlier there had existed a single, catch-all academic committee for each department, there would now be separate bodies for undergraduate and postgraduate programmes, at both the department and institutional levels. Also introduced, or overhauled, were the library committee, the scholarship committee, a committee of faculty advisers and – sovereign amongst these – a Senate committee for nominating members to all its other committees.

Thus came into being a thoroughly distributed and delegated framework of operation, one that has stood the Institute in good stead over the years, not least because it has allowed widespread, participative involvement of faculty in institutional decision-making. It’s a symbiotic tradition that has allowed the Institute to draw strength from its academic staff every bit as much as it has empowered them to bring about change and reform. And the tradition has endured: but for some tweaks here and there, the academic structure laid down by the Bedford Committee exists today essentially as it was framed then.

Largely as a corollary to the academic reforms, IIT-Bombay gained in July 1972 its first Dean of Academic Programmes. Kelkar explained to the Institute’s Board of Governors why the Dean was required:

“To do coordination of different courses, registration of programmes, appointment of Faculty Advisers, interdepartmental coordination and a variety

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c In part, this move was stimulated by Dr K.C. Mukherji of Electrical Engineering. Minutes of the 31st meeting of the Senate, IIT-Bombay, 22 July 1970, Item 17.
d Report of the Committee for Review of the Academic Bodies of the Senate, IIT-Bombay, 1973. The Committee was nicknamed the CRAB committee (after its initials) by Dr K.C. Mukherjee of Electrical Engineering, on the floor of the Senate. The acronym stuck, and has been used ever since.
of other tasks, which may arise due to the adoption of the present Semester Credit System and the new academic programmes.\textsuperscript{15}

Hand in hand with this Kelkar got the Board to grant the Institute, at the same meeting, a ‘Dean of Research’ who would ‘look after the institutional coordination of research programmes, sponsored research projects and also deal with outside agencies for undertaking various research and consultancy projects, etcetera.’\textsuperscript{16}

To the position of the Dean of Academic Programmes, it was but logical that the first incumbent should be the man who had steered the transition from the old set of rules for examination and evaluation to the new: Dr Hira Lal. To another science department went the distinction of supplying the first Dean of Research (the ‘and development’ tag was to come later): this was Dr R.P. Singh, of Physics.

At a prior session, in August 1970, the Board of Governors had approved another request by Kelkar that stands out as the only instance of its kind in the Institute’s administrative history. Kelkar asked that in view of the varied demands of the position, the Deputy Director’s post be bifurcated ‘for arranging the work of the Deputy Director to be looked after by two Professors’. The broad distribution of work was spelt out as follows: ‘1) Prof. N.R. Kamath, Head of the Department Chemical Engineering – Academic, Administration and related matters; 2) Prof. J.T. Panikar, Department of Civil Engineering – Building, Construction, Estate and Miscellaneous matters.’\textsuperscript{17}

The arrangement was to continue for four years, until 1974, when once again a single Deputy Director – Dr S.C. Bhattacharya of Chemistry, a
doyen of chemical research – took over. Ever before and ever since, IIT-Bombay has seen just one Deputy Director; however, with governance structures proposed to change over the next few years, the idea of having more than one is being actively entertained again.

The changes built into the refurbished undergraduate programme and curriculum were in due course extended to postgraduate programmes – but not before the mandatory surveys had been carried out. Once more, Kelkar insisted on a comprehensive review of the postgraduate programmes – the M.Tech. and Ph.D. in particular – and only when faculty at large were convinced of the benefits of ringing in the changes, were they introduced.

First to come under the purview of the new rubric, two years after its jurisdiction on the B.Tech. had been established, was the M.Tech. programme, in 1973. In less than a couple of years, all other programmes – the M.Sc., D.I.I.T., and the Ph.D. – had adopted the same broad format: of broad-based curricula sprinkled with electives, of the semester-based credit system, of continuous evaluation. The findings of these reviews, carried out by committees convened by Dr G.S.R. Narasimhamurty of Chemical Engineering and Dr A.B. Biswas of Chemistry, will be revisited later in the book (Chapter 11).

A mid-seventies visitor to the Institute would have been hard pressed to discern much overt change in its outward anatomy (or for that matter in its inner apparatus) from five years ago – its buildings, equipment and people were essentially what and who they’d been before. He’d have been in error, however, in judging the Institute on this evidence: the surface stasis was a deceit. For the Institute had in fact undergone sweeping changes to its inner, invisible-to-the-world workings: to, you could say, its very physiology. The purpose of the retreat had been served. Its academic batteries recharged, IIT-Bombay was all set to take on the pedagogic challenges of the years to come.

A CORNUCOPIA OF CENTRES

While all this academic churning was taking place, and was cause for some sense of accomplishment, there was rising cause for unease as well. It centred on that part of the Institute’s development which, unhappily sluggish all through the 1960s, was still showing no real signs of picking up.
Casting an examining look around – and all smiles when handing over the scroll.
Mrs Gandhi’s visit to the Institute in September 1972, on the occasion of its 10th Convocation. It’s a matter of some incidental interest that Mrs Gandhi proceeded from IIT-Bombay to the BARC that day, there to set the wheels in motion leading to the Pokhran nuclear explosions of 1974. See Perkovich, J. India’s Nuclear Bomb, OUP, New Delhi, 2002, p. 172, where the author states: ‘[Sethna said that] Mrs Gandhi authorized fabrication of a device for a peaceful nuclear explosion on September 7, 1972, the day of the tenth convocation of IIT-Bombay.’

IIT-Bombay was still struggling to make inroads of note into the province of research. In an Institute perennially short on intra-mural funds to support its research plans, one of the chief measures of the health of this activity was the volume of externally sponsored research: and this was decidedly slim. In the fiscal year 1973-74, for instance, the investment at-
tracted from external agencies came to less than Rs 9 lakh: not even in those days could this be deemed a healthy sum.

And if you happened to tally them, the externally sponsored projects ran into numbers an infant could count: a mere half dozen were being conducted. The figure struck hardest when set against the number of faculty at the Institute, then hovering around the 300 mark. Assigning, conservatively, each project against one pair of hands, six projects implied that only one in every fifty faculty was working on an extramural project: truly an unpromising proportion.

Of industrial consultancy projects there were a far greater number – some 215 in all – but the money they brought in the same year was meagre, altogether about Rs 3.5 lakh. Generating on the average Rs 1800 each, most of these projects therefore answered broadly to the descriptor ‘small jobs’. Nor did they do much to intensify the Institute’s R&D effort. Very many took the form of routine testing assignments rather than of collaborative research or technology development.

Academic staff who joined around this time beheld the Institute in an unflattering first light. An example is the 1974 Physics recruit Dr Dipan K. Ghosh, in time to fortify the Institute’s functioning in several capacities, including those of Dean of Resource Mobilization and of Deputy Director. ‘IIT-Bombay at that time,’ says Ghosh, in his trademark make-no-bones, gunshot style, ‘was not at all known as a research institute; it was primarily a teaching institute.’ For him, there appeared to be an all too manifest contrast between the research-driven TIFR at the other end of the city, where he’d done his Ph.D. in the late sixties, and the IIT-Bombay of the mid-seventies. All in all, then, amongst IIT-Bombay’s faculty, the notion of ‘research as an indivisible part of academic life’ would appear not to have taken root.

At around this time, two developments unfurled that set the wheels of change rolling, and along several fronts at once.

First came a change of Director, bringing with it – inevitably – a reorienting of sights, a shift of outlook and emphasis. Second, and perhaps more importantly in a purely pecuniary sense, came a series of schemes drawn up a thousand kilometres away by the nation’s economic think-tank: by the Planning Commission in Delhi. These were aimed at toning
up conditions and facilities for technological R&D across the nation – and were to prove a godsend for IIT-Bombay and for its sister IITs alike.

IIT-Bombay’s ‘new’ executive head was new, however, only to the Director’s chamber in the Main Building; to the Institute at large he, like Kelkar before him, was no newcomer. In fact he was almost as much a veteran as Kelkar himself: Dr Arun De had been recruited for the Institute during Kelkar’s pioneering stint as Planning Officer. Since then De had headed the Mechanical Engineering department, and in 1969 had gone east to Durgapur, in West Bengal, to take up the directorship of the Central Mechanical Engineering Research Institute (CMERI). The Ministry now asked him to head west again, and lead IIT-Bombay.

If Kelkar had been restless about one thing, De was restless about another. The Institute during his predecessor’s term had reinvented itself in the arena of academic curricula and practices; De was keen that it should reinvent itself in the realm of R&D.

Yet there appeared to be little, in practical terms, that he could do. The Institute could boast no great riches by way of a research base. Its legacy of Soviet equipment, while saturating its laboratories, still acted less as a stimulant to research than as an inadvertent millstone. And the crunch on governmental funding continued unabated in its severity, keeping the Institute from replenishing and upgrading its inventory of equipment.

What came as a ray of sunshine parting the clouds of privation was the nation’s fifth five-year plan.

India’s famed five-year plans – glittering examples of the ‘high-command’ mode of stage-managing a national economy – had always been well-intentioned, promising to earmark generous support for science and technology. But in the translation of thought into action, they had repeatedly fallen foul of the nation’s economic and defence crises that reared up with destructive frequency through the sixties and early seventies.

The five-year plans had therefore made themselves felt little, if ever, in positive ways over the first fifteen years of the Institute’s existence. Indeed the primary upshot of the bouts of economic planning in New Delhi seemed to be periodic cutbacks in funding, compelling the Institute to defer some plan or the other – relating to construction, development of infrastructure, or the strengthening of research in its laboratories. This la-
ment from the Institute’s annual report for 1967-68:
‘Unless a certain amount of foreign exchange per year based on the research activities of the Institute is given to the Institute, many research workers in the future would be handicapped’;

and this from the very next year:
‘Unless research activity is supported by adequate financial resources ... intensity for such activity cannot be sustained’;  

and the refrain was to recur well into the mid-seventies.

India’s fifth five-year plan, for the period 1974-1979, held out a fresh glimmer of hope. In Chapter Five, under the section ‘University Education’, came the pronouncement:

Post-graduate education and research will continue to be strengthened through the development of centres of advanced study, science service centres, common computer facilities and regional instrumentation workshops.

This was followed in the section on ‘Technical Education’ by the more pointed:

Centres of studies in material science, cryogenic engineering, energy studies and ocean engineering are expected to be established in close collaboration with user agencies. 

Where things differed this time round was that the statements of intent were acted upon in decisive fashion. The Department of Science and Technology (DST) was asked to look into the execution of the plans. Crucially, the DST suggested that the areas identified would best be developed by setting up dedicated centres for interdisciplinary work backed by reasonable funding, and by locating them ‘in those educational institutes where certain traditions of basic and applied research in science and technology had a more or less firm basis’; these, in the DST’s considered opinion, were the IITs. 

In 1975 the Ministry of Education and the IIT Council, acting on the resolutions, set up a committee to look into their implementation. The committee, which included the directors of all five IITs, was headed by a scientist who by this time was striding across the Indian science and technology scene with considerable authority. Prof Y. Nayudamma, then Director-General of the CSIR, although neither a product nor ever on the
staff of an IIT, was to have a remarkable impact on the fortunes of the five institutes over the decade to come.

The Nayudamma Committee, in four meetings held between 12 August 1975 and 16 April 1976, addressed two questions before it: into which areas of cross-disciplinary R&D should resources be ploughed, and how and where to catalyze their growth. To the areas identified by the Planning Commission the Nayudamma Committee added one of its own: Resources Engineering, making a total of five. Since there were five IITs, and five identified areas, each IIT could be apportioned one based on an assessment of the potential at each. In the event, it was to be the discipline tagged on at the end that was allotted to IIT-Bombay: Resources Engineering.

Owing to an added feature of the Nayudamma Committee’s dispensations, however, Resources Engineering proved to be just one of the many prongs of munificence engendered by the governmental initiative. The Committee had felt that while each IIT should take the lead in one chosen area, it should also have each of the other disciplines represented, if to a more modest degree. In this way, work on any given problem in any of the IITs was to complement allied work in all the other institutes, the hope being that the synergy would lead to breakthroughs otherwise not possible. Thus, to go with Resources Engineering as its primary Centre, IIT-Bombay was also to come into a quiver of ‘sub-centres’ in each of the four other areas – Materials Science, Cryogenics, Ocean Engineering and Energy Studies.

Music to the ears of an Institute long thirsting – for over a decade and a half – for tidings of this gilt-edged sort to waft over from Delhi; and IIT-Bombay hastened gratefully to seize the opportunities they offered. Proposals were forthwith written up and sent; a Centre along with a small battery of sub-centres was won; and so it happened that the Institute inaugurated, in December 1976, its Centre for Studies in Resources Engineering (the CSRE). Likewise, IIT-Kharagpur took up Cryogenics, IIT-Kanpur, Materials Science, IIT-Delhi, Energy Studies, and IIT-Madras, Ocean Engineering.

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e Starting as a scientist in the Central Leather Research Institute in Chennai, Nayudamma was appointed its Director in 1958, a position he held until 1971. He was then elevated to the post of Director-General, CSIR, and went on to become Secretary to the Government of India in the Department of Science and Technology.
The CSRE, as its name suggests, was created to help develop integrated resources maps – water and minerals, oil and forests, amongst others – for the nation. It was to do this by using a conjunction of modern remote sensing techniques, such as satellite imagery, and ground engineering procedures. For its first few years the CSRE worked as a physically distributed entity, its equipment and expertise spread across the existing departments; its own cuboidal, four-storeyed building, wasn’t commissioned until 1981-82.25

The Centres came with several trappings valuable to the Institute. In the CSRE there were the generously equipped laboratories, dedicated seminar rooms, lecture halls, a library. But also, there was a stimulus to cross-disciplinary research straddling many areas, especially with the sub-centres simultaneously created (though these were not housed in their own buildings).

While the Ministry of Education was overseeing the setting up of Centres of Advanced Study, its sister ministry, that of Science and Technology, had turned its mind to a parallel track, and brought forth another offering.

In an attempt to give shape to the Planning Commission’s vision of setting up ‘science service centres’ and ‘regional instrumentation workshops’, the DST resolved to create a different species of Centre, these too distributed nationwide. In conception they were more utilitarian than the Centres of Advanced Study. Named the Regional Sophisticated Instrumentation Centres (RSICs), they were to house state-of-art analytical instruments which might otherwise be too expensive for individual organizations to acquire, and make their services available to both academic organizations and industry ‘on a modest charge’. They were also to furnish technical advice in the acquisition of data, and to provide training for industrial personnel – hoping thus to boost industry-academia interaction.

It was a matter of some satisfaction for the Institute that it was chosen to house one of only four RSICs nationwide (the other three were assigned to IIT-Madras, the Bose Research Institute, Calcutta, and the Central Drug Research Institute, Lucknow). Sanction for the RSIC at IIT-Bombay, meant to serve the nation’s western zone, was received in March 1975; it was inaugurated on 28 December 1978, by the Prime Minister, Morarji Desai.
Towards the end of De’s tenure, a third government-led opportunity presented itself. Now it was the Department of Electronics that extended the olive branch. It had decided in the early eighties to set up four Computer Aided Design (CAD) centers across India; these were designed to acquaint industry with modeling, simulation, and control directed at improving process and plant efficiency. IIT-Bombay was identified for the CAD in chemical engineering; and so, to add to the ACRE, CSRE and RSIC, along came the CAD centre – and brought in its wake an invaluable spin-off for the Institute. Until then IIT-Bombay’s central computers – the second-generation MINSK-II, the third-generation EC-1030 – were housed in the Mathematics building, which hosted the Computer Centre. But the Institute by now had decided to acquire a new mainframe, the fourth-generation Cyber-80. It was going to be impossible to house the ever-expanding Computer Centre in Mathematics; a new site for the Centre was urgently needed.

The Institute, however, was too strapped for cash to put up a new building. As a compromise, space in the ground floor of CSRE was being earmarked for the Computer Centre. Simultaneously, however, architectural plans were being prepared for a separate CAD building. Dr A.P. Kudchadker, one of those leading the CAD initiative at IIT-Bombay, not long from then to become the Dean of R&D and the Deputy Director of the Institute, had an idea. He was himself unhappy with the proposed location of the Computer Centre at CSRE, feeling it wasn’t central enough for a facility of such widespread use. He suggested to De that with the Rs 10 lakh given by the Department of Electronics towards a building for the CAD Centre, the Institute could build an integrated unit, housing both centres – the Computer Centre and the CAD Centre – at a suitable central location. The idea was an eminently sound one; and so the two centres were lodged together, creating a powerful computational node in a location central as central could be, within easy reach of all departments, administrative units, and students.

Earlier in the decade, even as negotiations were proceeding with the Ministry of Education and the DST, IIT-Bombay had conjured for itself a ‘virtual centre’. The Industrial Research and Consultancy Centre (IRCC) was established in September 1975 to act as a link between the Institute and external funding agencies and industries. Overseen by the office of
the Dean of R&D, it was to liaise between Institute faculty and spokes-
persons from industry; it would act also as a clearing house for externally
funded research, and for development and consultation work.

The externally funded Centres, while warmly welcomed, were sharply
delineated in their scope, each committed to its own prescribed focus. De
felt that a broader spectrum of research effort could only be galvanized if
the Institute took it upon itself to do so. Plan funds, however, were tight.
(In the interests of clarity, a small explanatory aside on whimsical gov-
ernmental nomenclature is in order: ‘Plan’ funds are those reserved for
equipment, buildings, and other so-called ‘capital assets’, while ‘Non-Plan’
funds are those earmarked for recurring expenses such as salaries, con-
sumables, and contingent costs). To De’s thinking, the only solution lay
in a prioritized husbanding of the Institute’s limited Plan resources. In his
own words: ‘Until then, the yearly Plan allocation for the Institute was dis-
tributed equally amongst the departments. I said this won’t do, we must
build up a research base. One way of doing this was to procure analyti-
cal instruments of common utility worth Rs 5-10 lakh each, and designate
them as central research facilities. I remember we used to receive around
Rs 75 lakh every year as Plan capital; of this, my proposal was to set aside
Rs 30 lakh to build up these facilities.’

This he did; and from the pool thus created, the Institute succeeded
in acquiring two or three major items of equipment annually; by rotation,
each department might derive the intended benefit. A string of new labo-
ratories were supported through this mechanism, such as those for Sound
and Vibration Studies, and Lasers and Laser Systems.26

BUILDING ACADEMIC BRIDGES:
THE GROWTH OF INTERDISCIPLINARY PROGRAMMES

During this sub-phase (1974-84), then, a swiveling of the national fo-
cus towards interdisciplinary research had bestowed IIT-Bombay with a
collective stimulus for research and development. To leverage the oppor-
tunities created through the central research facilities and the externally
financed Centres and sub-centres, the Institute launched a range of new
interdisciplinary programmes, leading to the M.Tech. and Ph.D. degrees.
As many as eight were added before De’s tenure came to a close in 1984.
The time-line of the exercise reads like a veritable schedule of inceptions, 1976 onwards. That year saw the approval by the Senate of the interdisciplinary programme in Materials Science27; the following year, 1977, saw the launch of both Systems & Control Engineering and of Environmental Science & Engineering. In 1978 Industrial Engineering and Operations Research, and in 1980 Industrial Management, made their debut; the following year, in 1981, it was the turn of Energy Systems Engineering. Again a year later, in 1982, Corrosion Science & Engineering came along; while in 1984, Reliability Engineering was introduced.28

Thus, very many of the interdisciplinary programmes IIT-Bombay knows today took off during De’s tenure. Vitally, the seed of thought had been sown that cross-disciplinary research, then the emerging flavour of the day in science and technology, was important to the Institute – and, in requiring faculty from many departments to come together, spurred cross-fertilization of ideas and expertise along the Institute’s ‘long corridor’.

While there was all this bustle arcing across departments, things were quieter within them. Only two new academic departments came into being. A DIIT in Computer Science had been offered since 1973; the introduction in 1978 of an interdisciplinary M.Tech. and of a B.Tech. in 1980-81 in the discipline made it imperative, before long, to create a separate department of Computer Science and Engineering. This crystallized in 1982. Soon after, in 1983, the Department of Earth Sciences emerged out of its erstwhile position in the Geology section of Civil Engineering.29 Existing departments, too, came up with a new programme or two. A B.Tech. in Engineering Physics – a bold idea at the time, and one which proved itself successful – was initiated in 1981.30

**EXPANSION, CONTRACTION**

For the Institute’s academic programmes, while there had been a heartening expansion on some fronts, a major upheaval, of dubious merit, lay in store on others.

Dr Y. Nayudamma, who in the mid-seventies had led the committee on centres for advanced study at the IITs, was now, at decade’s end, placed in charge of one to look into the academic programmes of technical institutes country-wide. Specifically in response to the emergence of the ‘10+2’
pattern of school education in the country, the Nayudamma Committee recommended shortening the IIT B.Tech. programme from five years to four – which meant, in effect, lopping a twenty per cent chunk off it. These changes came into effect 1981 onwards.

The M.Tech. programme was even more severely affected: from four semesters it was shrunk, 1983 onwards, to three – an abridgement of 25 per cent. In a separate development, entrance to the programme also became subject to an all India qualifying examination, the Graduate Aptitude Test in Engineering or GATE.

The abbreviation of the programmes wasn’t a move popular with the IITs, but was seen through nonetheless; some commentators have viewed it as an infringement on the IITs’ autonomy.31 It certainly meant a less rounded curriculum for the B.Tech. programme, and a substantial compromise on the project work in the M.Tech. While the four-year B.Tech. persists to this day, the duration of the M.Tech. reverted, 2002 onwards, to its former two years.

At the turn of the decade, keeping the flag of academic experimentation fluttering, IIT-Bombay felt the itch for yet another appraisal of the undergraduate programme. On this occasion its purpose was to assess the performance of the new system in force since 1971. Adhering to institutional custom, it fell to a Senate Committee to do this. Constituted in 1980, it was headed fittingly enough by Dr Hira Lal, who a decade ago had overseen the framing of the re-structured rules and regulations.

The inner urge for renewal and renovation wasn’t the only stimulus, though, in this instance. His new committee set to work in the shadow of the impending curtailment of the B.Tech.

In essence the Hiralal Committee found that the extant curriculum and evaluation systems were in good order. Compared with the sweeping changes of a decade ago, the recommendations this time were in the nature of minor tweaks and turns. To give students even more time for independent study, the Committee suggested that weekly contact hours be further trimmed, from the prevalent 30 hours down to 25.32 Recommendations were also made in respect of in-semester assessment, including the number of class tests and quizzes and the heavier involvement of course assistants. Students were to be judged to a finer grain: the number of passing grades was increased from the previous five to seven:
this expansion saw the introduction of ‘saddle’ grades such as AB, BC, and CD, plugging the gaps between the straight A’s, B’s and C’s.

‘ONE DAY BETTER TO FORGET’

For all the Centres, Schools and schemes introduced during his tenure and his abundant energy in bringing them to fruition, De never enjoyed the luxury of being able to concentrate undisturbed on the Institute’s academic maturation. While keeping one eye trained on this facet, he had to keep his other fixed in an altogether different, and unquiet, direction. Barely a year into his Directorship, in 1975, came the announcement of the Emergency, with all its attendant uncertainties over the next two years. ‘Prof. De’s was also a difficult tenure,’ recalls Sukhatme, ‘because of the Emergency. Although IIT-Bombay was not directly affected – in the sense that nobody was arrested here, there were no disturbances on campus – the effects were felt indirectly. There were undercurrents which disturbed the… shall I say, the peace of the campus. No question about it.’ Saying that it wasn’t something he could quite put his finger on, he did recall the ministry’s control over small things seeming to have increased. ‘Directives used to come saying: on campus you must see that such and such is done. It made life difficult.’

When asked if there was ever a sense of threat to the Institute’s autonomy, ‘No threat to the Institute’s academic autonomy,’ Sukhatme said, ‘but certainly to the Institute’s administrative autonomy. I think there was a feeling that the Ministry wanted greater control.’

Mirroring the national mood of the times, employee unions, until then a species unknown to IIT-Bombay, started to rear their demonstrative heads. The first to make its voice heard was the Non-Academic Staff Association, or NASA, formed in 1974 (though accorded formal recognition only in 1981). The same period saw faculty ‘get organized,’ forming the Faculty Forum in 1978. The following year it was the turn of the non-academic ‘Class-I’ (i.e. administrative and technical) officers of the Institute, who formed their own Technology Officers Association.33

‘And these bodies got organized,’ feels Sukhatme, ‘initially to make their presence felt.’ Unions in their new-found enthusiasm aren’t the easiest to handle; they’re liable to create issues where none exist or blow them
up where they do; De had to deal with all hues of situations. Set against what was to come, however, the challenges posed by these arrivals paled into insignificance.

In the course of researching this book, a selection of faculty were asked the question: was there an interval in the life of the Institute that you felt was particularly problematic; when there might have pervaded a sense of pessimism or despondency? One of the most frequent responses was: the students’ unrest, accompanied by the mess workers’ strike and the resulting two-week closure of the Institute, in March 1980.

This struck me as remarkable. ‘Minor’ disruptions on this scale, after all – a strike here, a closure there – had for decades been accepted as par for the course at most academic institutions in country, particularly during the seventies. For a relatively brief closure to have had such a powerful impact here, its memory eliciting a sense of despondency 25 years on, was the puzzling thing.

On glancing at IIT-Bombay’s own historical canvas, though, one could see why. Until the late seventies, with the Institute 20 years old and growing, it had gone about its academic business without a stutter. Not a single examination delayed, not a single admission deferred, not a single convocation held up except in the event of some suddenly arising exigency. And, while internal friction had in fact cropped up from time to time – there was for instance the widely recalled 10-day mess workers’ strike in 1965, leaving students stranded, when the Institute’s staff and their families had rallied round to keep the hostel kitchens going – it had been tackled unerringly in a climate of negotiation, reconciliation and, above all, peace. All that changed in 1980, with events coming to such a head that, at their flashpoint, riot police had to be called in.

To try and piece together the events surrounding the closure, I spoke to some of those who had seen, or followed, the events at close range – and also to the man who was in the thick of the action, Director De. From their accounts, three or four undercurrents appear to have converged in precipitating the crisis. According to De he found, on taking over as Director, more than 250 casual workers on the Institute’s rolls in its hostels and laboratories. His experience at the CMERI in Durgapur cautioned him that this situation was the kind that could balloon into unrest any day: there in West Bengal, casual workers who’d worked for a year or so would then
force the organization’s hand to make them permanent. While to accede to such demands was all very well from the standpoint of compassion, it led to the distortions painfully familiar to the Indian public sector in the seventies, of runaway over-employment and plummeting productivity.

Anticipating similar complications here, De decided to terminate the services of those who had worked less than six months at the Institute; there were more than 150 such workers. As chance would have it, in a concurrent development four undergraduates who had been unable to complete their stipulated course requirements had been asked to discontinue their programme. The suspended students asked that they be given a further chance to satisfy their course requirements; students sympathetic to their predicament decided to come out in their support; so did a handful of the Institute’s academic staff. The Institute, however, remained unmoved, maintaining that a compromise on its academic standards was unacceptable.34

An unquantifiable but not intangible factor in all this was the political mood of the times. This was the late seventies, caught up in the backlash to the Emergency, abetting of mistrust and confrontation. Documents of the time also speak of ‘agents of instability’ in the Institute fanning the flames. A letter to the Times of India written by a group of three students pointed to ‘the real issue’ being ‘the infiltration into the campus of a group of radical students, who are trying their best to sow the seeds of confusion and chaos,’ and who ‘have jumped on to every bandwagon and tried to manipulate every demand to serve their own ideology and interests.’35 Others who cast their mind back to these events, for instance Dr H. Narayanan of Electrical Engineering, another of the Institute’s long-timers who did his B.Tech. and Ph.D. here between 1964 and 1973, concur with this contention. Narayanan felt the belligerent factions among the students were led by some who simply used the issue as an opportunity – a laboratory of sorts – to test and flex their ideological muscle: the ideology in question being, again by consensual memory, of the ‘radical left’ persuasion. The average student, in all this, appeared caught up willy-nilly in events not of his own making, and ‘paid heavily for a cause they had never believed in or supported.’36

As often happens in many-layered situations of this sort, once a delicate threshold had been reached, events snowballed. Mess workers went
on strike, throwing student life into disarray. Students, venting their own ire, gathered in the Main Building to protest at the Director’s door; some went on hunger strike. There was much tumult within their ranks, too: a record sixty-three ‘high-strung’ general body meetings are said to have been held in the Institute’s ten hostels over a period of four days.37

On Friday March 7 1980, a body of students boycotted classes to assemble in the Main Building lawns with their charter of demands. De told the strikers he wasn’t prepared to relent; at around noon, he was gheraoed. A few hours later an unexpected twist appears to have taken place, when ‘a few members of the non-teaching staff’ entered the fray, ‘shouting slogans and attempting unsuccessfully to pick a scuffle with some students.’38

IIT-Bombay was in a state of siege.

De, however, was no stranger to such situations. At the CMERI, late sixties and early seventies, with West Bengal in the grip of the Naxal movement, he had had to tackle several bouts of unrest. ‘I had been gheraoed several times there,’ he says, ‘so I was not cowed down by the situation here.’ And the experience he had gained there told him there was just one way out of such corners: dispersal.

Prof J.R. Isaac, who had joined Electrical Engineering in 1961, and in whose charge the Institute’s Computer Centre was first placed, reconstructs the events here on. Isaac, in his capacity as the Dean of Students’ Affairs – the first to hold this office by virtue of his unrivalled popularity with students – found himself ensnared in the tumult, incarcerated with De. ‘I had gone with Prof Chaturvedi [the latter was a Warden for one of the student hostels] to meet Prof De in the Director’s office,’ recalls Isaac. ‘It was then that we had a student gherao – we three were literally kept locked in the office from the morning – with students sitting on the ground, blocking all exits. Prof Bedford, the Deputy Director, then was on phone contact with Prof De, and it was decided to call in the police.’

The police asked the students to vacate the Main Building within 15 minutes. The students didn’t leave but allowed De, Isaac and Chaturvedi out under police escort.

‘The police came in their full regalia,’ says Isaac, ‘and led us safely through the students. We proceeded to the Director’s house. Prof De’s actions were swift. After a rapid meeting at his residence, he closed the
Institute with immediate effect. Then he and I flew to Delhi to report the matter to the Ministry.

‘I still remember the extra-ordinary meeting of the Senate Prof De called,’ supplements Sukhatme. ‘Apprising us of the situation, he asked if he could count on our support if he had to take drastic action. He said tomorrow I am going to take this step, and need your approval; well at least I am informing you.’

The Senate accorded its approval (the minuted text says ‘it authorized the Chariman, Senate, to take emergent actions/steps as the situation demands’). Armed also with the assurance of faculty at large, of the deans and of the heads of departments that he could count on them, and having obtained the Board of Governors’ approval for the step, De declared the Institute closed with immediate and indefinite effect. Students were asked to vacate the hostels within three days, by the evening of Monday March 10.

‘So that’s the only time in my memory,’ Sukhatme recapitulates, ‘when the Institute closed down. For about three weeks. That was the only thing to do. You know if the students aren’t getting food, things are getting ugly, one way is to separate people. So really the idea was to just cool things down by just separating everybody.’

In less than three weeks the crisis had been defused; the Institute was back to normal March 23 onwards. But the episode left a trail of bitterness and suspicion in its wake, not to mention the flood of mutual recriminations that ensued. It left the Institute not just academically disrupted, but psychologically polarized. Its administration and a section of its students continued in an atmosphere of mistrust (students at large, as indicated above, were merely bewildered at the upheaval, and glad for normalcy to be restored). Members of the faculty, too, were divided: one wrote to

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f Immediately after the emergency meeting of the Senate on 6 March 1980, De also called an extraordinary Faculty Meeting, at 5.30 pm. At this meeting, the 'decisions of the Senate were unanimously endorsed by faculty'. On 7 March 1980, De convened an 'urgent meeting of Deans and Heads of Departments' at his residence, at which, considering the threat of continued agitation from March 10, 1980 onwards, the body 'felt that it was not possible to run Academic Programmes smoothly and peacefully, and that it was therefore necessary to suspend academic session with immediate effect.' Minutes of the 70th meeting of the Senate, IIT-Bombay, 28-3-1980, Item 2: ‘Action taken on minutes of Emergency meeting of Senate held on 6 March 1980.’
the press, pointing out that the Institute’s academic standards were hardly likely to be compromised by ‘allowing a few weak students to work at their own pace,’ and adding: ‘The Director of IIT has reportedly blamed a few student radicals for the recent disturbances in the campus. I shudder to think of the future of a society in which the students are not radicals.’

The closure of the Institute in 1980 furnishes an illustration of the premium IIT-Bombay has always placed on seamless, uninterrupted functioning. Irrespective of the rights and wrongs of the stands taken by the various groups involved, for an Institute habituated to operating with clockwork precision and in inner harmony all these years, to be fractured by discord was no small psychological blow.

The reactions it elicits even today, 25 and more years on, are symptomatic of the scars it left behind. There are those, for instance, who’d prefer not to think back to it at all, amongst them Dr Hariharan: ‘The whole thing was over something I consider now to be a non-issue, it could have been sorted out, but all this is hindsight. It was one day it’s better to forget. It’s the only time, in March 1980, the only time when there was difficulty with administration in the campus. Otherwise we have had a very peaceful time all through.’

De considers it an unpleasant, but inescapable, decision to have downed the Institute’s shutters: ‘I had to close down the Institute, which was a very sad turn of events. I did not like it, I felt very sorry about it but there was no alternative.’

**CELEBRATION, REFLECTION**

In 1983 came an occasion to take long-range stock: the year marked IIT-Bombay’s Silver Jubilee.

In observance of the landmark, the Institute organized a series of seminars, workshops, and symposia. An essay written by De himself for one of these summarizes succinctly the strengths built up at the Institute and its weaknesses at this juncture.

‘It was generally noticed’, De remarked, ‘that the Institute had for a long time laid strong emphasis on undergraduate teaching. This emphasis did create, no doubt, a band of dedicated teachers who mostly confined their activities to excellent teaching. IIT-Bombay is known for its very able teaching faculty.’
Following which he observed:

‘Research had been given a second priority, second to teaching, while consultancy was on the whole frowned upon. Besides, the Institute suffered the disadvantage of not possessing adequate sophisticated analytical instruments and good computational facilities.’

At the quarter-century milestone, therefore, there was still a lingering feeling of inadequacy. IIT-Bombay could well take pride in its factory-fresh arsenal of centres and interdisciplinary programmes. Yet, it could equally be said that all through the 1970s and into the mid-1980s, the Institute had only really been leveraging research opportunities that had happened to come its way – without itself having done much to kindle them. These initiatives hadn’t, as we have seen, grown organically from within; most had come gift-wrapped from the central government.

IIT-Bombay, in this view, had been a passive recipient of the bequests emanating from New Delhi, and vulnerable still to the shifting winds of governmental policy. And there lay the rub. A research ‘mindset’, and what could be spoken of as ‘research culture’ to accompany it, had not yet seeped into the Institute’s corridors and laboratories. In 1978, with IIT-Bombay twenty years into its existence, a new recruit had come on board after spending several years at IIT-Kanpur: Dr A.P. Kudchadker, one of the lead players in the establishment of the CAD Centre. To his eyes the Institute of the late seventies and early eighties struck him as sporting ‘no research culture’ to speak of: essentially the impression formed several years before him by Dr Dipan Ghosh.

It wasn’t, however, as if there was no cause for cheer at all. Compared for instance with the situation in 1972-73, the volume of sponsored research at the Institute had spired hearteningly. Ten years previously, the number of sponsored research projects at the Institute stood at six, bringing about Rs 8 lakh in funding; in 1982-83, the figures had leapt to nearly 90 and Rs 90 lakh, respectively. Thus, although the quantum of funding attracted on average per project was surprisingly lower than a decade before, the much greater volume of activity meant that the Rs 1 crore mark was close to being breached. More significantly, since the number of faculty at the Institute had grown relatively little (from near 300 it was now near 350), this implied that a substantially greater proportion were engaged in research and devel-
opment. Revenue from consultation work had in fact topped a crore, but the jobs were more numerous (nearly 300) and as before, most of this work was confined to calibration and routine testing; little of it addressed R&D questions demanding experimentation and innovation.

Though the numbers in relation to sponsored grants could be interpreted to reflect a surge in research performance and orientation, this was true only as far as the Institute’s own activities a decade ago were concerned – which, it could safely be said, had bordered on the non-existent. In absolute terms, still only one in five or six – that is, about 15 to 20 per cent – faculty were carrying out sponsored research; and, in the fast changing times, a crore of rupees in research funding for an Institute as large as IIT-Bombay wasn’t a drum you could beat without attracting derision. The Institute still had a long way to go before it could claim to hold its head high in the wider world of generating, rather than just transmitting, knowledge.

One inhibiting set of factors continued to be the very real adversities in carrying out research. The equipment needed for front-line discovery and invention wasn’t available locally. Largely because of the handicaps arising from the ‘licence raj’ of those economically leaden-footed decades, Indian industry hadn’t matured to the degree that its products could keep pace with, and feed into, state-of-art technology on a global level; all such equipment had to be imported. And import procedures were cumbersome to the point of being an active deterrent; moreover, India from time to time had come under the force of sanctions imposed by the USA, such as in the wake of the nuclear explosions in Pokhran in 1974.

It would have to be left to the next phase in the Institute’s life, 1984 onwards, to see if this side of IIT-Bombay’s collective mindset, so far only modestly tuned, could be quickened and burgeoned; and if, side by side – and equally crucially – the conditions for research in the Indian milieu would improve.

All along the 1960s, we’ve seen that the boredom quotient for IIT-Bombay’s students had run inspiring high, fuelling a myriad interests and pursuits. The longer the boredom persisted, the surer it was to ignite something out of the ordinary; and in due course it did. Even as outrageously flared bellbottoms, ABBA, and the slow crystallization of a phenomenon by the name of Amitabh Bachhan began to hold sway over the public imagination, the campus’s winter air was lit up by its own icon
in the making: the very first Mood Indigo. Held between January 3 and 7, 1973, the festival announced itself in words that, looking back on them 35 years later, have an oracular ring to them:

‘About six months ago, the Students Gymkhana Committee of IIT Powai took a decision that may, well, herald the start of unique cultural happenings out here at Powai.’

The heraldic decision was spelt out thus: ‘A youth Festival, the first of its kind to be staged in Western India, was to be held here. There have been youth gatherings very often since Independence but perhaps, ventured the souvenir for the inaugural Mood-I (as it’s fondly known to its faithful), ‘one of the nature of Mood Indigo is not common.’ It went on to flesh out Mood-I’s conception:

‘The scientific mind turns almost every time to innovation and experiment and IIT students are no exception. The theme of the Festival was chosen to be experiment and creativity … and to give a chance to young Indians to break new ground on the cultural scene.’

Billing the festival as boasting certain ‘novel features’, the booklet supported the claim with an impressive schedule of attractions. Sprinkled amongst other events were competitions with rolling trophies for debating, quiz and a one-act play; a dance tableau by Kumari Chandralekha, ‘the renowned danseuse from Madras’; experimental Indian films and classics of the 1940s and 50s; a ‘Nostalgia Nite’ with singers of the Hindi screen; and to crown it all, the eponymous ‘Mood Indigo - the final programme in which young collegians from Bombay will bring together traditional music of India and the west.’

And the financial outlay for these ‘unique cultural happenings’? The organizers are said to have had all of Rs 5,000 in their wallets to play with: some way away, despite the dilutions of inflation, from the Rs 60 lakh mark today’s Mood-I is reckoned to be teasing. But Mood Indigo’s upward spiral wasn’t all smooth. Over its first decade it suffered oscillations in fortune so severe they threatened to bring it to an untimely end, partly because not all of IIT-Bombay’s students were equally thrilled about their new creation. But the festival rode the highs and survived the lows with aplomb – a graph we’ll track at closer range in Chapter 17.
CHAPTER 9

THE LEANEST OF TIMES

The hopes with which IIT-Bombay started this, the third chapter of its life – hopes of becoming a peer-acknowledged, briskly productive hub of R&D – were fated to be dealt a cruel blow. Scarcely had the Institute started forging ahead on its chosen track, than it was as if dragged down to a crawl by a set of powerful brakes.

Turning once more to the funds attracted for sponsored research as a readout of the vigour of the Institute’s R&D endeavour, we find that while over the first few years – from 1984 till around 1988 – there was in fact a sharp upswing in accruals, there followed in their wake an unhappy slowdown. Receipts for sponsored R&D which had breached the Rs 1 crore mark in 1983-84, shot up four-fold to Rs 4 crore by 1987-88 and to Rs 5.6 crore the following year, bringing a smile to the Institute’s lips. The very next year, 1989-90, however, there was a steep dip. Only Rs 3.8 crore came in; nor did the figure budge in 1990-91. Accruals fluctuated over the next three years, but in 1993-94, a good five years after the Rs 5.6 crore high of 1988, they stood at no more than Rs 5 crore: a small drop over the half decade.¹

This drop, unexceptional on the face of it, was in fact hobbling when set against the economic climate of the times. These were years of near-double-digit inflation, and stagnation in income could cut purchasing power by more than a third over five years. They were years, moreover, of a progressive devaluation of the rupee: in 1991 alone, at one fell stroke, it suffered a 20 per cent depreciation. Since dependence on imported equip-
ment for research continued to be near-absolute, the stagnation translated into a hard-hitting slowdown in research.

Nor did other readouts tell a story any different. In 1985-86 the number of faculty who flew overseas to participate in international conferences was a mere 25. Three years later, in 1988-89, the numbers were even less consoling: a total of 16 faculty and 4 Ph.D. students boarded those international flights. Of a faculty 380 strong, this represented a paltry 4 per cent; and as for Ph.D. students, present at nearly equal strength, it was truly the rare one that went.

There was a somewhat better showing in the matter of broadcasting their intellectual efforts while staying put at Powai: in 1985-86 faculty published some 210 papers in international journals. Yet, since research and publication were dominated by a relatively small number who cared to wade into these waters at all, the figure doesn’t furnish an accurate impression of the general prevalence of R&D. A better indication comes from the number of faculty involved in sponsored research towards the end of this phase, between 1993-94 and 1996-97, which varied between 75 and 180.

More troubling than these metrics in themselves was what they meant for IIT-Bombay’s standing on the wider academic scene. Science had entered an era where knowledge was more than doubling every year. It was also an era where the volume and quality of original research had come to be the universal scales on which the calibre of seats of higher learning was judged. On this increasingly busy and demanding international canvas, IIT-Bombay, rather than carving out a place for itself, was in peril of fading unceremoniously out of sight.

On other fronts, too, the Institute found itself in straits just as dire – such as in the matter of the annual grants it received from the Ministry. Around the early nineties, so thinly lined had its coffers become that the Institute was unable to ensure so much as routine upkeep of its infrastructure and its equipment. And by way of upkeep, there was much that was sorely needed. Many of IIT-Bombay’s buildings were now 30 years and more old. While this is no great age for a building, over the years it had become apparent that the quality of their construction in the 1960s had fallen well short of the mark. This inherent failing, worked upon by the severities of the Bombay climate, had weathered the buildings to the point where many were close to a state of dilapidation. The first clear cry of
alarm rose at the very outset of this phase, from the pages of the Institute’s annual report for 1983-84:

The Institute would require an additional building grant for preventive maintenance of its buildings necessitated by the local weather and environment conditions. The grant provided by the Ministry is not enough… It is necessary to have a higher special repair grant to maintain the buildings particularly those constructed 25 years back.⁵

It was a cry into an unlistening void. No ‘higher special repair grant’ was to be forthcoming from the Ministry for years together. Only 1992-93 onwards did some targeted rehabilitation grants come along, then again at a trickle.⁶ Going into the early and mid-1990s, with the Institute’s buildings suffering yet another decade of erosion, they were brought to their very knees, with conditions for work and living starting to verge on the appalling. Dr D. Khakhar joined the department of Chemical Engineering in 1987, at a time when things were near their worst. ‘The financial crunch had a direct impact on the way things looked,’ he recounts. ‘All the buildings were very run down, hadn’t been painted for ages. There was plaster falling from the ceilings – as bad as that. And the second impact was that if you wanted to develop a lab, trying to get any kind of renovation done was next to impossible. Money from within the Institute for almost anything was difficult.’

In a comparably frail state were the assets housed in the Institute’s academic buildings: their scientific equipment. And not just did the Institute’s equipment need running repairs, an ever-growing portion of it needed to be summarily retired and replaced. Already obsolete by the mid-seventies, much of its great legion of Soviet equipment now stood like museum-pieces in its laboratories, sources of amusement for the passer-by, a matter of dejection for the Institute’s staff attempting to use them for their teaching or research. The issue of obsolescence, too, was raised with the Ministry time and again, but to no avail. Until as late as 1977, no provision was made in the Institute’s grants for the replacement of instruments and equipment. Subsequently, the Rs 6 lakh per year granted for equipment and Rs 4 lakh per year for furniture and fixtures went only so far and no further.⁷ Also bitten into was the scholarly urge of the purely bookish kind. With the Institute’s library budget suffering the same ero-
sion as all others, journals had to be struck off the subscription list year after year, while for new subscriptions there was simply not the money.

The Institute’s internal documents of the time provide further insights into the attrition. One, which analyzed specifically the distribution of the yearly increments in governmental grants, showed that the lion’s share of the increments (which ranged between 10 and 20%), was guzzled by fast-rising salaries and allowances, accounting for 70 to 85% of the increments, leaving precious little to spare for works and maintenance. The yearly rise for the latter stood at a paltry 1-5%, nowhere near enough to keep pace with the escalating requirement, or even with inflation.8

**A FORLORN FORECAST**

Not just were the Institute’s existing buildings in disrepair, practically no new buildings were coming up either. And this was starting to tell adversely on the volume and quality of IIT-Bombay’s intellectual capital. In his deposition to the Second IIT Review Committee in July 1984, the then Dean Planning, Dr D.N. Buragohain, drew attention to a glaring deficit. Of a total of 2673 employees, only 879 were accommodated on campus. Faculty fared rather better on average: 292 of 340 were housed. However, quality of housing was another matter altogether: most were staying in ‘quarters’ one or two categories lower than their entitlement, then again in apartments which were in decidedly ragged shape, and decidedly cramped: some had ‘stayed with their families in single rooms for over five years.’

Focusing on non-faculty academic staff, Buragohain sounded a grim warning:

‘Whereas many engineers and scientists are eager to join the institute, they refrain from doing so because the Institute cannot assure them of accommodation. In fact many scientists have left the Centres after being in the waiting list for accommodation for years’.9

Within six months of the Dean of Planning’s deposition – in November 1984 – there took place a meeting of the IIT-Bombay’s Finance Committee which furnishes a vivid illustration of the government’s mood of the time, unwilling to concede the smallest inch in matters financial. The Institute’s
budget proposal for establishment (‘Plan’) expenses for the year had run to Rs 229 lakh; in response, the Ministry had sanctioned just Rs 140 lakh. The Institute’s Director Dr B. Nag made a plea to enhance the provision to at least Rs 165 lakh, adding that the Institute was likely to suffer significant setbacks otherwise. To no avail: Ministry representatives wouldn’t budge, and Rs 140 lakh was all IIT-Bombay got.

The back-and-forth was faithfully re-enacted the following year. The Institute proposed a provision of Rs 249 lakh; was sanctioned a lean Rs 115 lakh; it pressed for an enhancement to Rs 183 lakh; was turned down again. The message was clear: IIT-Bombay would simply have to make do with less than half the amount it required.

What, under the circumstances, could Nag do but bemoan how ‘the paucity of Plan funds is very adversely affecting the recruitment of faculty and scientists, as the Institute is not in a position to provide them with accommodation’? Pointing to the scarcity of ongoing construction, he raised the one spectre that shouldn’t have failed to touch off a plangent chord of concern: a fall in academic standards.

‘Unless this adverse situation is remedied,’ he cautioned, ‘the Institute is likely to face a grave situation in the matter of appropriate personnel, thereby resulting in the deterioration of the standards of education and research.’

Not even this forlorn forecast, though, could melt the steeled Ministerial heart. And so, over these years, added to the stagnation in R&D output, the very climate for research in the Institute was fast being eroded, and the Institute’s human resources stood in danger of being depleted and demoralized.

Why a whole decade of hardship and privation; where lay its roots? The mid-80s were a time of upheavals and new beginnings for the nation. In the early hours of October 31, 1984, an incredulous India had awoken to the news of Indira Gandhi’s assassination; days later, Rajiv Gandhi had assumed charge. Within a year or two it was clear that India’s new, young Prime Minister had science and technology high on his mind as one of the cures for the nation’s faltering fortunes. Yet there was little by way of resources he could set aside for the cause. India was in the throes of an enfeebling financial crisis. The irresponsible, wasteful fiscal conduct of its political and bureaucratic apparatus over two long decades had returned
to haunt the country. And all through the 1980s, despite the far-sighted pronouncements of the Rajiv Gandhi regime, India was still firmly in the clutches of its licence raj and its babudom.

With all-pervading inefficiency and corruption ruling the day, the nation’s reserves were swiftly depleted. The nadir was reached in 1991, when forex reserves plummeted to an all-time low, barely enough to cover two weeks’ worth of imports. The way the Indian economy was gradually turned around over the next few years through its ‘liberalization’, P.V. Narasimha Rao and current Prime Minister Dr Manmohan Singh the chief architects of the transformation, is familiar to all. Until the mid-nineties, however, the abiding motif was one of national instability and near-insolvency – and everyone, including the IITs, had to shoulder some share of the burden.

‘No doubt about it,’ says Dr Dipan Ghosh of Physics, when reminded of those years. ‘The situation was extremely frustrating for anybody who wanted to do anything. It was tied to the larger national crisis. It wasn’t just funding for science – there was just no money in the country. And people thought that IITs were already getting a lot of money in the national context, so the question of getting more simply didn’t arise.’

Part of the reason for IIT-Bombay’s impoverishment over these years lay also in the mechanism by which its annual grants from the Ministry were decided, and how this practice discouraged the Institute from earning its own revenues. But before we plunge into those financial thickets, a glance at the human face of the Institute during the period under review.

The man presiding over IIT-Bombay’s fortunes over this chequered phase was Dr B. Nag, one of India’s best recognized computer system designers and a pioneer in the field of computer science and engineering in the country. Nag had also fashioned himself into a technocrat: in 1978, he had been appointed Secretary to the Department of Electronics and Chairman of the Electronics Commission. He took over as Director at IIT-Bombay in September 1984, holding office for two successive terms until his retirement in August 1994. When Nag moved to Bombay, then, his credentials included not just impressive technical expertise but also a penetrating insight into the psyche of government departments: their ways of working, their pet predilections and peeves. These insights, many who have witnessed this phase have averred, proved crucial to IIT-
Bombay’s efforts at keeping neck above water in the choppy seas of the late 1980s and early 90s.

It sometimes happens that a handful of people, brought together by circumstance, are so well matched in sensibility and outlook that they make a team greater than the sum of its parts. Exactly this kind of synergy came about during Nag’s tenure – and the players were, for the main part, three. One had joined IIT-Bombay some years before Nag, in 1978: this was Dr A.P. Kudchadker, of Chemical Engineering, in 1986 to become the Institute’s Deputy Director and to continue in this office for the rest of Nag’s tenure. The third came a year later than Nag, in 1985. He joined the ranks of the Institute’s administrative staff, but was a man truly academically inclined: the Institute’s new Registrar, Dilip K. Ghosh (not to be confused with the other bearer of his family name and exact initials, Dr Dipan K. Ghosh of Physics). Ghosh, lauded by many as a ‘thinking man’s registrar’, imparted to his administrative post a scholarly slant. As the Institute’s Registrar he also had to exercise vigilance on its income and expenditure; and it was my conversations with him that brought alive the financial helplessness of the Institute during the eighties and nineties. To fully appreciate these circumstances, however, we’ll need to grapple for a few moments with the terminology, often opaque and perplexing, that forms the dialect of governmental finance.

**YOU MAY EARN WHAT YOU LIKE, BUT REMEMBER …**

The mainstay of funds for the Institute had come to be, 1980s onwards, the annual grants from the Ministry of Human Resource Development (MHRD), under whose wider umbrella the erstwhile Ministry of Education had been subsumed. Other monies came from the Institute’s own earnings. These included student fees, the Institute’s share from consultancy done by its faculty, subscriptions to its Continuing Education Programmes, and grants won for sponsored research. However, with the IITs accorded the status of institutes of national importance (a status which, considering the financial treatment meted out, was not without irony), it fell naturally to the Union Government to bear the bulk of their expenses.

The grants from the MHRD were determined broadly on the basis of either of two formulae laid down by the Education Commission back
in 1966: Deficit Financing and Block Grant Financing. Until 1993, the Ministry operated the former scheme. The protocol here was that IIT-Bombay would place every year a budget estimate for the upcoming financial year before the MHRD. The Ministry, after running it over with the Institute’s Director and Registrar, would decide the actual grant.

If there was one hallmark these annual allocations bore, it was a general stringency of payouts – and they echoed more the alleged limits on the MHRD’s own resources than the Institute’s needs. The grants would normally not be more than 10% over the previous year’s: just enough to counter inflation. Some years, though, the grant was kept static at the previous year’s level; worse, there were years when parts of the grant were lopped by up to 5% ‘in the interests of national economy’, and IIT-Bombay asked to manage through the practice of that saintly but unappetizing virtue, austerity. These cuts meant sheer impoverishment for the Institute. Its financial needs were growing unabated, fuelled by the inexorable rise in outflows on heads ranging from salaries and ‘dearness allowances’ (one of those especially winsome governmental turns of phrase) to power, taxes, and stationery. ‘Such a situation created untold stress for the Institute,’ says ex-Registrar Ghosh, cheerlessly recalling what a strain it was to have to monitor expenditure from one day to the next, combating it wherever possible. A good deal of time and energy, he recalls, would be drained in petty housekeeping of the kind.

Aggravating the effects of the Ministry’s tightened purse strings was a quirk of the deficit financing scheme, one which dissuaded the Institute from making up some of the shortfall by earning its own income. The annual ministerial grant sanctioned to IIT-Bombay was split into two parts: one that was (and still is) called a Plan grant, and a Non-Plan grant. The Plan grant – also called the ‘non-recurring’ grant – catered to the creation of assets: new buildings and roads, books for the library, equipment. The ‘Non-Plan’ grant – and who but a die-hard bureaucrat could have dreamt up such dazzling coinage, defined solely in the negative? - defrayed salaries, maintenance, scholarships. Since it met the annual expenses determined by the size of the institute and its staff, this component was also called the recurring grant. IIT-Bombay would thus receive an yearly sum, say P + NP, P being the ‘Plan’ and NP the ‘Non-Plan’ component. Before fixing the grant, though, the Ministry would ask IIT-Bombay a seemingly innocuous
question. How much had the Institute earned for itself during the previous year – from fees, Continuing Education Programmes, and so forth? Call this sum I, for income. Promptly they would subtract I from the total sum requested, and \( P + NP - I \) was what the Institute would end up getting.

It was this simple arithmetic that extinguished any desire on the Institute’s part to earn a part of its keep. In every way it was like promising a child a certain amount as monthly pocket-money, then saying: ‘You’re free to go out and earn your own bit, too – only remember that if you do, you’ll end up getting that much less from me next month.’ Which right-thinking soul, under this regime, would toil a single extra minute to earn a single extra rupee?

Indeed this curious illogic can be seen to be one of the main reasons why tuition fees at IIT-Bombay had remained pegged, from the student’s point of view, at blissfully low levels for more than three decades. For the B.Tech. programme, for instance, fees remained motionless between 1958 and 1992 at Rs 200 per annum. While in the late fifties Rs 200 might have burned a small hole in one’s pocket, the Institute’s alumni will remember that by the early nineties it was merely the price of a hearty meal for two – hot-sour soup, haka noodles, gobi Manchurian, say – in ‘Chinko’s’, the keenly patronized all-night canteen on campus (it would be too much to call it a restaurant). (Sadly, Chinko’s faded into oblivion some years ago; more recently the NCC building, atop which it was perched, has also fallen to the demolisher’s hammer.) All in all, with IIT-Bombay effectively forbidden from topping up the ministerial grants with its own earnings, it ended up even poorer than it might otherwise have been.

For staff who joined the Institute in the late 1980s or early 90s, therefore, IIT-Bombay wasn’t a place that inspired much joy or confidence, and we find Nag’s anxieties reflected directly in their experiences. Take the case of Dr A. Mehra, recruited into Chemical Engineering in 1991. Mehra remembers an occasion, some years before he signed on, when he’d been invited to IIT-Bombay to present a seminar. Entering the Institute’s gates, his taxi passed a set of structures that looked so run-down Mehra was hard put to believe they housed the Institute’s faculty; yet he could tell, from their size and layout, that they did exactly this.

Then when he joined, he was put up in transit accommodation – and was obliged to look quickly for ‘permanent’ lodgings. It was ‘not a pleas-
ant exercise’, he remembers. ‘The Institute was so short of money they had stopped repairing the vacated houses, and were offering them without so much as a fresh lick of paint.’ As luck would have it, Mehra ended up in one of the very houses that had left him incredulous when driving in for his seminar some years ago. ‘It was just the least terrible house I was entitled to.’ And to live in it ‘was depressing, horrible’, he recalls, unpainted as it was, infested with insects, and endowed with a talent for developing large cracks on its ceilings and walls, and subsidence in its floors. Naturally, Mehra had it whitewashed, and repaired to the extent possible, at his own expense (and later there were the continual running repairs) – and recalls how he felt this to be a ‘crucial let-down in terms of the expectations’ with which he came to IIT-Bombay.

Over in the departments, academic initiatives too were severely stifled. ‘The Institute itself could not take too many initiatives,’ says Mehra’s colleague in Chemical Engineering, Khakhar. ‘If you wanted to kick start new programmes or projects, for example by injecting intramural funding, you couldn’t – and as for putting up a new building, it just wasn’t possible. Prof. Nag had so many ideas, he wanted to do so many things – but his hands were tied.’

Come 1993-94, and a new funding pattern – the Block Grant scheme – was unveiled, ostensibly in the context of globalization and economic liberalization. A central, and unappetizing, feature of the scheme was that for each of the next four years (the so-called ‘block’), the Ministry would provide the Institute an unvarying annual grant, pegged at about 10% over the previous year’s (i.e. the 1992-93) level. As for inflation, this would have to be neutralized by what apparently was an appetizing feature. Recognizing the drawback of the previous scheme, the Ministry introduced an incentive for the Institute to bolster its own income. Under this dispensation, IIT-Bombay would be allowed to retain its own earnings rather than have them subtracted from next year’s grant. And as a bonus, if it saved some part of its income in a designated Corpus Fund, the Ministry would reward the thrift, providing a matching grant to double the savings. Bequests received by IIT-Bombay from ‘well-wishers’, such as industry and alumni, would also qualify for matching grants. The thinking behind the creation of the Corpus was that once it reached a certain level, interest earned on it could be deployed for development-
tal expenses, the fund itself serving as a financial buffer. This was stimulus indeed for resource generation and for saving; armed with these assurances, the Institute promptly set about doing all it could to create and build up its Corpus.

Looking ahead a few years, IIT-Bombay’s fortunes under this scheme were to fare little better than before. Most vexingly the Ministry, for reasons best known to itself, did a volte-face on its promises. IIT-Bombay, for example, did build up a corpus comprised of its own savings and endowments from alumni (alumni had by this time started coming forward to donate significant amounts to the Institute). ‘Except for some stray payments’, however, the Ministry never released the promised matching grants;\(^{16}\) and we’ll hear more on the effects of this facet of governmental fickleness in the next chapter.

‘AN ABATEMENT OF ENTHUSIASM’

As if this muster of travails weren’t enough, IIT-Bombay – no differently from its sister IITs – had to square up over this decade to another whip-lash: a swelling chorus of public disapproval. This was a sentiment rooted in two unflattering perceptions. There was first the growing concern that the IITs, cocooned in their worlds of privilege, had become indifferent to the nation’s scientific and technological needs they had been set up to address. Echoing the thought, an India Today article in 1987 said of the IITs: ‘The total research output is poor. Their contact with industry has been almost negligible. Projects for rural development are unheard of. And far from helping the nation towards technological self-reliance, the Institutes have grown into ivory tower institutions.’\(^ {17}\)

In the view typified by this quote, three decades and more into the IITs’ existence, there were no sparkling technological success stories the Institutes could showcase. No consumer product of note that could boast the ‘Developed in IIT’ stamp; virtually no industrial process that could be held up as having spun out from the workbenches of IIT laboratories.

Views of this sort were set against the backdrop of a report published in 1986 by a high-power review committee set up by the Union Government in 1984, the first of its kind to examine the functioning of all five IITs together. The committee was headed by none other than Dr Y. Nayudamma,
influential pilot of the nation’s technical policy-making apparatus from the mid-1970s to the mid-1980s. Here’s what the Second Review Report itself had to say in one of its sections, titled ‘Shortfalls’:

We realize that the consequence of excellence is elitism... It is good to recognize that while science is international, technology within which IIT is engaged has strong national parameters. Therefore IITs have to relate their programme more to the national surroundings. They need to shed their hesitancy to involve themselves in the national perspectives and technological developments of our country.

‘There are serious mismatches,’ declared the vice-chairman of the committee, Dr Hiten Bhaya, in an interview, ‘between efforts and outputs. There is an abatement of enthusiasm in keeping abreast of modern technology and a creeping reluctance to face up to the challenges of the country.’

A second damaging perception was that the IITs had turned themselves concurrently into sophisticated conveyer belts for the outflow of the nation’s intellectual capital – and that they were doing precious little to stem the tide. The trend among IIT-Bombay’s students that its first Director, Brig. Bose, had remarked upon as a ‘preference’, then decried as a ‘craze’, had continued unthwarted through the seventies and eighties, until the public at large had begun to raise reproachful eyebrows. And not only were IIT graduates deserting Indian shores, they were seen to be betraying their very calling. This observation from the 1986 review report: ‘The cream of the graduates are not available for service in the country... and even those who remain prefer to go for managerial positions.’

The Press had more to say. Business World carried a cover feature on the IITs in 1985 in which, noting that ‘nearly 70% of the nation’s limited budget for higher technical education is allocated to the five IITs’, it remarked: ‘Amongst the more frequently voiced criticisms leveled against the IITs is that after training students at considerable expense to the taxpayer, over half of the IIT graduates emigrate – mainly to the US.’ And an article in the Illustrated Weekly of India spoke of the IITs as ‘the geese that lay no golden eggs.’

The readership, too, were having their say on the subject. Business India in September 1988 carried a letter to the editor which berated IIT
graduates for what was perceived as sheer thanklessness: ‘Is it not fair for society to expect some return from the students on whom it has spent a fortune? Especially when such opportunities are denied to the vast majority of the student community?’

The IITs were quick to refute these charges. They could hardly be expected to perform at international levels of research, they said, when saddled with obsolete equipment and continually low funding for research. And they could hardly be faulted for poor links with industry or for the so-called brain drain if Indian industry wasn’t in a position to offer technologically challenging jobs, or the nation at large unable to offer acceptable – let alone attractive – living conditions to their graduates.

We leave it for later to examine at greater length the contentions on both sides of the divide, especially in relation to IIT-Bombay (see Chapters 12 and 18). For the time being, so strident had this volley against the ‘brain drain’ become, and so inclusive – its ranks were swelled by the voices of ministerial officials – that they provoked two teams of faculty in two IITs into conducting systematic studies of the phenomenon. The studies showed that while considerable numbers of IIT graduates were indeed fleeing, mainly to the US, as a fraction of the total they amounted to no more than 25-30 per cent, and not the 50 per cent and more alleged in many quarters. By far the larger chunk had stayed back, the studies concluded, and by now had started to populate the upper echelons of India’s entrepreneurial, technical, and administrative cadres, fortifying thus the country’s industry and its economy. But entrenched perceptions wouldn’t be so easily dispelled, and for many years the public gaze remained, despite these assurances, skeptical and cold.

As can well be imagined, an array of vagaries as wide and deep as this spelt the leanest of times for Institute, not just materially but also psychologically. During Nag’s tenure, therefore, the Institute had its back pinned firmly to the wall. Many of the ambitions IIT-Bombay had entertained for itself threatened to be foiled, if not snuffed out entirely. And public sympathy for its visions was fast drying up.

Piercing these clouds of gloom came, from time to time, rays of short-lived relief, if not of lasting hope. As had happened in the previous span of the Institute’s existence, the rays emanated again from the chambers of the Ministries in Delhi; and they came this time in the shape of ‘Thrust Areas’ of
science and technology the government wished to promote nation-wide.

With the economy in frail shape, however, just a handful of disciplines
could be primed. As was quickly to become evident, Rajiv Gandhi leaned
strongly towards certain fields; the Planning Commission in its Seventh
Five Year Plan, for 1985-90, carried this declaration under his signature: 29

There are major new areas in S&T emerging on the world scene, such as
micro-electronics, informatics and telematics, robotics, biotechnologies,
material sciences, oceanography, instrumentation, several areas in chemis-
try, modern biology and earth sciences and space technologies. These should
be reorganized as thrust areas and should receive significant support.

Expectedly, the few spurts of funding that came IIT-Bombay’s way
fell largely in these fields. By way of implementation the MHRD intro-
duced three new schemes it christened ‘R&D’, ‘TAPTECH’ (Thrust
Area Programmes in Technological Education) and ‘MODROB’
(Modernization and Removal of Obsolescence). IIT-Bombay for its part
submitted a number of proposals targeted to the schemes, and enjoyed
a fair degree of success. By 1987, the Institute had received grants for the
creation of infrastructure in several areas of emergent technology, in-
cluding bio-conversion, remote sensing, micro-processor applications,
and environmental engineering. Also supported were microelectronics,
computer-aided design and manufacturing, robotics, telematics, and edu-
cational technology.

The MHRD-sponsored projects added up to about Rs 1.5 crore in fund-
ing; 30 it was these that underpinned the doubling of funds received for
sponsored research from Rs 2 crore in 1985-86 to nearly Rs 4 crore in the
years 1986-87 and 1987-88. And to complement the initial upward trend
came the arrival, finally, of a second cause for cheer: this in a critical do-
main in which the Institute had been ‘very unlucky’ compared with its
’sister institutions’ so far, all along the thirty years of its existence.

**GOODBYE TO STEAM – AT LAST**

Pre-1987, IIT-Bombay had been singularly hard done by in the matter of
computers. Witness this moving lament from an Institutional document
in 1983, a Strengths-Weaknesses-Opportunities-Threats analysis produced
in preparation for the pan-IIT review of 1984:
While the annual budgets for different IITs are of comparable order, IIT-Bombay has been very unlucky in terms of computational facilities. In the early years, the Institute had a second generation Computer MINSK-2 at a time when sister institutions already had third generation computers such as IBM-7044. Later, when the Institute acquired the EC-1030 computer it was still lagging behind sister institutions which had acquired large fourth generation computers such as IBM-370 and DEC-10.31

The grievance wasn’t over yet; there was still more to the generational gap. The SWOT report continued:

IIT-Bombay is perhaps the only leading educational institution, which has nothing better than card readers for the main frame computer, while sister institutions have computers with interactive facilities for on-line work through video terminals and graphic terminals. This weakness has also added to the difficulties of the Institute in recruiting good faculty and competent research staff and to the disenchantment of students.

Card readers in an age of video terminals! So notorious was the reputation the Institute’s computers had earned themselves along and across the land that students at IIT-Kanpur in the seventies reportedly scoffed their counterparts at Bombay for tinkering about with a steam engine when they, at Kanpur, had moved on to the electric locomotive.32

And so ‘woefully inadequate’ had computational facilities at IIT-Bombay been, that they had obliged the Institute to ferry its ‘disenchanted’ students to and from the other end of the city, to the TIFR at Colaba, for their work. This meant another drain on the Institute’s already strained purse – not to mention the swathes of time wasted, much to the detriment of time-bound projects and dissertations.33

Little surprise, then, that when the Institute’s first fourth-generation computer, its first mainframe – the Control Data Corporation’s Cyber 180/840 – came along in late 1986, it was greeted with widespread excitement. Thrown open for general use in March 1987,34 enthusiasm for IIT-Bombay’s long awaited ‘electric engine’ was quickly in evidence. Eight packages were developed and as many as 15 projects implemented on the new system before a year was over. In not much time, a backbone of Ethernet cables had been laid down to provide terminals to the Institute’s departments and centres, linking them to the mainframe.35
Another piece of cheering news came forth towards the end of this phase. The Planning Commission initiated a novel scheme involving R&D projects undertaken jointly with industry in select areas, incorporating a 25% commitment of funds from industry. In these ‘Technology Development Missions’ (TDMs), IIT-Bombay was funded in two domains: Food Process Engineering, and Integrated Design and Competitive Manufacturing. Through them it was able to build up pilot plants and develop processes and prototypes that benefited a range of departments. The Missions were also to enjoy a good degree of success in later years; some of them, for example the Supercritical Fluid Extraction Plant designed to recover herbal fragrances and high value food-related products, would in 1998-99 be transferred to industry for commercial deployment.36

Over in the Institute’s classrooms, its B.Tech. and M.Tech. programmes settled during this interval into their abbreviated life-cycles. In July 1981 had begun the 4-year edition of the B.Tech., and in July 1983, the 1-1/2 year (3-semester) M.Tech., the biggest victim of this truncation being its dissertation project. By way of new academic programmes there was just a trickle: programmes, as Khakhar observed, needed money to be kick-started, and these were penurious times. Yet, though not numerous, some of the initiatives taken during this phase carried an air of adventure about them, signalling a definitive shift in the Institute’s outlook and thinking.

Thus far at IIT-Bombay, although much academic experimentation and exploration had been carried out – such as in shaping new interdisciplinary programmes and centres – it had all been done within a fairly orthodox interpretation of the term ‘engineering’ (the exception so far having been the Industrial Design Centre, and its programmes). Mid-eighties onwards, the Institute set foot into areas not conventionally associated with engineering. The most dramatic of these excursions were into the universes of biological sciences, and of management.

Within the biological arena were undertaken two separate campaigns. The activities in bioconversion flagged off in 1983 matured, in 1987, into the Biotechnology Centre; the same year, the Centre started offering an M.Sc. in Biotechnology.37 Concurrently, early eighties onwards, groups of faculty inclined towards another domain involving living systems had been making their small excursions into it: the application of engineering principles to the medical sciences. These forays culminated in 1988 in the
inception of the interdisciplinary programme in Biomedical Engineering, its debut batches of Ph.D. and M.Tech. students being taken on in 1988-89. Over in its committee rooms, the department of Humanities & Social Sciences had crafted its own academic innovation, and in 1993 launched an M. Phil in Planning & Development. The first of its kind in an IIT, it was aimed at providing an understanding of, among other things, the role of technology in sustainable development.

Even as all this newness was taking shape, novelty of another variety was brewing in the Institute’s thoughts. Nag and the then Chairman of IIT-Bombay’s Board of Governors, Mr. D.V. Kapur, felt that while the IIMs – the Indian Institutes of Management – were assuredly supplying the corporate world with skilled business managers, the country was lacking still in certain kinds of management expertise. This was true especially of areas linked closely to technology: production management, project management, management of technology, and the like. It occurred to them that an IIT was best placed to meet this need by producing a different kind of manager: one who had a firm grounding in technology development and manufacturing. They envisaged a management programme into which only engineering or technology graduates would be admitted, and trained in technology oriented management. Under the guiding hand of Dr K.P. Madhavan of Chemical Engineering, plans were drawn up for
IIT-Bombay’s School of Management of the future. Such were the times that there was no hope of getting the government to fund it; and so Nag and Kapur, in an overture pioneering for its time, undertook to approach those who stood to benefit most from the new brand of graduates produced: the industrial and financial houses of the land. Their instinct and powers of persuasion served them well. Two firms, ICICI and Hindustan Lever, came forward readily with generous bequests, paving the way to setting up the School. These developments came, however, towards the very end of Nag’s tenure, and the School’s academic activities would commence only after Nag had left the scene.

In the early seventies, another phase in which R&D at IIT-Bombay had been low-key, the Institute had turned its energies in other directions: towards revamping its academic programmes and curricula. Likewise, from the mid-80s through to the mid-90s, it embarked on a separate programme of contemplation. It subjected to inspection those facets of its functioning which, not unlike its equipment and buildings, were growing outmoded, and in need of a restoring touch. This array of efforts could be clubbed into four broad groups: an overhaul of administrative systems and processes, the introduction of office automation on a campus-wide scale, an intensive drive for faculty recruitment, and taking the first firm steps to reach out to IIT-Bombay’s alumni. We take up each in turn; and we adopt in many instances the vantage of the Institute’s Deputy Director over most of this phase, Dr A.P. Kudchadker, who both instigated these measures and played a lead part in seeing them through.

WHAT OUGHT TO HAVE BEEN, WHAT WAS

Unquestionably the financial hardships imposed upon it by its chief patron, the Union Government, had set IIT-Bombay back in many ways; but when the Institute looked within, it found equal if not greater cause for dismay.

The inner blemishes vitiated its functioning in two main spheres. First, processes and procedures for the simplest administrative tasks had in course of time become convoluted to the point of being obstructive, and needed rationalization. ‘Over the years, several norms of operation had solidified into rules,’ observes Kudchadker. ‘And we were very rigid in following the
rules, which didn’t exactly make for the best work atmosphere.’ An example was an irritant that had been turned into a standing joke between Nag and Kudchadker: Nag called himself IIT-Bombay’s Municipal Commissioner, and Kudchadker its Deputy Municipal Commissioner. ‘That’s because so much of our time was wasted in signing papers for the smallest of things,’ says Kudchadker. ‘Housing, purchases, leave, travel. Everything was so centralized. And both Prof. Nag and I hated signing papers.’

To this malady, the solution was relatively simple. A de-centralized, distributed system was ushered in, reducing paperwork by increasing the sanctioning powers of the heads of departments, the Registrar, and everyone along the authority chain up to the Deputy Director (a remedy that was also a booster for functionaries lower down the chain, who felt better empowered).

More problematic by far were the Institute’s support systems. They were demonstrably tottering, and in their work ethic an unfortunate rot seemed to have set in. Like any educational organization, IIT-Bombay can be said to be composed of three distinct groups: the student body, the faculty, and the administrative and technical staff. Faculty and students interact for all matters academic, depending on the third group for support in a variety of ways. This group comprises a number of sections: the Academic Office, the Library, the Estate Office (charged with maintaining the Institute’s infrastructure), an Administration section which handles recruitments and entitlements, and so forth. And the evidence suggested that some of these support services had fallen, towards the mid-1980s, into a greater or smaller degree of disarray.

Some divisions – such as the Civil and Electrical maintenance wings of the Estate Office – were mired in inefficiency and apathy. One consequence was that whatever money the Institute was able to spare for repairs and maintenance, in itself quite meagre, was being ill-spent or misspent. This wasn’t the only dissipation; morale in several sections, too, seemed to have slumped to an all-time low, pulling down both the quantity and quality of work. Quality benchmarks like efficiency, responsiveness, and professional courtesy seemed to have been forgotten somewhere along the way. ‘The customer wasn’t important,’ is how Kudchadker puts it. ‘In today’s language, both the internal and the external customer had become unimportant.’ The Nag-Kudchadker-Ghosh trio were left in no doubt that
the Institute needed to take up administrative reforms in earnest, streamline processes, and change the mindset of staff.

Just as Kelkar had done in the early seventies in the interests of academic rejuvenation, Nag set up, mid-1980s onwards, a cohort of committees to apply the stethoscope to the support sections of the Institute and to prescribe cures. It promised to be a forbidding task, both massive and unpopular, but he was able to gather together a group of faculty and staff who were more than willing to tackle it. For the good of IIT-Bombay, they were agreed it had to be done. Apart from Kudchadker and Registrar Ghosh themselves, some of these were Dr J. Vasi from Electrical Engineering, Dr D.B. Phatak from Computer Science and Engineering, Prof R. Hazra of IDC, Dr S. Nagaraja of Civil Engineering, and Dr Dipan Ghosh of Physics.

Each of the committees made observations on ‘what ought to be’ the mode of functioning of these sections and ‘what was’. Their reports make for unsettling reading. In each instance, they found glaring gulfs between the two reference points, more yawning in some sections than in others. And they pulled no punches in setting down their verdicts. The Academic Office, for instance, they felt ‘should be aware at all times of the fact that students are our most important asset… It should therefore do everything possible to solve the problems faced by students in a speedy and effective manner’. And what were things actually like? ‘Little or no effort has been made to give a student with a problem any idea as to whom to approach, when to approach and how promptly the problem can be tackled.’ Many personnel in this office didn’t project an image, continued the report, of accountability, or so much as a sense of duty. ‘Thus instead of solving the problem which the student is facing,’ they sounded the incensed rebuke, ‘they try to get rid of the student.’

Another arm – the Administration unit – seemed to have obsessed itself with financial rectitude, labouring under that timeless bureaucratic maxim: of assuming everyone guilty until proven innocent. ‘There are unnecessary checks and counter checks,’ reported the group surveying this section. ‘Even petty disbursements of advances are subjected to very elaborate checks. No confidence,’ they rued, ‘is shown to any level of employee.’ All this contributed to ‘delays with no particular gain’, and in many cases to that ludicrous cost-benefit inversion that would be comical were
it not so tragic: ‘The expenses incurred for the manpower required and even the stationary utilized for these checks and counter-checks far exceed the amounts in question.’

But it was the units in charge of maintaining the Institute’s infrastructure – its Construction Division, Estate Office and Electrical Division – that seemed to have plumbed the sorriest depths, and came in for the most unsparing censure. ‘There is a world of difference between “what ought to be” and “what is”,’ wrote their reviewers, adding: ‘The less said about the Estate Office the better. The present state of affairs with respect to the maintenance of the entire campus is largely due to the poor functioning of the Estate Office.’

And what exactly was this state of affairs? Maintenance all around was ‘very poor.’ It could be ‘houses, hostels, departments, laboratories, workshops and classrooms’; it could be ‘roads, side-walks, parks, telephone and electrical lines’ – all told ‘the same, “nobody cares” story’. The outward manifestation of ‘the sad, depressing state of affairs’ was captured evocatively in a catchphrase made famous in the Institute by Kudchadker: ‘The Institute is young but the campus looks old.’

Campus residents, having to bear the brunt of the laxity of the Estate divisions (the report went so far as to call it ‘callousness’), were at the end of their tether: ‘There is hardly any one in the campus who does not show deep resentment and anger about the way Estate office and Electrical division manage the maintenance work.’ Students were equally hard hit, both in the lecture halls and elsewhere: ‘Maintenance of classrooms is appalling and is a disgrace to our Institute,’ railed the report. ‘These are just not fit for teaching.’ And as for the hostels, the situation there was particularly alarming in terms of quick redressal of residents’ complaints. Students have to waste much of their valuable time especially during working hours in chasing complaints... Every hostel has a large number of rooms with leaky walls and faulty electrical connections, fans not working... making them unusable for habitation. Most of the toilets are in filthy condition.

And so it went. The committee substantiated its statements with an appendix of photographs. The evidence was harrowing: portrayed here

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were laboratories where hi-tech equipment had been dismantled for fear of electric short-circuits; classrooms with scabby, grimy walls and broken windows; houses that flooded every monsoon, termite trails on their walls; toilets in departments in repulsive shape...

To add to the despair there was also the demoralization. ‘There appears to be a sense of helplessness,’ remarked the committee, ‘and we seem to have accepted to live with these problems.’44 And on an audibly distressed note, alluding to the Estate divisions which seemed to have become a law unto themselves: ‘Why does this happen and why do we allow it to continue to happen without taking any action against the defaulters?’45

These were the harshest of self-indictments. IIT-Bombay, for all its lofty, global ambitions and vaunted potential, was in some respects functioning as an ossified provincial municipality might, quite at odds with its own purposes, bringing Nag and Kudchadker’s quip to unnerving life; its cup of woe was full. Yet, taking a broader view, the reports also picked out circumstances that extenuated some if not all of the poor showing. The Institute’s non-academic staff had become by and large a demotivated lot, lacking clear career advancement routes and on-the-job training, and themselves the victims of poor work conditions such as ill-organized workspaces and dilapidated office equipment. The committees were unanimous in recommending at least three ameliorative measures: better work environments; sensitization of staff to the virtues of efficiency and responsiveness; and the introduction of office automation for record-keeping and speedier processing. And the last of these can be seen to lie at the heart of the next set of measures taken up by the Institute.

**LEDGERS INTO DISKS: USHERING IN THE DIGITAL AGE**

Nag was through and through a ‘computers man’, a hands-on man at that, and if there was one person who was clear in his mind that IIT-Bombay should embrace office automation, it was he.

Nag and Kudchadker set to work on the committees’ recommendations. They handpicked Drs D. B. Phatak and S.S.S.P. Rao of Computer Science & Engineering, both experts in computer applications and databases, as the prime movers of the effort. The idea happened to excite them both, and they set to tackling it head-on. An obvious mode of implemen-
tation was for them to contract it out to external agencies, and this was first explored. ‘But the expertise and software the Institute needed came at a price it simply couldn’t afford,’ remembers Phatak. Undaunted, the team decided to take on the whole exercise in-house, using staff recruited exclusively for the project supplemented by a team of the Institute’s M.Tech. students. Despite formidable odds – computers and programming in the late eighties, Phatak reminds us, were in the formative stages of their evolution, slow, clunky and laborious – they were able to take the task to completion. ‘They rose wonderfully to the challenge,’ says Kudchadker with visible pleasure.

If computerization was to have its desired impact, a necessary precondition would be to change the mindset of its intended beneficiaries. In 1980s India, however, automation was viewed with suspicion at the very least, often spilling over into antagonism. In a country already battling high rates of unemployment, it was easy to see computers as foes of the living wage, liquidators of jobs. To promote acceptance, staff in all sections, starting with officers and going down to data entry operators, were put through intensive training programmes. Assured that their jobs weren’t imperilled but rather made more efficacious and skilled, they responded warmly to the move.

Starting with the Institute’s Academic and Accounts sections, office automation was introduced in the Stores, the Library, and Administration. In tandem, the academic area of the campus was being enmeshed in an intricate web of cables: early nineties, IIT-Bombay’s Local Area Network was being put in place apace in an effort led by Phatak, Rao, and Dr N.K. Khosla of Metallurgical Engineering. In synchrony with these information expressways came intercom connections to all faculty and officers’ desks; and the foundations had been laid for on-line transactions, speedy access to information, and vastly improved communication across the Institute.

These early exertions against the odds have borne the richest dividends. Computerization and networking at IIT-Bombay are today acknowledged to be among the strongest amongst academic institutions in the country; web-based information, amongst the most comprehensive. And if a recent survey has rated IIT-Bombay’s web pages as the very best out of 3546 institutions surveyed in the Indian sub-continent, it’s only fair to say that the foundations for this accolade were laid by IIT-Bombay’s digital
trailblazers some twenty years ago. And it speaks again of the trait widely attributed to many of IIT-Bombay’s academic staff: their dedication to the Institute’s cause, their willingness to take on daunting challenges: a trait that has shaped many of the inner strengths one finds today.

A healthy mind in a healthy body, goes the immemorial adage; acknowledging its wisdom, Nag and Kudchadker saw that if the administrative reforms being ushered in were to work, they’d need concomitantly to do something about the physical appearance of the sections. A new unit dedicated to the look-good enterprise, the Design Cell, was established. Placed in the hands of Prof R. Hazra of IDC, it took stock first of the Academic Section, then of Finance and Accounts – these being the points of first contact for students, where they went for information, or to settle their fees, or for their transcripts. A friendly look was designed and executed, featuring open-plan offices and new, sleeker furniture, iced over with that vital invisible ingredient: streamlined processes.

It was yet another project carried out under the financial squeeze typical of the time, so priorities had to be assigned. Recalls Hazra: ‘The Director’s office was also in dire need of refurbishment, but Prof. Nag wouldn’t hear of it. He insisted that the Institute’s support units be spruced up first, areas that would directly affect staff and students.’ (The spirit of abnegation in the larger interest endured. A whole decade was to go by, including the tenure of Nag’s successor, Dr S.P. Sukhatme, before the Director’s office felt the refurbisher’s touch; it was only in the new millennium, with the Institute enjoying relatively sound financial health, that the Director’s office was finally renovated.)

What use a friendly, efficient looking office, however, if not manned by friendly, efficient people? Around the mid-eighties the world of management had been taken by storm by Masaaki Imai’s book, Kaizen: The Key to Japan’s Competitive Success, asserting the importance of quality and efficiency of service. Subscribing to its propositions, the Institute arranged a number of Kaizen workshops for its non-academic staff. Mr G.L. Lalwani, at the time of writing one of the longest serving of the Institute’s personnel, was recruited back in 1964 to set up IIT-Bombay’s in-house Printing Press, whose Manager he remained for decades together. Remembered widely for the meticulousness and sincerity he brought to his job, Lalwani remembers fondly how the Kaizen sessions helped his section both in
outlook and materially. By attending closely to the smallest details – this being one of the prescriptions of the Kaizen way – such as selecting just the right size, thickness and texture of paper for each job, and rationalizing its processing, the Press was able to effect cost reductions of up to a third: useful economies for an Institute strapped tight for cash.

These measures betokened nothing short of a cultural change for the Institute – in work practices, in attitudes towards work. A grateful-welcomed upshot of the administrative reforms was that the Institute’s functionaries, less mired in paperwork and with the administrative units moving more efficiently, could devote more time to weightier matters, such as policy issues. And one of the issues preoccupying everyone’s thoughts over this interval was faculty recruitment. IIT-Bombay by the late eighties, according to Kudchadker, had entered a ‘danger zone’ in regard to its faculty, and needed urgently to do something about it. When asked to reflect on why he’d thought so, Kudchadker offered a couple of pointers.

**APPLYING THE ‘FULL TREATMENT’**

Much as was the case for its equipment and buildings, the Institute’s human capital, too, was aging and in need of a recharge. By the mid-eighties, the average age of the Institute’s faculty had grown to 45, and retirements were coming up in large numbers.47

‘Every evening after 6 o’clock,’ Kudchadker relives the times, ‘the three of us used to have discussions in Prof. Nag’s office – himself, Ghosh and me. Prof. Nag, puffing away continuously at his cigarettes and sipping his tea,’ – for Nag was an established chain smoker and chain tea-cup-quaffer – ‘would say, “It’s time for us to aggressively start recruiting faculty”.’

The Institute embarked on an intensive recruitment drive both within India and overseas, one of its targets being a reduction of average faculty age to 35. And in the way Kelkar was an academic visionary, Nag was an administrative path-breaker, said to have tremendous confidence in handling rules and interpreting them to IIT-Bombay’s advantage. One rule, Kudchadker remembers, required candidates to have three years of research experience in order to be considered for the post of assistant professor. The IITs as a result had become conservative in offering positions: a fresh Ph.D. would be considered only for a lecturer’s posi-
tion, something that had begun to put off the higher achievers amongst prospective candidates. Nag – ever the creative interpreter of rules – decided that IIT-Bombay would count the three years spent on their Ph.D. thesis as professional research experience. 'A very simple solution,' says Kudchadker, 'and no violation of rules either.'

To Kudchadker, Nag issued a carte blanche: 'It's for you to develop a strategy for recruitment on a mass scale. And you have the freedom to develop it as you please.' As a matter of course, there were the press advertisements. More importantly, however, the Institute's functionaries went actively head-hunting. Much of it was done through personal contacts. By this time, as a direct outfall of the 'brain drain', the brightest Indian students were powering some of the best research laboratories of the US and Europe. Kudchadker travelled far and wide, covering a number of leading universities in Europe, UK and in particular the USA. IIT-Bombay was marketed aggressively using presentations and video films, an approach uncommon for an Indian institution of the eighties. Also by this time, there were facets of IIT-Bombay that lent themselves to showcasing. The Institute was changing – if only gradually – in the sophistication of its laboratories and the flavour of its interaction with industry. A comprehensive microelectronics laboratory had been set up, Dr J. Vasi one of those at its helm, which not long from then was to earn repute beyond the nation's frontiers for its work. And Kudchadker's successor to the Dean R&D's chair, Dr S.C. Lakkad, had set up a lab on the artificial ('Jaipur') foot.

With the help of the recently created Education Technology Cell in the Institute, the film projected these and other successes. It also featured capsules on IIT-Bombay's history and on the opportunities for industry interaction in a city like Bombay. And it played up the lure of the campus. Aerial views were flashed – from which vantage the campus, notwithstanding its unhappy inner state, presented a disarmingly pretty picture.

In June 1958, we recall that Chandiramani had called the US-based Katti from out of the blue to induce him to take up a faculty position at the still-nascent IIT-Bombay; more than 30 years later, Kudchadker went about 'doing a Chandiramani' on several prospective candidates, sounding them out, conducting telephone interviews (through which he also judged communication skills). Following this, Kudchadker would typically report back from the US to Nag on phone; Nag would study the case
in consultation with respective departments, and if all seemed in good or-
der – such as a strong track record and four matching strong letters of
recommendation – promising candidates were made offers in absentia,
appointment letters being faxed across. Dr G.K. Suraishkumar, who was
taken on board in Chemical Engineering in 1993, was one of those who
benefited from this style of functioning. ‘I started applying to academic
institutions in India (mainly IITs) about a year before I thought I would
finish my Ph.D.,’ he recalls. ‘The first choice was my alma mater, but after
about 9 months of efforts at that IIT, it didn’t work out. I applied to IIT-
Bombay in June 1992, and was pleasantly surprised to receive a letter from
Prof. Kudchadker within about three weeks. He came to Drexel to meet
me during his visit to the US in August 1992, and I got my offer letter from
IITB in December 1992. It felt very good to experience the initial response
and processing speed at IITB, and thus I decided to join IITB although I
had another offer by this time.’

No less aggressively were recruitments done on home turf. Take the
case of Khakhar, who in 1987 was already at IIT-Kanpur as an Assistant
Professor of Chemical Engineering. In the middle of that year he hap-
pened to pay IIT-Bombay a chance visit, in the course of which he went
over to the Institute’s CAD Centre to hand over a parcel to a colleague. It
was here that Kudchadker got wind of Khakhar’s presence on campus. He
had prior knowledge of the latter’s case: Khakhar had applied previously
to IIT-Bombay but IIT-Kanpur had made him a better offer, and Kudch-
adker had regarded Khakhar’s preference for Kanpur as IIT-Bombay’s loss.
Kudchadker, searching Khakhar out, that very afternoon invited him home
for tea – where, in Khakhar’s words, he ‘really gave me the full treatment,
convincing me why I must be with IIT-Bombay and no other place.’

What did it entail, this ‘full treatment’?

‘Basically that this was absolutely the best place for me,’ remembers
Khakhar, ‘offering great research opportunities, and how I shouldn’t
worry about the Lecturer’s versus Assistant Professor’s position, how IIT-
Bombay had a very short lag before promotions, and how I’d be there in
no time. Essentially, everything I wanted to hear’ – which was enough for
Khakhar to entertain second thoughts on the matter.

It was on the strength of this dialogue, and with the added attraction
of being close to family, that Khakhar was convinced into moving from
Kanpur to Bombay. A move that left IIT-Bombay the richer for its efforts: for Khakhar went on to become a prominent figure on the country’s engineering landscape, publishing the first ever paper in his discipline from an Indian laboratory in the journal *Nature*, and securing, among others, the nation’s highest scientific accolades, the Swarnajayanti and Bhatnagar awards.

A glance at the numbers of faculty recruited over this period tells its own tale. As many as 135 were welcomed on board between 1986 and 1993, some 75 of these from overseas. Dr S.L. Naraynamurthy, one of IIT-Bombay’s early intakes (he joined as an M.Tech. student in 1962, in Chemical Engineering, as faculty in 1964, and was later to become the Dean of R&D and Dean of Resource Development), compliments Nag on the recruitment initiative: ‘When I was the Head of Chemical Engineering, I had this embarrassment of riches. I had nearly thirty five people on board – it took us a long time to get those kinds of numbers again. Prof. Nag did that across the board in all departments, and it’s a huge legacy he left behind. Good faculty recruited in large numbers. Today, they’re delivering the goods. They’re showing what IIT-Bombay can be.’

For those who were won over by the hard-sell, there were sure to be let-downs in store. ‘Some were disappointed when they joined IIT-Bombay,’ Kudchadker adds on a subdued note, ‘because of the housing. That situation continues today and we must do something very quickly about it.’ Be that as it may, in one sustained tug, IIT-Bombay had been wrenched out of the danger zone.

But while faculty recruitment was all about enticing newcomers to the fold (for only a few of them might have graduated from the Institute), at about the same time, a separate drive was being set in motion. This brought back into the fold those who had once loped about IIT-Bombay’s classrooms and corridors, and thrashed about in its investing lakes: the Institute’s alumni.

**BOATING, HOUSIE, KITE-FLYING ...**

Thus far, the culture hadn’t really existed in IIT-Bombay to reach out towards its former students. Things simply worked at a personal level, for instance with faculty who were close to students during their time here –
prominent examples being Prof J.R. Isaac, first of Electrical Engineering and later of Computer Science and Engineering, Drs K.P. Madhavan and S.L. Narayanamurthy of Chemical Engineering, and Dr N. Ramaswamy of Mechanical Engineering.

Typical of Nag’s and Kudchadker’s style of working, a concerted, many-pronged approach was chalked out. This included building up an alumni database, meetings with Bombay-based alumni, launching a quarterly alumni bulletin and membership drive, silver jubilee get-togethers, and an effort by Kudchadker to establish contact with US-based alumni during his trip there.

Building up the database was easier said than done. The IIT-Bombay Alumni Association (IITB-AA), fitfully active in the early eighties, had lain near-dormant for a good while. Kudchadker, who in the early nineties was the Association’s President, teamed up with others who volunteered for the task, including Drs. Moudgalaya and Madhavan of Chemical Engineering, and Drs. Somasundaram and Vasi of Electrical Engineering - and with IIT-Bombay’s first ‘real’ Public Relations Officer, Mrs Aruna Thosar-Dixit, who had joined in 1985. And if Dilip Ghosh has been described as IIT-Bombay’s first ‘thinking Registrar’, Thosar-Dixit was equally, accordingly to many who’ve worked with her, the Institute’s first ‘thinking PRO’.

The team firmed up and enlarged the database for alumni within India and abroad, addresses being garnered from department offices and individual faculty. Over in ‘Town’ (as the southern reaches of Bombay are often dubbed), alumni like Sharad Saraf (B.Tech. Electrical Engineering, 1969) were already making a concerted effort to revive the Association; membership drives were also launched locally for India-based alumni. And within the Institute, a quarterly bulletin was produced, transmitting information about the Institute to alumni and vice versa. Called ‘Network’, it included news about developments in the Institute’s classrooms, hostels, and campus; and carried profiles on alumni who’d already made a mark for themselves, such as Dr Ramani Iyer, Dr Arun Dravid, and Nandan Nilekani.

And yearly in December or January, the IITB-AA joined up with the Institute to organize an Alumni Day, old students congregating in the Institute’s lawns and halls to partake of an alluring programme of events put together for them (in 1986, the programme prominently featured
‘Housie’ and ‘Boating’ among its attractions – topped up with that loftiest of the technical arts, ‘Kite Flying’.

A tradition started in 1988, and which has grown from strength to strength over the years, was the Silver Jubilee reunion on Alumni Day in December every year. It was set off with the Institute’s very first couple of batches (the graduates of the 1962 and 1963 convocations) assembling at the Institute in December 1988. The reunion proved a resounding success and IIT-Bombay hasn’t looked back since, bringing more and more alumni back into the fold. The first major single-batch Silver Jubilee reunion took place in 1994 for the Class of 1969, spearheaded by Saraf and his Chemical Engineering batch mate, Parag Rele. In years to come, Silver Jubilee batches would begin to compete with one another to see what they could offer to IIT-Bombay in return for the shaping and nurturing they had received here during their formative years.

Nag, enthused by the warmth of the response, suggested to Kudchadker that during his faculty recruitment trip overseas he use the opportunity also to fortify links with alumni settled abroad, several of whom were already in touch with the Institute. In 1991-92, during his recruitment sojourn, Kudchadker also contacted as many alumni as he could. And it was on the California leg of this trip that he had seminal meetings with the Institute’s alumni settled along the West Coast: amongst whom he recalls Anil Kshirsagar, Deepak Sabnis, Raj Mashruwala, Sandeep Pandya, and Mahesh Krishnamurthy, all of whom were to make a large and lasting difference to Institute-alumni relations in times to come.

Back in Bombay again, alumni like Parag Rele joined forces with the likes of Saraf, and soon there were two alumni associations on opposite sides of the globes, in Bombay and in California, working in tandem, taking up an idea and turning it into something of a movement: one that will occupy our attention in the next chapter.

LOSING THE HABIT?

Between the mid-1980s and mid-90s, the Institute had shored itself up in several ways. It had revitalized its internal support systems, its faculty numbers and its links with alumni. But it had yet again, as in the prior phases of its life, been unable to realize its ambitions in the sphere of re-
search. To add to this disappointment it was now confronting an even greater threat. If this situation were to persist, the Institute's academic staff might conceivably fall out of the habit of research as part of the weave of the academic life. Just as muscles can weaken from disuse, so can facets of the intellect if consigned to neglect. And a multiplicity of factors, many of them feeding into one another, were deadening faculty's impulse towards research. There was the lack of modern equipment, and the perennial pinch on Institutional funds with which to try out new ideas before turning to extramural agencies for support. There was the continual devaluation of the rupee, forcing cutbacks in import of equipment. Typical of the time, there were the convoluted procedures and extravagant delays in acquiring equipment, rendering your research ideas dated before you'd had a chance to examine them.

And if you did finally acquire the equipment, there was scarce support for running your research, the Ministries being inclined to fund capital equipment preferentially, frowning ever more upon contingent and running costs – never mind the fact that equipment could scarcely be expected to run without the personnel and materials to go with them. There was an incapacitating shortage of graduate students to carry out the research: the Ph.D. programme itself, with its meagre stipends and long, arduous path to the degree, had become an unattractive, even derisory option. For several years in the eighties and nineties, the Institute found itself unable to fill all its earmarked places for the programme. The accommodation shortfall was driving project scientists and engineers away. Opportunities to interact with peers at international conferences were scarce, either for yourself or for your research crew. Indeed Dr M.N. Ghatikar, who retired as Professor of Physics in 2002 after a stint of 30 years at the Institute, recalls that there were 'no funds for attending conferences or seminars even within India.'

And long as this list might already be, it is merely a partial enumeration of the many-layered, dispiriting obstacle course the pursuit of research had become. It was easier, and sometimes made more sense, to give up on the seemingly Quixotic dream, especially if your job at the Institute was secure. Which is an additional factor that cannot be underestimated, nor left unexamined: the advantage the Institute's academic staff enjoyed of having permanent jobs firmly protected by legislation.
With employment never seriously under threat for under-performance, and only promotions depending on research (even this was true only mid-seventies onwards), it wasn’t difficult to see one’s ‘job description’ at IIT-Bombay as starting and stopping with teaching. So long as you did your allotted share of teaching, you could not be accused of dereliction of duty. Research was still a passion you pursued, a personal avocation, and not a mandate central to the job. In this climate, institutional expectation from individual faculty in terms of commitment to research was also being whittled away.

And it showed. It’s instructive here to take the impressions of someone who entered the scene exactly midway through this phase. Dr U.A. Yajnik, who was appointed Assistant Professor in Physics in 1989, feels that at the time of his arrival, barely 5 to 10 per cent of his colleagues across the Institute were active in research. ‘There were very capable people around,’ he contends, ‘some excellent teachers who would also have made good researchers. But they never had the opportunity to prove themselves, principally because of lack of facilities and funding throughout the sixties and seventies. Trying to do research here was like trying to run in a six-legged sack race.’ Yajnik was familiar with their teaching prowess, being an alumnus of the Institute (he graduated with a 5-year integrated M.Sc. in Physics in 1980). And Yajnik’s impressions have been echoed by practically everyone who joined IIT-Bombay over this spell. It would appear, then, that several of the Institute’s faculty had already fallen out of the ‘research culture’ by the late eighties and early nineties – or had never had the chance to fall into it. The greater danger was that the Institute as a whole might also fall prey to this jeopardy. Put together, it made a collage of observation and impression that didn’t bode well for times to come.

It was in this brittle climate, in the mid-1990s, that the Directorship changed hands; and after a four-month interregnum during which Dr S.C. Sahasrabuddhe of Electrical Engineering held office, it now passed into the hands of one who brought to the post two distinguishing features. He brought, first, more in-house experience than any of his predecessors had done. On January 2, 1995, when Dr S.P. Sukhatme took over as Director, he had worked at IIT-Bombay for thirty years, and those again without major breaks: he hadn’t been away on deputation or lien for extended periods. Having already held the positions of Head of Department of Mechanical
Engineering and of the Institute’s Deputy Director, and having served on a large range of high-level committees, he had become part of the life-blood of the Institute. In return, the Institute coursed as if in his veins, so intimately did he know and cherish it. And he brought to his post a further distinctiveness. Other Directors before him had been accomplished each in their own way, some erudite, others adept at administration; none, however, had come with the breadth and depth of academic credentials that Sukhatme did. He had published extensively in the leading journals of his field, had authored books that had become standard texts country-wide, had undertaken systematic studies of the brain drain that overturned prevailing notions, resulting in another book; and in 1983, he had received the Bhatnagar award.

‘When I took over of course it was a period where things were a little difficult,’ says Sukhatme in his understated way. ‘We had a situation in which the Institute was not in good shape in terms of its infrastructure. There were indications that things were picking up in 1995 but certainly it was a cause for worry, the question of funding.’

He took heart from the fact that IIT-Bombay still had its inner strengths: excellent students and faculty, many of the latter a fresh and enthusiastic crop inducted by the previous regime. ‘Our strength also was,’ he adds with emphasis, ‘non-academic staff who, by and large, were dedicated. That was not true of many other places in India in the 90s’ — a statement which suggests that the sustained efforts of the Nag-Kudchadker era might have borne some of their intended fruit.

‘So we had all these strengths and with these, there was reason to hope that if things turned around in terms of funding or we could generate funds from other sources, we could probably go forward.’

‘If things turned around in terms of funding’ ... It was the biggest of ifs; and, even as the mid-nineties dawned, and Bombay became Mumbai, and the approaching turn of century (and millennium) loomed in everybody’s mind with an oddly bloated significance, there was no clear answer in sight to the Institute’s existential tenterhooks.
CHAPTER 10

ON THE COMEBACK TRAIL

Up in the heavens some guardian angel seemed, this time round, to have been listening; the Institute’s big ‘if’ started to find its answer. And one of the mediums through which it came was the telephone.

The answer sprang from a phenomenon that had been brewing in the wings for some time, yet came to a head with startling force and swiftness. And it’s best illustrated by two calls received by the Institute’s functionaries, some two years apart.

The first rang out in the Director’s office in late 1996. An international call; and the voice at the other end said: ‘Professor Sukhatme, I’m calling to give you some good news.’ Sukhatme could perhaps sense what it was. In a moment, he’d heard it. ‘The Heritage Fund is formally registered now;’ continued the voice. It belonged to an alumnus of the Institute known to Sukhatme: Anil Kshirsagar, batch of 1975; he was calling from California. ‘We’ve got it IRS approved, with tax-exempt status. It’s all set to go.’ Sukhatme remembers being delighted. It was ‘an important step’ he’d been waiting to hear about.

The second call, a little over two years later, and really two calls rolled into one, was from within India. The phone rang in two offices, the Dean of Resource Development’s and, once more, the Director’s. Best to follow what ensued in their own words.

Narayanamurthy, then the Dean, revisits the call he got, dialed from a car. ‘It was towards mid-February, 1999. Close to lunch time. I had a call from Nandan Nilekani, saying he wanted to honour his commitment to

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a The reconstruction presented here is based on separate interviews with Drs S.P. Sukhatme and S.L Narayanamurthy.

μ A glimpse of the modern face of IIT-Bombay: part of the Hostel 12 – 13 complex.
give the Institute a million dollars. I said yes Nandan, what can I do about it? How soon, said Nandan, can you get the formal acceptance from the Institute ready – can you do it this evening? I said, where are you? In a vehicle, he said – I went to Mysore, am on my way back to Bangalore. Can you get back to me, I want this sewn up. If not today, tomorrow.’

Narayanamurthy hurried along the corridor to Sukhatme’s office. Sukhatme, meanwhile, had also heard from Nilekani – a 1978 alumnus, B.Tech. in Electrical Engineering, and Managing Director of Infosys Technologies Ltd. at the time. Nilekani had said he was interested in selling part of his personal holdings in Infosys shares and gifting the proceeds to the Institute. Sukhatme had told him IIT-Bombay wasn’t allowed to hold shares since the Institute couldn’t speculate with money; Nilekani assured him he’d take care of that side of things. Somebody else would sell the shares and IIT-Bombay would get their market value. But he needed the Institute’s formal agreement and approval.

‘A million dollars,’ remembers Sukhatme – this was the rough value of the shares – ‘it was more than four crore rupees. The Institute had never before received this kind of amount in this way. For Nandan, it was imperative that he transfer the money to the Institute before the financial year was over. I asked him to give me some time – this was big money and I had to be careful.’ (In the end, the 14,000 shares Nilekani donated were to fetch IIT-Bombay Rs 6.9 crore.)¹

When Narayanamurthy arrived in Sukhatme’s office, the two of them weighed up the situation there and then. ‘Narayanamurthy said,’ Sukhatme recalls, ‘that there’s no way we’re going to let this money go. I said, let me call up Prof. Menon because this requires the Board’s approval.’

Sukhatme called Prof. Menon. ‘I said this is the position but I can’t request a Board meeting at such short notice. “What’s the problem?” said Prof. Menon, “We’ll take care of the paper work later. I’ll simply tell the Board I okayed it if anybody questions it.”’

The ‘Prof. Menon’ of these allusions was Dr M.G.K. Menon, then Chairman of IIT-Bombay’s Board of Governors (he held office between 1997 and 2003). An imposing figure in the world of Indian science, Menon had previously held a long string of positions of prominence – Director of the Tata Institute of Fundamental Research in Bombay, Chairman of the
Indian Space Research Organization, Director General of the Council of Scientific & Industrial Research, and Minister for Science & Technology. Recipient of the Bhatnagar Award and the C.V. Raman Medal, he was also awarded the Padma Shri in 1961, the Padma Bhushan in 1968 and the Padma Vibhushan in 1985. To one of such stature, it’s possible to see why it should have come so easily to give the go-ahead to Sukhatme on the strength of his own conviction.

Narayanamurthy, who was sitting by, adds: ‘Prof. Menon said, ‘Just go ahead. Send me a fax and I’ll authorize you by return fax to accept the funds.’ He had no reservations since the funds were coming from Nandan. We faxed ... and at 4 o’clock that day, we had his clearance.’ Clearance in hand, Narayanamurthy got back to Nilekani. ‘Nandan said things were ready at his end – and the gift deed of his shares was with us the next day.’

Before the money itself could be funneled into IIT-Bombay’s accounts, however, the challenge was to complete all the documentation and sale transactions within two weeks. Adds Sukhatme, ‘This is something that required a fair amount of work from Prof. Narayanamurthy. Going back and forth, calling up here and there, getting all the paperwork done.’

At one stage, with the preparatory work nearly complete, Narayanamurthy remembers going along to Sukhatme, asking for his signature on an unfilled form. ‘Prof. Sukhatme smiled and said, are you asking me to sign a blank form? I said, what’s to be filled in can be done later. It’ll be details of the Institute’s incorporation and autonomy, which resolution of the Board of Governors says what on the subject. But I need the signature now, I take the responsibility for what will go into it. He signed.’

IIT-Bombay succeeded in meeting the deadlines and also launching the associated endowments by 10th March, its Foundation Day. Within a few weeks, the Institute found itself richer by close to Rs 7 crore – and this wasn’t all either. Nilekani’s endowment was actually a handsome top-up on another generous endowment already received from another alumnus, Kanwal Rekhi – B.Tech. Electrical Engineering, 1967 – who had donated $2 m, translating into nearly Rs 8 crore. (Not long from then, in December 1999, IIT-Bombay was to be richer by yet another Rs 4.7 crore, with Nilekani donating another chunk of his holdings in Infosys. It’s also noteworthy that Nilekani continued to give generously to the Institute...
over the next couple of years. In September 1999 he committed himself to a sum of $5 million, and in due course made good his promise, boosting the Institute’s corpus by about Rs 23 crore in all, becoming thereby its largest individual donor so far.)

What was all this money gushing in for? Rekhi’s and Nilekani’s endowments enabled, among other initiatives, something the Institute couldn’t have dreamt possible just a couple of years ago: the setting up of a new academic unit mainly on the steam of non-governmental money. This, the Kanwal Rekhi School of Information Technology, KRESIT for short, was launched in late 1998, once Rekhi had announced his lead donation.\(^4\) Narayanamurthy’s recap soon after the event was succinct: ‘While Kanwal’s munificent donation helped the School of Information Technology take off, Nandan’s generosity has launched it into orbit.’\(^5\)

In the ‘Nilekani episode’, as it may be termed, three things stood out in turning possibility into reality. From Narayanamurthy’s viewpoint, it was complete trust reposed in him by the Institute’s highest functionaries – plus a second vital ingredient. ‘This is what I call risk taking,’ he says. ‘Fine we knew and respected each other, but what if I’d let Prof. Sukhatme down? With money of this kind involved, there’d be a huge national scam. The key thing was trusting leadership, whether it came from Prof. Sukhatme or from Prof. Menon. The trust they reposed in a person who had little knowledge of these things but good intentions, and was willing to say let’s go ahead and do it. It substantially reduced our response time.’

Sukhatme in turn applauds Narayanamurthy’s commitment to the cause: ‘In the event, everything was done on time because we had a Dean who said it would be done. I recall this incident as an example of his dynamism. Somebody else could have given a hundred excuses for not doing the work but he did it – strengthening the process, getting things done and letting people know what was happening with the money they gave.’

The episode also underscores how IIT-Bombay’s autonomy, vested at various levels – in the Director, in the Chairman of its Board of Governors – could be turned by its office bearers to the Institute’s enduring advantage, and how, without this freedom of action, little of this might have seen light of day.
Outrage, Affection, ‘Payback’

Rekhi’s and Nilekani’s endowments were part of an extraordinary surge in alumni donations IIT-Bombay received near the turn of the century. As early as 1995, for example, the ‘Class of ’70’ had put together close to Rs 4 lakh for a scholarship fund. In 1997, the Class of ’72 proposed at its Silver Jubilee reunion to raise Rs 45 lakh towards a hostel and Convocation Hall renovation fund, and towards laying down fibre optic links between the hostels and the departments. The next year – calendar year 1998 – saw IIT-Bombay’s fortunes along this tack positively soar, as alumni endowments poured in thick and fast. The Institute’s annual report for the year joyously chronicles the spate:

During the calendar year 1998, the IITB Heritage Fund raised around $2.5 million including the $1.9 million lead donation from Mr. Kanwal Rekhi (B.Tech. 1967, EE) for the School of Information Technology. Besides, some large donors have pledged around $2 million over the next couple of years [this would have included Nilekani’s second pledge, made good early 1999 onwards]. The Heritage Fund has coordinated and channelized the US Alumni contributions to funds for painting Hostel-10, the Class of ’72 endowment fund for Hostel maintenance, Class of ’75 fund for Internet access facility to all Hostels, and the Class of 77/75 fund for Scholarships. The Heritage Fund sponsored the first set of ‘Excellence in Teaching’ awards conferred on faculty members in September ’98. Besides, the Fund has also raised money for a Library endowment.6

Painting hostels. Setting up a new School. Wiring up for internet access. Sponsoring awards and scholarships. Hostel upkeep. Supporting the library...here was an impressive palette of commitments indeed. For a few years, alumni donations became a noticeable – even perhaps notable – fraction of IIT-Bombay’s annual budget. Take the case of fiscal year 1998-99, over which IIT-Bombay had a total inflow of Rs 108 crore. Of this, the ministerial grant comprised Rs 68 crore, a variety of other sources accounted for Rs 32 crore and donations, principally from alumni, brought in some Rs 8 crore. Thus, while the Ministry had remained (and continues to remain) IIT-Bombay’s primary source of funding, the revenue from donations, negligible until then, had now jumped to some 8 per cent of
the inflow. But to many minds it wasn’t the absolute amount that mattered so much as the psychological tonic it constituted – and the air of possibility it conjured up. The rush of goodwill prompted IIT-Bombay to mull upon the examples of US universities where alumni endowments had financed not just new academic programmes but also ongoing research, faculty positions and support systems – all in ample measure – and to start wondering if something along these lines mightn’t be possible in its own instance.

But no Indian educational institution had so far benefited to any significant degree from monetary expression of alumnus gratitude. What, then, led to this heart-warming volley of ‘alumni payback’ to the Institute as it came to be known?

Two sentiments can be seen to have surfaced with palpable intensity over the space of a few years. On the one hand there was a sense of horror and outrage at the adversities IIT-Bombay had lately had to endure. Many visiting alumni had been dismayed by the shabby state of the physical infrastructure, and had spread the word amongst fellow alumni. ‘Hostels in disrepair, laboratories with obsolete equipment,’ wrote one, ‘libraries cutting back on journals, students being asked to live off-campus or double up in tiny rooms’ – they were ‘shocked at the extent of the decline in the infrastructure.’ For many who had passed through it in the 1960s and 70s, this was a pale shadow of the Institute they had known.

The other sentiment was a gradually dawning sense of possibility, even of excitement, at perhaps being able to do something to help. This came in the shape of the IIT-Bombay Heritage Fund, set up by US-based alumni with two main objectives. It sought first to provide a tax-exempt channel for them to assist IIT-Bombay ‘in its efforts to keep the institute amongst the ranks of the best universities in the world.’ It sought also, unapologetically, ‘to provide a means for us, the alumni, to benefit from our association with this excellent institution.’

The Directors of the Heritage Fund appealed to fellow alumni to come forward and contribute to IIT-Bombay’s cause. And it seemed eminently possible that the Institute’s former students could in fact make a difference. Many among their number had by this time scripted remarkable success stories for themselves in their chosen vocations. Their names had started cropping up with predictable regularity in the highest technology and busi-
ness circles and in the media; they were seen occupying leading positions in organizations representing academia, industry, government, finance, management consulting...any which way you cared to look. Many of them, especially those in the US, had generated and acquired tremendous wealth, running into the tens of millions of dollars (and sometimes the hundreds). Many had also built up that ‘soft’ but vital asset: influence and clout in circles that mattered. Some of this wealth and influence, then, could be leveraged to IIT-Bombay’s advantage, if only they felt like doing so.

And feel like doing so they certainly did. Complementing the alumni’s shock at the Institute’s vicissitudes was an abiding affection for the years they had spent here. It roused in them a fierce sense of loyalty which, translated into action, was shortly to take on the shape of a crusade.

IIT-Bombay, sensing the growing mood, busied itself setting up the mechanisms and processes needed to receive the donations through the Heritage Fund. One of the first measures Sukhatme took after assuming office was to get the Board’s approval for a Dean to look after the ‘planning and execution of all matters relating to the development of resources for the Institute.’ Dr D.B. Phatak, of Computer Science and Engineering, was appointed the first Dean of Resource Development in 1995 (the post is now Dean of Resource Mobilization), succeeded by Narayananmurthy in 1998, both of whom brought enterprise and energy to the post, streamlining procedures, trying to make the ‘act of giving’ as unencumbered as possible for prospective donors.

Once the money started flowing in, an air of buoyancy coasted the air, now and then blowing over into euphoria. Such was the optimism generated that in 1999 the Institute thought it within the bounds of possibility to raise Rs 500 crore through alumni by 2008, its Golden Jubilee year. This is a figure that needs to be seen in perspective: it was comparable to the annual grants the Institute had received from the government over the last 10 years of its existence put together. So immense is the attention the phenomenon of alumni ‘payback’ has attracted, of such profound satisfaction has it been to the Institute, and such great store does IIT-Bombay set by it for the future, that it merits deeper exploration in its own right – and is taken up further in Chapter 16.

Alumni donations, for all the high spirits they fanned, formed just one part – and in purely monetary terms, a relatively small part – of the an-
swer to the anxieties assailing the Institute at the end of Nag’s tenure. At around the same time, the mid to late 1990s, came the second part of the answer, leaving the Institute in much sounder fiscal health than it had been a few years back. The government’s grants to the Institute became suddenly more liberal.

As ex-Registrar Ghosh remembers it: ‘From the mid-90s, the flow of Plan funds from the Ministry was smooth and at times it provided funds pro-actively. In 1994-95, the Plan grant was Rs 3.6 crore; by 2003-04, it had risen to nearly Rs 21 crore’ – representing a six-fold increase over nine years. Inflation during these years, by contrast, was in progressive decline, dipping to the 3-5 per cent mark by the early years of the new century. This meant that costs would have risen only about 50 per cent in those nine years, translating into relative financial comfort all around.

It was at the beginning of the nation’s Ninth Five-Year Plan, for the years 1998-2002, that IIT-Bombay saw a steep increase of grants which helped the Institute carry out some over-due maintenance of the campus as well as add new infrastructure. As a particular example, network connectivity was given a long awaited shot in the arm. The MHRD came up with a targeted scheme for modernization of information technology infrastructure, under which IIT-Bombay was funded to the tune of Rs 18 crore. This resulted in the provision of a new PC to practically every desk in the Institute and in vastly enhanced net access, IIT-Bombay’s gateway speed shooting up from a somnolent 64 kbps to an athletic 2 mbps (a figure reduced to somnolence today, access speeds having risen to 32 mbps). IIT-Bombay was well and truly wired to the world.

These twin developments – alumni endowments and renewed Ministerial generosity – added up to a veritable U-turn in the Institute’s fortunes. One might well ask why the government, for its part, underwent a sudden change of heart. As in the case of the slump of the 1980s and early 1990s, the reasons were anchored in the health of the national economy. India had clawed its way back from the economic brink. Within five or six years of the introduction of economic liberalization in 1991, and for the first time in decades, the government found itself in a state of fiscal well-being, and was willing to share some of its newfound prosperity with IIT-Bombay. But there was a second, largely unstated, reason. The sometimes incredible success stories of IIT-Bombay’s alumni, along with their sustained interest
in helping their alma mater (and this was true of other IITs as well) must have played their own part in prompting New Delhi to rethink its attitude towards the Institutes: finally, it seemed, the IITs had ‘come good’, most evidently in the currency of their human resource output.

An issue that merits parenthetical comment is the ‘shabby state of the Institute’s infrastructure’ that had roused the sympathy and the ire of its alumni. As noted, government funding for IIT-Bombay had also started improving mid-1990s onwards. Why then the sustained deterioration in conditions, well into the late nineties?

Two reasons can be discerned. There was first the matter of sheer inertia. With such scant repair and maintenance carried out over the preceding decade, an ever mounting backlog had accumulated, and simply needed time to clear. Second, recall the block grant scheme introduced in 1993, which incorporated an incentive for the Institute to earn some and save some, tagged with the promise that savings would be doubled via matching government contributions. The scheme produced a side effect which resulted in IIT-Bombay’s financial belt being tightened yet further. ‘Excited to build up its Corpus’, the Institute did everything it could to save – by stashing away as much possible of its already strained grants into the Corpus Fund. The outfall was that for some years there was even less money on hand to carry out refurbishments, exacerbating the already weakened infrastructure. Worse, as mentioned earlier, the Ministry didn’t keep its end of the bargain: ‘except for some stray payments’, no matching grants were released to supplement the Institute’s hard-won savings.
If at all there was a silver lining to this disappointment, it was the sizeable corpus IIT-Bombay had built up, a cushion that was to stand it in good stead in years to come.

‘NO TWO WAYS ABOUT IT’

Even as all this monetary churning went on like a penumbra of beneficence surrounding the Institute, life at its core proceeded in the time-tested way: attempts in several directions were made to bolster its academic programmes, its research, and its affirmation of those who had served it well.

Thirty five years of none too happy experience had shown that the annual ministerial grants were never going to propel R&D at the Institute at any significant pace. Sukhatme was determined that IIT-Bombay should increase its commitment to externally sponsored research—and as a corollary, turn itself into a more decidedly post-graduate institute. IIT-Bombay’s Institute Faculty Meetings had by now evolved into a forum where incoming Directors set down their roadmap for the Institute over their incumbency; and Sukhatme made his thoughts on the matter known in no unclear terms at the first meeting he addressed, in January 1995. ‘There could be no two ways about it,’ he remembers having declared. ‘I said faculty simply had to devote more time to research, get more sponsored projects.’

Efforts needed to be intensified in three directions at once: win more sponsored research projects, do more research, and publish more. At the same time, rigour of teaching – that strength which lay at the heart of the reputation for excellence IIT-Bombay had already carved out for itself – was vitally important, and couldn’t be watered down. Good research and good teaching had to go hand in hand.

The accent Sukhatme placed on research left a lasting imprint in the minds of many. One of these was Dr K. Sudhakar, taken on board in the Aerospace Engineering department in 1984. Sudhakar picks this as his most vivid memory of the shaping of institutional trajectory throughout the 1990s. ‘Prof. Sukhatme’s statement that research, and research publications, should be given the highest priority by each individual faculty, and would count the most towards their assessment: something like this had never been articulated so clearly before. I remember that and my colleagues and I saw this as a major shift in the Institute’s emphasis.’
During the five years Sukhatme held office, a concerted attempt was made to see that faculty not only pursued individual projects but also joined forces to apply for larger projects from agencies with bigger financial outlays. Conscious moves were made to set up centres either within the departments or attached to them, so that the Institute would have the funds and the infrastructure to support ever more students and staff for their projects. From a situation where most research grants ran into some lakh of rupees, IIT-Bombay’s faculty made the transition to applying for grants running into a crore or two. In this new mode, the Institute interacted with the Department of Atomic Energy to set up the Centre for Formal Design and Verification of Software (the CFDVS) aimed at carrying out research in the area of quality software, the project bringing in a couple of crore.15 A similar overture to the Aeronautical Development Authority resulted in the Centre for Aerospace Systems Design and Engineering (the CASDE) sited in the Aerospace Engineering Department, funded to a similar degree. Other projects of this nature and scale were the Thermo-Hydraulic Facility from the Department of Atomic Energy, running to Rs 2.5 crore,16 and the Geo-Technical centrifuge put together with funds from various sources – the Department of Science and Technology, the Defence Research Development Organization, and the MHRD – running altogether to about Rs 6 crore.17

Also set afloat was an Information Technology business incubator within the new School of Information Technology. This aimed to help entrepreneurs amongst students or alumni develop their own start-up companies and generate, in due course, homegrown IT products and technologies. A pilot incubator programme was begun in 1999 with a part of the financial assistance received from alumni Kanwal Rekhi and
Nandan Nilekani; in time, it was to evolve into a full fledged Technology Incubator at the Institute.

The new approach spurred by Sukhatme left its mark. Over the years 1995-2000, by comparison with the stagnation witnessed over the previous five years, sponsored R&D flourished. When Sukhatme took over as Director, IIT-Bombay was attracting in the region of Rs 8 crore a year through sponsored projects; by the time he left this had doubled to around Rs 16 crore a year. Perhaps more importantly, the Institute’s expectation from its faculty had undergone a transformation: the idea that each should be active in research had been consistently and repeatedly driven home. And the ‘think big’ mood at the Institute, sparked off in Nag’s time with the Technology Development Mission projects, had been scaled up and strengthened. What had also helped in no small measure was that new faculty inducted in the early 90s by Nag and Kudchadker had by now settled in and become productive while, simultaneously, many of the older faculty who’d been unconvinced about the importance to be given to research and publication had retired.

GET MORE, PAY MORE: STUDENTS’ BILL OF FARE

For the primary clients of the Institute, its students, there was never a dull moment during the second half of the 1990s. A varied platter of measures touched every aspect of their lives on campus, be it the academic programmes they could choose from, what they paid for their education – or even the tenor of the ‘social bonding’ they underwent in their hostels.

Engineering and technology graduates from across the nation got the chance to enroll in, for example, a management programme tailored exclusively for them. A major launch at the very beginning of this phase was the academic operations of the recently formed School of Management. The planning for the School had already been done, and it remained to be executed: something Sukhatme had kept at the very top of his agenda. True to established IIT-Bombay tradition, even as it awaited its building, the School began its two-year Master of Management from temporary digs, in the Mathematics department, in July 1995. Following a generous donation from alumnus Shailesh Mehta towards its building, it came to be known as the Shailesh J. Mehta School of Management (SJM-SOM).
A second carefully contemplated academic experiment saw IIT-Bombay offer, 1996 onwards, its JEE entrants the chance to walk away after a five-year stay with both a B.Tech. and an M.Tech. tucked under their belts, through a single integrated programme. One of the main reasons for launching this, the Dual Degree Programme, was to produce a different breed of graduate: one with a strong research orientation. A five year programme offered more time to introduce greater breadth in science and humanities to start with, as also more time – a year and a half – for the dissertation towards the end, thus turning out a graduate more likely to contribute to R&D from the word go, whether in academia or in industry.

For students, there was a clear worldly incentive: they could gain their Bachelor’s and Master’s degrees in less time than it would have taken for both separately. The curriculum for the Dual Degree programme included most of the course work required for the B.Tech., a selection of courses in the area of specialization of the M.Tech. and an intensive M.Tech. thesis project. The programme was introduced in 1996 in Chemical, Electrical and Mechanical Engineering; between 1997 and 2000 it had been extended to all other engineering departments. And it enjoyed a fair degree of success. Between 120 and 160 students were admitted every year to the new programme – well over a third of the numbers admitted to the flagship B.Tech. programme.

July 1995 saw the department of Mathematics offer a new M.Sc. programme, in Informatics and Applied Statistics, designed to meet the growing need for people trained in information science and technology. Meanwhile, as we’ve seen, the discipline of Information Technology had sent down roots of its own, the foundation stone for the new School being laid in late 1998. Things moved at a good clip from then on. 1999 saw the introduction of the School’s academic programmes, its first batch of M.Tech. and Ph.D. students being admitted that July; the School’s building came up in 2001.

Keeping the flame of curricular renewal burning, the undergraduate programme – especially its core component, stretching over two years – was given a searching look, now that the customary interval of about 10 years had elapsed since the last review. Dr H. Narayanan of Electrical Engineering convened the committee (they called themselves the ‘Core Committee’) charged with the appraisal. The Core Committee’s principal
finding was that the extensive overhaul of the curricula in the early seventies had consummately withstood the test of time. At the end of a wide-ranging survey that included students and faculty they felt compelled to note, admiringly: ‘Although our programme may have minor flaws, by and large it should be regarded as working very well. It is, therefore, not desirable that we change the philosophy or the structure of the programme drastically.’ Accordingly, the Committee’s recommendations centred mainly on ‘fine-tuning’ the programme, such as in suggesting that departments introduce greater flexibility in their component of the programme.21

During the same spell, the Institute’s attention turned to a broader question: that of the numbers of aspirants being given the chance to avail of the increasingly coveted IIT-Bombay education. Student enrolment at the Institute had stood still at around 2,600 for a couple of decades since the early seventies. By 1995 it had grown to 3000 – a growth of a mere 400 over a period of 20 years. And IIT-Bombay felt that for the size of its campus and its staff, particularly its non-academic staff, this was untenable (there were times when the ranks of IIT-Bombay’s non-academic staff outnumbered its students). On the national scene, the benefits of the IIT education needed to be extended to a larger catchment; equally, technical personnel needed to be generated in greater numbers to meet the demands of the burgeoning post-liberalization Indian economy and industry.

Acting upon a considered resolve to add students, by the end-nineties the Institute had nearly 4,000 enrolled – a rise of more than 30% over the 1995 figure. An important facet of this expansion was that most of it was brought about through the Dual Degree, M.Tech. and Ph.D. programmes. The upshot was a rise in one of the indices by which educational institutions are judged as being primarily teaching- or research-oriented: the ratio of its postgraduate to undergraduate students. This ratio, which had tilted heavily in favour of undergraduates all through the sixties and seventies, had approached parity only in the early eighties, and stayed marginally in favour of postgraduates for another decade.22 By the turn of the century, however, it had risen to nearly 1.4 : 1, denoting a 40% outnumbering of undergraduates by postgraduates at the Institute – not, of course, the most welcome of developments for its ‘UGs’, who over the decades had become accustomed to regarding the Institute as virtually their private stamping ground.
And then in 1998, IIT-Bombay brought to an end a student rite of passage of primitive character and decidedly dubious merit. Ragging was banned. ‘Even if one student actually suffers because of ragging,’ was Sukhatme’s view, ‘it’s one too many.’ With the redoubtable support of Dr Dipan Ghosh of Physics, who was then Dean of Students’ Affairs, and vigilant policing along the hostels’ corridors by faculty at the start of each academic year, they succeeded in clamping down on this curious form of amusement and ‘social bonding’ (as its apologists termed it). And IIT-Bombay could justly compliment itself on having taken a leading step here, predating as it did the Supreme Court’s national anti-ragging order by three years.

Sadly for students, the extended era of being able to secure the best technical education money could buy in return for, as one alumnus retrospectively termed it, a ‘miniscule investment’ – that unforgettable figure of Rs 200 per year – drew to a precipitous end. It was an era that had lasted three decades; fees were jumped to around Rs 1000 per annum in the early 1990s, but this was still a lightweight figure. In the late 90s, the Institute raised its tuition fees sharply, though not with a view to generating any great chunk of its revenue from this stream. The IIT-Bombay education would continue to be heavily subsidized; the idea was that students should place at least a cognizable monetary value on the education they received here.

It was a move that had to be routed through the Directors of all the IITs before it was formalized and approved by the IIT Council, to whom Sukhatme was asked to present the case on behalf of the Directors. The task required a fair amount of co-ordination – and persuasion. As Sukhatme puts it, ‘The instantaneous reaction to hikes in fees is always: no, don’t talk about it. But if you present how reasonable it is, how most people can afford it, and how anyone who can’t will get a scholarship, it goes through. After all, any good university in the world sees to it that about 15% to 20% of its revenue comes from fees.’ Sukhatme went on to present these ideas – and by the time he was done, he recounts, one or two of the Members of Parliament on the Council, their initial doubts overturned, said they felt the new levies proposed weren’t enough and the IITs should be charging still more.

The hike was introduced in a phased manner. From their level of Rs 1,000 per year in 1996, undergraduate fees were pitchforked to Rs 12,000
in 1997 before being raised more gradually to Rs 17,000 in 1998, Rs 22,000 in 1999, and Rs 27,000 in 2000.\(^{24}\) (Fees for the M.Tech. and Ph.D. programmes remained more heavily subsidized.) Everyone, in the event, took the rise in their stride: everyone, as Sukhatme had predicted, was either provident enough to afford the fees, or was provided for through some or other means of assistance.

Not content to be passive recipients of measures taken by ‘the authorities’, the Institute’s students came up with creations of their own: in particular, a quiver of mint-new events and festivals. Yantriki, an intercollegiate robotics competition, was conceived in 1994 (with the lead taken by Dr C. Amarnath of Mechanical Engineering) to hone the skills latent in students for innovative product development. In a short while Yantriki had become a keenly awaited fixture on IIT-Bombay’s calendar, but was to be eclipsed before long by IIT-Bombay’s first all-India technology festival, Techfest, unleashed in 1998. Aimed partly at bringing industry and academia together on a common platform, the festival was attended in its very first year by over 3000 students from around the country, and by over 30 leading companies and organizations. ‘Technology is Fun’, ran the feisty motif of the competitions. Techfest offered (as it still does) a blend of pre-defined technology development contests (inaugural examples were Open Software and Windmill Design), on-the-spot contests, a lecture series by eminent scientists and technologists, technology workshops, and an infotech show. Recording resounding success in its first edition, the festival has only grown in strength since; of late, Yantriki has been subsumed within its ambit. And the following year, in 1999, started Eureka!, IIT-Bombay’s annual Business Plan contest, and billed as Asia’s largest ‘techno-preneurship’ competition.

Techfest in particular, even though confined to matters technical, has fast acquired a cachet akin to Mood-Indigo’s, with teams from all over the country vying to outdo each other in inventive brilliance, and throngs of students queueing up to savour the special events, lectures and side-shows.

**COLOURING THE ALMANAC RED**

IIT-Bombay had led, until the mid-1990s, a more or less reclusive, inward-looking existence, only sporadically engaging the world outside in
its domestic occasions. A separate suite of initiatives mid-decade onwards focused on toning down this insularity by projecting the Institute to the outside world, and involving the latter in its observances. Feeling that this would best be served by concentrating on certain days of special significance to the Institute, Sukhatme picked four such markers: Foundation Day, Convocation Day, Teachers’ Day, and Alumni Day.

Foundation Day – the 10th of March – in the sixties used to be an open house day, school children being invited to the Institute and taken around its laboratories stocked with Soviet equipment, doubtless an exciting novelty for their time. There followed a period in which the historic day was not celebrated in any significant way, until its revival in the late eighties, a colloquium being organized to mark the occasion. Sukhatme felt that Foundation Day was an apt occasion for the Institute to resurrect a tradition that had fallen into disuse – if something that had been done just once, could be said to be a tradition. In 1983, its Silver Jubilee year, the Institute had honoured those of its former students who had notchéd up exceptional achievements. It had conferred on a number of them – fifteen – its Distinguished Alumnus Award; but after this one-off occasion the gesture, for reasons undisclosed, wasn’t turned into yearly practice, and had lain dormant since.

Now, about a dozen years later, the mechanism for the selection of distinguished alumni was framed anew, and the Institute started once again – in 1996 – to confer the awards on Foundation Day. Quite naturally, it was a revival alumni applauded wholeheartedly – and in time it became an entrenched and keenly awaited tradition. When asked how they felt about it, awardees – amongst them Dr S.G. Kane (Chemical Engineering, 1965), Shailesh Gandhi and Sharad Saraf (Civil Engineering and Electrical Engineering, 1969) – have without exception said how ‘wonderful’ or ‘elated’ they’d felt when informed of their selection, and how it served to reaffirm their bonds with an alma mater they’d always held dear. The only regret, registered on both sides, was that IIT-Bombay shouldn’t have allowed the practice to be consigned to cold storage for fifteen long years.

Another ‘Day’ linked with alumni that had already lodged its roots in IIT-Bombay’s calendar was given further strength and substance, and reformatted. Alumni Day, started in Nag’s time, was celebrated every year in the last weekend of December, and during the present phase the
batch celebrating its Silver Jubilee came to play an increasingly special role, launching fund-raising drives during their reunion. Alumni Day also saw the introduction of another badge of acknowledgement from their alma mater in the form of the Distinguished Service Award, instituted in 1998-99. Through these, IIT-Bombay started recognizing the services rendered by alumni to the Institute’s cause, as distinct from winning laurels for themselves.25

Next to be placed under the scanner was the Institute’s Convocation Day, an event whose layout and trappings had become somewhat dated. The old British pattern was being followed, complete with black gowns and a staid ceremony. And to some it did come across as more than just staid. ‘The Institute’s Convocation,’ feels Dr B.G. Bhat, of Chemistry, who joined IIT-Bombay in its earliest years and has seen its convocations from the start, ‘used to be a very solemn occasion. People said it was more like a funeral than a convocation. Why should such a big ceremony be conducted in such profound silence? I don’t know how this can be inspiring, as it’s meant to be.’

Moving sharply away from this sepulchral incarnation, the Convocation was transformed into a quite colourful occasion – with the Institute’s graduates quietly resplendent in traditional ‘Uttariyas’, the members of the Senate sporting pastel gowns (the National Institute of Design at Ahmedabad helped in fashioning the new apparel), choral music to herald the proceedings, and a video presentation on a side-screen accompanying the Director’s report. Students responded enthusiastically to the change; indeed so successful did it prove to be that it earned itself the best possible tribute, a number of universities adapting (read copying) it for their own convocations.

At a tangent to the occasions just mentioned, there came into being one that was set apart for purely internal affirmation and felicitation. Alongside its alumni and students, IIT-Bombay felt it needed to congratulate those who had played a decisive part in shaping those products: their teachers. The Institute envisaged awards for excellence in teaching, the recipients for which would be decided in the main by students’ feedback on courses. Perhaps surprisingly, views on the idea were divided in the Senate, the nay-sayers holding that faculty might simply start doling out high grades to win good feedback in return. Those who felt strong-
ly about the inner strengths of their vocation cited counter-examples of how at IIT-Bombay its best regarded teachers hadn’t necessarily been the ones who handed out inflated grades. In fact, they’d often been resolutely tight-fisted, an outstanding example being Dr M.S. Kamath of Electrical Engineering, legend in his lifetime for the quality of his teaching, the virtuosity of his exams, the toughness of his grading, and the universal respect he commanded – and of whom we shall hear more in Chapter 14.

In the event, ‘after protracted deliberations’, the issue resolved on the side of trust; the Senate adopted and formalized the idea. Alumni, meanwhile, had set up through the Heritage Fund an endowment that enabled a token cash award to be presented along with the citation. IIT-Bombay had started recognizing good teaching formally – and fittingly enough, the awards are conferred on Teachers’ Day, the 5th of September (also the birthday of Dr S. Radhakrishnan, the IITs’ first Visitor), to about half a dozen faculty every year.

In sum, by reddening these days on its calendar in these special ways, IIT-Bombay had accorded recognition for certain kinds of achievements or for services rendered that hadn’t been formally acknowledged earlier. And in so doing it had strengthened its bonds with those who, in one way and another, had fashioned it into the Institute it was.

The principal legacy of the ‘Sukhatme years’, then, could be said to be a many-faceted reinforcement of the academic and financial fibre of the Institute, creating a foundation on which it could look to build a robust superstructure in times to come. Just as importantly, IIT-Bombay was out of the woods; and it had reason not just for hope but also a measure of confidence in what the future might hold. In this transition there had, of course, been an element of luck, the nation’s fortunes taking a turn for the better at a critical juncture. No less, though, had there been the Institute’s own grit: a never-say-die attitude which saw IIT-Bombay through its toughest days.

Nor was sight ever lost of the ambitions with which the Institute had been set up. At its thirty-third convocation in July 1995, Sukhatme de-

b Faculty resistance to the idea wasn’t new. Thirteen years before this, in 1983, the Senate had entertained a proposal for the establishment of a ‘Best Teachers’ Award’, only to demur, feeling it would be ‘best left to the Students’ Gymkhana’ to consider its institution and to ‘work out appropriate details.’ Minutes of the 85th meeting of the Senate, IIT-Bombay, 22 Apr 1983, Item 13.
clared, ‘We have to become known internationally and nationally as a research institution, while maintaining our reputation as an excellent teaching Institute’, speaking next of moving on ‘to achieve our objectives and towards our tryst with excellence.’

The phrase ‘tryst with excellence’, redolent of Nehru’s ‘tryst with destiny’, caught the imagination of many, including alumni, the media, and government functionaries. It has since been frequently quoted and invoked, becoming a sort of rallying cry, and most recently finds itself embossed as one of the motifs on IIT-Bombay’s Golden Jubilee brochures.

At this threshold, just as the Institute had transcended what had arguably been the most difficult period of its life, and emerged buoyant, it was time for the baton to be passed on. Sukhatme was to retire in late 1999 – though only from IIT-Bombay, for he was moving on to take up the Chairmanship of the Atomic Energy Regulatory Board, due east of Powai at the BARC. From this new observation point, he was to continue to keep an absorbed eye trained on the evolving fortunes of the Institute, and on its tryst with excellence.

**TAPPING THE POTENTIAL**

Owing largely to the extraordinary visibility its alumni had secured, IIT-Bombay’s stock had risen high during the early 2000s. Alongside, its in-house achievements were starting to be recognized by industry, government and media. In 2000, IIT-Bombay was rated the top technical institute in the country in one survey, and third amongst technological institutes in Asia by another, conducted by *Asiaweek.*

These plaudits were merely a foretaste of things to come: for in 2003, the Institute’s stock went clean through the roof. In March that year was broadcast CBS’s now fabled episode of ‘60 Minutes’ focusing on the IITs and in which IIT-Bombay was mentioned – rapt viewers have contended – no less than four times. The IITs were called ‘the most important university you’ve never heard of’, enjoying in India the status of ‘Harvard, MIT and Princeton together’, and boasting ‘a curriculum that may be the most rigorous in the world.’

And then in 2005 came the US Congressional resolution that praised ‘Indian-Americans’ – and in particular IIT alumni – for their ‘valuable and
significant’ contributions to the American economy and ‘to society in every profession and discipline’, something that had never happened for any other nation’s educational institutions before. In addition there dawned, more quietly, the growing recognition that IIT graduates who had stayed back had likewise come to form much of the backbone of the nation’s industry and economy, heading many key institutions in the private and the public sectors. And local media, in telling contrast to their pitch in the eighties and early nineties, had now taken a shine to the IITs: their tone turned friendlier by the day, and was often adulatory.

If just ten years ago IIT-Bombay’s cup of woe had been full, it was now the turn of its cup of joy to brim over.

Along with the recognition, however, came the pressure. IIT-Bombay now had a formidable reputation to live up to; perhaps a shade more formidable than it had bargained for. Above all, it had to reckon with the sometimes inflated expectations of academic visitors, of industry and, not least, its own prospective students.

And visitors started literally pouring in 2002 onwards, drawn by the new mystique. Hardly a week would go by without some delegation or other trooping in, wanting to know more about academic programmes here, facilities for research, and the possibility of tie-ups in either. In 2004 alone, 31 major delegations (and very many others) visited. With the eyes of the world riveted marvellingly upon the Institute, it needed to give a better account of itself than it had ever done before. IIT-Bombay’s faculty and students had their task cut out for them: and amongst faculty the one person who’d have to engage with the external world more than anyone else was the Institute’s new Director.

The man who took over from Sukhatme – after a five-month hiatus during which Dr S.C. Sahasrabuddhe, of Electrical Engineering, Deputy Director during Sukhatme’s time, officiated for a second interregnal spell as Director – also had his feet planted firmly in the tradition of research. Dr Ashok Misra, coming over from IIT-Delhi in May 2000, had published widely, co-authored a textbook, been Head of the Centre for Polymer Science & Engineering at IIT-Delhi and more lately, between 1997 and 2000, its Dean of Alumni Affairs & International Programmes.

Speaking of what drew him to the directorship of IIT-Bombay, Misra said that while he was at IIT-Delhi the impression he had gained of its
 counterpart in Mumbai was that of an institution ‘on a progressive path, going forward in both its education and research programmes.’ And he was impressed by the excellent relations IIT-Bombay enjoyed with its alumni. The good work done over the previous decade could be capitalized upon: ‘Prof. Sukhatme and Prof. Nag had worked very hard to establish a reputation for IIT-Bombay,’ Misra remarked, ‘and it was a challenge to go and see what I could do here.’

In broad terms, Misra felt IIT-Bombay had all the makings of a high end research institute; the main challenge he saw for himself was to see if the Institute could be galvanized to maximize its potential. Recognizing that faculty would be the prime movers in the endeavour, some of the first measures taken by Misra were directed at creating an atmosphere in which faculty would feel, above all else, enabled. He wanted to send out the signal that if there were initiatives faculty wished to take that benefited them and the Institute, the Institute’s functionaries would ‘find a way to allow it’.

As an example, an issue that came to Misra’s attention was the prevailing stance towards faculty proceeding on sabbaticals. Misra detected a reluctance to grant sabbaticals to those who were also going to earn substantial sums during their sojourns, the thinking being that in such instances leave of absence ought to be availed instead. Misra felt otherwise. Were faculty to be paid $200,000, say, for their work during their sabbatical, he felt the Institute’s image stood only to be strengthened all around. Two other fronts on which Misra thought faculty needed to be encouraged was in attending international conferences and in being nominated to national academies of science and engineering. With funding from MHRD flowing more liberally than ever before for the former, it was possible 2002 onwards for IIT-Bombay to offer faculty full support to participate in international conferences twice every three years, with paperwork for the approvals and finances cut down to negligible levels – a far cry from the straitened situation just a decade ago.

Misra also felt that faculty at IIT-Bombay were a little too content in the recognition they derived within the Institute and weren’t sufficiently active in seeking appreciation among their peers in the wider world, for instance through memberships and fellowships of national academies. On leafing through their records, it was clear to him that a good many of them
might easily qualify if only they applied. Encouraging them to do so, nominating them himself, he was proved right, many such fellowships being granted within the first year of their nomination.

**LOOKING THE ‘WORLD-CLASS’ PART**

Until the mid-nineties, turning right into Powai from Larsen and Toubro on your way to IIT-Bombay, the view that greeted you had remained pretty much as it had been in the 1960s, when the campus was first settled. All you saw to your left, beyond the lake, were the silhouettes of the southern hills fringing the Borivli National Park. Around the late nineties, this vista was rewritten. The north-western shores of the lake came to be dominated by two tall, white, boxy buildings: these the new hotel and service apartments erected there, the Renaissance and the Residency. But they weren’t to remain the stand-out feature of the view (whether ornament or eyesore, depended on your tastes in these matters) for long. In 2004 they were upstaged by a pair of buildings which, though not as tall, were bolder by far in architecture: many-armed, terraced and tiered in ship-deck fashion, their central arms bridged by glass-walled skyways, and daubed a pastel blue, pink and green. These seemed for all the world to be a brace of new hotels outclassing the old – but they were nothing of the kind. In fact they were IIT-Bombay’s latest additions; and they weren’t department buildings, or convention centres, or faculty complexes, either – they were the Institute’s newest student hostels at the far end of its campus.

Hostels 12 and 13, as they’re officially known (the Institute, for all its assembled intellect, still hadn’t progressed beyond numerals in the art of naming its edifices), attracted much excited press when they burst upon the landscape, and are today emblematic of the ‘new-look’ IIT-Bombay: a look that bids farewell to the drab, uninspiring ‘Public Works Department’ flavour conventionally associated with government structures, and embraces modernity with gusto.

And the new look has asserted itself over the core of the campus as well. Predating the more visible hostels had sprung up the Shailesh J. Mehta School of Management, the kresit, and the new guest house complex, each of them an age removed from the surrounding buildings – except perhaps the Main Building and the Convocation Hall which, re-
markable compositions that they were for their age, continue to hold their own against the new pretenders.

When the new hostels were being planned Misra had two things in mind: durability and appearance. ‘The existing hostels were in terrible shape,’ was his impression, ‘and what did their past tell us? You should make a hostel to last, it shouldn’t be falling apart in thirty or forty years.’ The Institute therefore insisted first on high quality, durable construction. ‘Second, we said to ourselves,’ reminisces Misra, ‘remember you’re taking the best students of the country. Now on the one hand you’re saying we have world class intellectual capital, but if your hostels are absolutely third class it doesn’t match up.’ The project was entrusted on a turnkey basis to Architect Hafeez Contractor, one of Mumbai’s leading architectural firms, and to Larsen & Toubro for construction – possible only because a good part of the funding for the hostels came from a private benefactor, and a name already familiar for other endowments: Nandan Nilekani.

The new-age sheen didn’t stop at new buildings. Even as the first initiatives were taken during Misra’s tenure to strengthen the Institute’s intellectual life, others were taken to improve its corporeal grooming. IIT-Bombay’s campus, though much better off on this count than five years before, was still in need of tidying up. The prolonged neglect of the 1980s and 90s had left its scars upon its brickwork. Thus, while the ceremonial trappings of the convocation had been toned up, the same couldn’t be said about the arena they were conducted in. The Institute’s Convocation Hall was in disrepair. When Misra first went there ahead of his first convocation, a month after his arrival, he saw walls soaking with leakages, doors broken, paint peeling. When he went to offices in the Main Building, they brought back for him memories of provincial government offices; and when he went into the Institute’s departments, things were no less unkempt. He was greeted by tangles of wires and untrammelled cables sagging on corridor walls, gas cylinders standing about unstrapped, toilets in forbidding shape.

These were symptoms of a deeper malaise that seemed to have crept in: the Institute’s staff, for so long beset by shabbiness, seemed to have become conditioned to it, accepting the dishevelment even if better could be afforded.

So started another round of renovation and refurbishment, section by section. The shape-up drive started in Nag’s time was continued, inten-
sified; and today, the Institute in all its spaces – corridors, laboratories, offices, gardens – wears a slicker, neater look, consistent with its resurgent image. This time round, the Director’s office was also subjected to the designer’s drawing board, and found itself gaining a new, plush avatar. From the financial standpoint what made it all possible – the continuingly liberal funding from the MHRD apart – was the abstinence exercised in the preceding years, thanks to which IIT-Bombay had put away enough in its Corpus to defray these expenses.

ENVISION, PLAN, STRATEGIZE:
NEW MANTRAS FOR A NEW-AGE INSTITUTE

Some years ago, IIT-Bombay had enunciated its vision for the future. And enunciations, in these mercurial times, were no less subject to the laws of obsolescence than were motherboards or operating systems. IIT-Bombay’s existing vision statement, formulated a decade ago, was already ‘rather old’, felt Misra, and in need of reconditioning. Misra established a Vision Committee convened by Dr S.C. Sahasrabuddhe, the immediate past Deputy Director, and on it he included faculty who struck him as far-sighted in their outlook. What emerged from their cogitations was the Institute’s Vision, Mission and Strategy document which articulated IIT-Bombay’s new, crisp vision:

To be the fountainhead of new ideas and of innovations in technology and science.

And the Institute’s professed mission now was:

To create an ambience in which new ideas, research and scholarship flourish and from which the leaders and innovators of tomorrow will emerge.

For IIT-Bombay to move purposefully towards its stated goals, Misra felt it essential to take a close look at the planning and strategy required. Who would do this? ‘The Director, Deputy Director and all the Deans were very busy by now, so we decided to set up a committee for strategy and planning whose convener would be someone who wasn’t a Dean at the time.’ These mullings led to the formation of the Institute Strategy and Planning Committee (the ISPC), envisaged principally as a recommending body charged with seeing if the Institute was on track towards
realizing its vision and mission. In particular, the ISPC would evolve long-range research and education projections for the Institute, and adapt its strategy to changing times and needs.

In its very first meetings the ISPC – with Dr J. Vasi of Electrical Engineering its first convener – decided that it would be best for the Institute to focus resources on two sectors: first, on a few carefully identified areas of research, designated ‘thrust areas’, and two, on a few select central research facilities. Finally, it proposed measures to boost cross-disciplinary research at the Institute.

Why identify ‘Thrust Areas’? The exercise appeared to be the need of the hour, the more so in view of IIT-Bombay’s transactions with the outside world. Institute functionaries who dealt frequently with funding agencies, alumni, and other academic organizations – especially foreign universities – were time and again being asked where IIT-Bombay’s key strengths and priorities lay. Second, it was felt that if the Institute began to gain recognition in a few chosen fields ‘at world class level’, this would help propel other research groups, too, towards increased visibility and – it was hoped – ‘preferential treatment from funding agencies’.35

Ideas for the identification of Thrust Areas were invited, and in March 2004 a one-day seminar was held at which their proposers made presentations to a large group of assembled colleagues. Factoring in a number of criteria, the ISPC identified six areas at the end of the exercise: Broadband Communications, Nanotechnology, Database Systems, Computational Fluid Dynamics, Magnetism & Magnetic Materials, and Earthquake Engineering. Since then, the Thrust Area groups have enjoyed special internal funding over three or four years, the Institute’s support in seeking funds, and its assistance, if needed, in striking up national and international collaborations. In future, should these areas have grown to self-sustaining levels, the idea was to identify another set of areas for the next round of support. In this way, if in a decade there emerge between ten and twenty areas in which IIT-Bombay could be said to have attained world-class levels of research and expertise, the effort and investment would have ‘been vindicated’.

A second measure taken by the ISPC to elevate research was to set up about half a dozen central facilities, each of which consisted in high-end research equipment useful to at least 4-6 departments and 15-20 faculty. A third step was aimed at catalyzing cross-disciplinary work in cutting-
edge areas that demanded the involvement of faculty from 2 or 3 different departments and a relatively limited grant to get going. This resulted in the formation, based again upon vetted proposals, of a dozen Cross-Disciplinary Research Groups which received seed funding to set sail on their explorations.

Again it was the Institute’s Corpus that made these provisions possible – but also, the MHRD supplemented this with smart jumps in its annual grants from time to time. From Rs 60 crore in 2000-01 the total grant leapt to Rs 92 crore in 2001-02, a smart 50 per cent over a single year. Further significant jumps were recorded between 2003 and 2004, when for the first time the grant crossed the Rs 100 crore mark, and between 2004 and 2005, when it rose further to nearly Rs 120 crore. A key attribute of the recent increments (2002 onwards) was that they were almost entirely made up of enhancements in ‘Plan’ grants, meaning that the Institute had ever more money for equipment, buildings, books, and other new infrastructure – again a refreshing turnaround from the privation of its middle years.

Simultaneously over this period, the Institute’s faculty were venturing forth and bringing back ever more research projects; and if sponsored project funds had doubled over the previous five-year period, they nearly doubled once more over the ensuing five, rising from about Rs 16 crore in 1999 to Rs 28 crore in 2004. With inflation still pinned down to the 3-5% range, this again made for a substantial increase in real terms.

In not much time, the enhancement of the Institute’s research profile and infrastructure accomplished over the preceding few years started to pay off. Take the example of Dr D. Choudhury of Civil Engineering, in 2002 awarded for the Best Ph.D. Thesis in Geotechnical Engineering (which he did at IISc Bangalore) across all Indian universities. He joined IIT-Kanpur in 2002 but was lured away to IIT-Bombay in 2003 because, in his words, ‘the overall academic and research environment of IIT-B attracted me’, as did the prospect of ‘independent academic research, and being able to use the national geotechnical centrifuge facility’ – coupled with the fact the Institute offered him an Assistant Professor’s position as against the Lecturer’s he held at IIT-Kanpur.

Keeping in mind that one is known as much for one’s own exploits as for the company one keeps, invigoration of R&D was attempted through an overture of quite another nature: association. In 2004-05, two Nobel
Laureates, both in Chemistry, were invited to IIT-Bombay: Dr Alan MacDiarmid from the University of Pennsylvania, a 2000 Laureate, and Dr Hartmut Michel, a 1988 Laureate and Director, Max-Planck Institut für Biophysik, Germany. It was especially heartening for the Institute that each liked what he saw of its in-house activities and research potential enough to accept the position of Distinguished Guest Professor, MacDiarmid in the Department of Chemistry and Michel in the School of Bioscience and Bioengineering.  

The tides of recognition for IIT-Bombay have also resulted in an especially wholesome development over the past dozen years: a shift in the complexion of the industrial consultancy undertaken at the Institute. Previously, the majority of such work was composed of small to medium scale jobs for Indian public and private sector companies, limited largely to the testing of industrial products as distinct from genesis through research. Recent years have seen consultancy pick up in a big way, with a trend in evidence that was unheard of as late as the early 1990s. National and international industrial houses, including some marquee names, have been approaching IIT-Bombay not just to consult faculty but also to sponsor research laboratories at the Institute. Firms such as Xilinx and Tata Infotech have endowed laboratories in the department of Computer Science and Engineering; the Electrical Engineering department now hosts an Intel Microelectronics Laboratory, one set up by Tata Consultancy Services, and one by Texas Instruments; and Cummins have sponsored an Engine Research Laboratory in collaboration with Mechanical Engineering. The laboratories come with generous support for student projects, and so offer both staff and students a hands-on stab at live industrial problems. Students also get to train themselves for the industrial world in the course of their degree programmes, something the Institute from its earliest days had wished would happen.

Mergers & Acquisitions – Academic Style

For several academic units in the Institute, the first five years of the millennium were a time of flux. They had to square up to a number of rearrangements and realignments, carried out with a view to consolidating strengths in allied areas. Late nineties onwards, the two principal groups
oriented towards the biological and medical sciences — the interdisciplinary group in biomedical engineering and the biotechnology centre — were reviewed. The reviewing panel contended that while each of the groups was functioning creditably in itself, were they to be amalgamated to form a single, broader entity, their increased visibility and wider collective strength would benefit the groups as well as the Institute, a notion that led to the formation of the School of Biosciences and Bioengineering in early 2002.\(^3\)

On the other hand there were centres and interdisciplinary programmes unable to realize their full potential for being sub-optimal in size, and so were reviewed separately.\(^4\) Some which were judged too small to be self-sustaining were merged into departments. Corrosion Sciences and Engineering was melded in this vein with the Department of Metallurgical Engineering & Materials Science, and the Computer Aided Design Centre — the activities of which had evolved into being largely chemical engineering oriented — was subsumed within the department of Chemical Engineering.\(^c\)

Most recently — and for many observers intriguingly — 2006 saw the integration of the Kanwal Rekhi School of Information Technology into the department of Computer Science & Engineering.\(^4\) Recalling that KRESIT had come into existence in 1999, it has been especially evanescent as an independent entity, lasting no more than seven years. Recalling also that Information Technology had in some senses cleaved off its ‘parent’ discipline of Computer Science, the story has come full circle, reminiscent of the prodigal son’s return to the fold — although the sentiments triggered here might be rather more complex than in the Biblical tale. As for Computer Science and Engineering, it has climbed steeply in strength: 36 faculty strong in its expanded version, the department is now the largest of its kind in the country. The attendant hope here is that, together with the numerical gain, each of the research groups in the department may now have the strength to make a qualitative dent in its area of work.

\(^c\) One of IIT-Bombay’s first ever Centres of R&D, the Advanced Centre for Research in Electronics (initially set up in the early 1970s as the Radar Project Centre) was also proving to be unviable as an independent entity, and was dissolved. Its staff were redistributed into departments, while its physical space has now been given over to a new institutional initiative, the Centre for Research in Nanotechnology & Science (CRNTS).
Some disciplines, in contrast, had emerged worldwide as areas of burning scientific interest, and promised to blossom into larger entities in their own right within the Institute. Along these lines has come the formation of the brand-new department of Energy Science and Engineering in 2007 - the first new department (as against School or Centre) at the Institute in 24 years – deriving from the pre-existing programme in Energy Systems Engineering, and soon to offer its own B.Tech. programme.

While the remoulding of existing units was afoot, new offerings from departments had been in abeyance, but picked up 2005 onwards. Notable amongst these were a couple of ‘firsts’ for the R&D Centres of the Institute. One of the Institute’s largest and most successful Centres, the CSRE, thirty years after its momentous formation in 1976, announced the first academic programmes of its own: an M.Tech., followed shortly by a Ph.D., in Natural Resources Engineering. Over at the IDC the ‘designers’ in the Institute, confident that their discipline had matured to the point where new knowledge could be created and pondered upon in depth, rolled out a Ph.D. in Design. Several new avenues for students were offered by other departments.

A different kind of Centre, and ‘programme’, came into being in 2002, targeted not so much at audiences within the Institute as without. Aimed at strengthening the quality of engineering education in the country through the distance education mode, the MHRD launched in 2002 its ‘NP-TEL’ programme – short for National Programme for Technology Enhanced Learning. The IITs and IISc-Bangalore were entrusted the task of developing curriculum-based video and web courses which could then be shared with other engineering colleges; this led in turn to the formation in IIT-Bombay of the Centre for Distance Engineering Education Programme (the CDEEP). Over the past few years, a comprehensive suite of lectures have been recorded at CDEEP and transmitted live to destinations, with two-way interaction enabled in many instances. The Centre also archives events such as seminars and workshops held at IIT-Bombay.

Among these were another Dual Degree programme introduced in 2006: an M.Sc.-Ph.D. in Energy advanced by the Energy Systems Engineering group (Minutes of the 181st meeting of the Senate, 8 Nov 2006, Item A.2.3). In 2007 were offered two novel Dual Degree combinations from Physics. One comprised a B.Tech. in Engineering Physics coupled to an M.Tech. specialisation in Nanoscience; the second linked an M.Sc. in Physics to a Ph.D. (Minutes of the 173rd meeting of the Senate, 23 May 2005, Items A.1.9 and A.2.2).
Completing the Journey

As if in ironic counterpoint to the merger of the School of Information Technology into Computer Science and Engineering, an experimental unit that had been seeded within KRESIT had grown to such proportions that it needed to fly the nest, forge its own destiny. This unit, the Business Incubator (BI), now acquired a new shape and address. The operational model adopted for the migration was the creation of a registered society under whose auspices the incubator would operate: this was the Society for Innovation and Entrepreneurship (SINE), formed specifically to promote hi-tech startups within the Institute. With generous support from the Department of Science and Technology and the Ministry of Communication and Information Technology, SINE took charge of the pre-existing BI and re-cast it into a Technology Business Incubator (TBI) in April 2005.

The new facility is an attempt to address a charge long leveled against the Institute: that of not having translated its in-house R&D into technologies the wider world could use. In spite of IIT-Bombay’s advantages conducive to entrepreneurship – enterprising faculty and students, a range of R&D endeavours, its siting in Mumbai – ‘the R&D journey at the Institute used to stop at the publication and patents stage,’ observed Dr K.C. Khilar, Dean of R&D between 2003 and 2006. The Institute hopes that the Technology Business Incubator will help take the oft-abortive journey several steps further, by ‘providing enabling conditions that create successful entrepreneurship’, including fully furnished offices, internet connectivity, and conference rooms (it was relocated to the CSRE, which had space to spare).44

The tinkering that leads ultimately to discovery and invention was given a fillip in another way. In 2002, the M.Tech. programme reverted to its pre-1983 two-year self, its dissertation project made muscular as of old. But it was the Ph.D. programme that was given the greatest stimulus. In previous years the effort had been to boost postgraduate programmes across the board; now, the Institute decided to single out the Ph.D. programme for expansion, as this was felt to be most likely to assure returns in research. The number of Ph.D. students enrolled crossed the 1200 mark in 2006, and the number that took their doctoral degrees crossed the 150
mark for the first time at the 2007 convocation (up sizeably from the approximately 100 graduated annually in the mid-1990s) and the prevailing mood is such that the Institute is looking forward to the day 250 candidates will line up for their Ph.D. degrees at the convocation.

‘A LONG WAY TO GO’

The turn of the millennium had seen IIT-Bombay’s material fortunes turn dramatically around, and a newly resurgent phase in its life take shape. Now, its wounds healed, its self-confidence renewed, the Institute could speak boldly once more, when taking stock, of ‘standing tall’ on the international academic stage.

In four years we will be celebrating the Golden Jubilee of the Institute and, comparing our achievements with that of great institutes around the globe in their first 50 years, we stand tall. Our education programmes are comparable to the best in the world and our graduates are highly sought after in all professional fields.

As late as 2004, though, it had to acknowledge the biggest weakness it would need to address, as it did in its Annual Report for the year:

The IIT brand name is clearly well established and recognized. However, in our research achievements, although we are amongst the best in India, we have a long way to go to be counted amongst the best in the world.

Today, in sum, IIT-Bombay seeks to be a leading player on the global academic stage. And while its strengths in teaching, built up over the decades, will doubtless stand it in good stead, the Institute is clear-eyed about the fact that it still has much to do in the sphere of R&D. It is attempting to rise to the challenge by engaging itself in continuous and rapid expansion on all fronts: student numbers, academic programmes, research infrastructure, entrepreneurial initiatives, and ever more vigorous Institute-industry partnership. What the future holds will be determined in large part by how the Institute adapts itself to the demands of the increasingly mercurial times.

As ever, there are challenges aplenty, and no few areas of concern. Funding and infrastructure, while they’ve improved, are still nowhere near top international standards. Departments and individuals, by and large, are still not, as Dr K. Ramamritham, current Dean of R&D reflects, as ro-
bustly research oriented as they could be. Nor are the Institute’s patterns of governance and management, by now out-of-date in some ways, what they need to be, sporting weak spots that impede efficiency of functioning. And academic curricula need to be radically revamped to keep pace with the fast changing times: concerns to which we’ll revert as we go along.

This section has surveyed the evolution of IIT-Bombay from the nascent establishment it was in the late fifties, to the beleaguered adolescent of the 1970s and ‘80s thwarted repeatedly from many of its dreams but persevering tenaciously in its objectives, finally to the somewhat impetuous youth of the early 2000s, eager to corner a share of the international academic limelight. In the following section we look at the many facets of the Institute’s persona over these 50 years, peering deeper into the ‘stories within the stories’ that have backdropped its evolution.

We also take up the questions that have cropped up from time to time but haven’t been tackled at the granularity they’ve warranted. What are the ingredients that have predicated the success of IIT-Bombay’s academic programmes, widely admired for their rigour? For what reasons has the Institute failed to make a mark in R&D, what inner constraints and external vagaries must it arm itself to battle in future? Has the Institute’s governance been consistent with its academic aims, and on what fronts does vigilance need to be exercised to preserve its autonomy of functioning? Who are the people – Directors, faculty, students, administrative staff, others – who have fashioned IIT-Bombay into what it is today?

We follow the tenor of student life over the decades, tracing the iconic festivals IIT-Bombay’s students have created, amongst them Mood Indigo and Techfest. We also take stock of the ebb and flow of the ‘toughest entrance examination in the world’ – the JEE – and its ever changing avatars over the years. We ponder the light in which IIT-Bombay is seen by others (government, media, society), how it sees itself, and what this augurs for the Institute. The book closes with the prospects – the causes for unease as much as for hope – awaiting IIT-Bombay in the decades to come, and the trajectories a range of people associated with the Institute think its pursuits should take.
PART IV

THE STORIES WITHIN: A THEMATIC LOOK AT IIT-BOMBAY’S EVOLUTION
CHAPTER 11

ENGINEERING THE ENGINEER

If there’s one arena in which IIT-Bombay has unarguably fulfilled the charter drawn up for it, and indeed made a mark for itself over the decades, it’s in the strength of its academic programmes, most visibly the undergraduate, and the rigour of its curricula.

Perhaps the most compelling tribute to this attainment is the keen demand the products of these programmes, IIT-Bombay’s graduates, have enjoyed for decades together in the academic and industrial worlds alike. By 1965-66, just three years after its first Convocation, they were being welcomed by universities overseas, prefacing the steady efflux that was to earn itself the unhappy epithet of the brain drain. Closer home, Indian industry was also recognizing them as special among the ranks of engineers produced in the country; by the 1970s, they were much sought after in the corporate sector – if in the main for managerial positions.

Then in the mid- and late 1980s, even as a segment of public opinion was turning cold towards the IITs for having fallen short of expectations in technology development and for being unable – and unwilling – to stem the brain drain, their academic programmes were winning pleasing applause from all quarters. The same Business World article that had spoken in 1985 of the perceived shortcomings of the IITs’ also remarked on their ‘significant achievements of attaining and maintaining internationally recognized academic standards,’ going on to concede: ‘By common consensus, amidst the almost extravagant chaos and degeneration that characterizes the Indian system of higher education, the five IITs are highly visible exceptions.’ And in 2003 came what many saw as the ultimate accolade, when CBS’s ‘60 Minutes’ lauded the IITs for ‘a curriculum
that may be the most rigorous in the world’; and IIT-Bombay could justly pride itself on the part it had played in making these accolades possible.

‘EDUCATIONISTS’ AND ‘NON-EDUCATIONISTS’

Those are principally the impressions from without. A look at the Institute’s inner workings across the years reveals that this synonymity with academic excellence wasn’t easily arrived at.

From conversations with the Institute’s early architects, one of the strongest impressions gained – and quite an unexpected one – is that the 1960s in particular were as deeply marked by internal strains and tensions as they were by rapid growth and fleshing-out. Many battles had to be waged, and disputes resolved, to nurture and sustain vitality in academic programmes. The Institute, just born, was a malleable organism; the precise shape it took would depend largely on those in charge of its affairs. And amongst its early guardians, there surfaced more than a few differences of opinion and approach, falling to the sides of distinct fault lines.

There was first the question of whether IIT-Bombay should regard itself as primarily an undergraduate or a postgraduate establishment. There was concurrently a tussle over the turf to be conceded in an institute of technology to the sciences, including the social sciences. A third conflict revolved around the framing of the Institute’s curricula and the rules governing them. And as if these mightn’t prove distraction enough, yet another rift formed and deepened: on whether IIT-Bombay should fashion itself into chiefly a teaching Institute, or one in which research was given at least equal weight. We fix our attention in this chapter on the first three divides, leaving the last for the next.

The fault lines didn’t take long to surface. They started to make themselves felt as early as the first year – indeed over the first few months – of the Institute’s operations, in the rooms of its temporary campsite at SASMIRA in Worli.

Going by the recall of early observers – such as Drs R.K. Katti of Civil Engineering, P.P. Kane of Physics, B.G. Bhat and D.D. Deshpande of Chemistry, and M.V. Hariharan of Electrical Engineering – the clefts could be attributed essentially to variances between an old school of thought and a new. The former adhered to the academic ethos of Indian
universities of the time, hallmarked by rigid curricula, an overriding emphasis on teaching, and sternly hierarchical modes of operation. The new guard, in contrast, professed allegiance to flexible, adaptive curricula, a greater accent on R&D, and participative, ‘horizontal’ governance in framing the Institute’s operations.

In all this, there was one man who seems to have towered above all others in setting the Institute’s academic tone in the earliest years. ‘Prof Kelkar held Prof Kamath in high esteem,’ says Deshpande, ‘and put him in charge of several things. Later, all academic policies were formulated by Prof Kamath as the Deputy Director. Everything.’ Bhat concurs: ‘Prof Kamath was the academic man for IIT-Bombay, he was the father of all academic things.’ And Deshpande adds, ‘We started with a blank sheet, and it was he who framed all the rules initially. The rules, we used to say, were on his tongue, and others had to follow his bidding.’

The man with rules on his tongue, formulating everything in sight, was N.R. Kamath, of Chemical Engineering. He had been identified as early as 1957, while still at Bombay University’s Department of Chemical Technology, to join Kelkar, then the Planning Officer, in framing the Institute’s academic operations. According to Katti, it was Kamath and Prof R.P. Mhatre of Civil Engineering, also from Bombay University, who were the strongest proponents of the ‘university’ ethos.

To Katti’s mind, those who advocated adoption of university-like practices ‘were not regarding postgraduate research activities in general and Ph.D. programmes in particular with the sort of sympathetic outlook and progressive view that was necessary to fulfill the Sarkar Committee’s objectives and mandate. Uncalled for discussions started taking place,’ he contends, ‘about who was an ‘educationist’ and who a ‘non-educationist’ – the second label conferred on those who tilted towards postgraduate programmes and research, allegedly to the detriment of undergraduate education. While debating such issues faculty tended to forget, Katti feels, ‘that the need of the hour was to plan IIT-Bombay’s education system to incorporate the culture of MIT, Imperial College and Manchester University.’

Most galling for Katti, however, was his experience in bringing to life his own brainchild – an M.Tech. in Soil Engineering which he proposed in the Institute’s inaugural academic year, 1958-59. He recounts resistance to his proposal by ‘the people from Bombay University.’ In May 1959 Katti
had gone for a few days to Poona; on his return he was told ‘that Prof Kelkar feels that my M.Tech. programme be postponed to a later date – on the advice of Prof N.R. Kamath.’

This really got Katti’s adrenaline flowing: he was raring to go, and in no mood to be thwarted. ‘Certainly, I was agitated,’ he owns. ‘With all my regards to Prof Kelkar, I said I’d like to meet Brig. Bose.’ With his penchant for home-grown imagery, he remembers saying to Bose: ‘If I have to wait for two years my brain will get rusted, my enthusiasm will go away. It would be difficult for me to continue like this at IIT-Bombay.’

Sympathizing with Katti’s predicament, and wishing not to lose him in so precipitous a manner, Bose took peremptory action. Calling the stenographer, he dictated, on the spot, an advertisement and a letter addressed to the editor of the *Times of India*, and advised Katti to go over to the newspaper’s office the same afternoon. Off went Katti, and was next morning rewarded: the advertisement appeared in nine editions of the *Times of India* nationwide, calling for admissions to IIT-Bombay’s M.Tech. in Soil Engineering. Katti’s obduracy paid off: in answer to the advertisement, he remembers, ‘we received 141 applications for 5 seats’, each carrying a monthly stipend of Rs 150.

Katti’s M.Tech. was only the third postgraduate course in the Institute, ‘and the first,’ he notes with pride, ‘to be started by a native.’ (The first two, in Electronic Devices and in Electro-Vacuum Technology, had been introduced by UNESCO’s Soviet experts). And perhaps this was partly the reason why it had met with the resistance it did: Katti’s Indian colleagues seemed unsure that one of their own could pull off a postgraduate course so early into the Institute’s life. And this wasn’t the only domain in which IIT-Bombay’s pioneers had difficulty in trusting themselves with what might be called quality assurance.

One of the main strengths of IIT-Bombay’s academic rubric has been the tradition of internal evaluation, with faculty granted complete jurisdiction over the courses they conduct and over student evaluation. Yet here, too, there was divergence of opinion to begin with; and here, too, the legacy of the university ethos had to be overcome. Katti remembers in particular a meeting of the Staff Council, held in September 1959, at which the issue of the Institute’s examination and evaluation practices was taken up. A sizeable number of faculty held that fairness in final ex-
am evaluation could only be ensured if they were conducted by external examiners. Others’ views on the matter were diametrically opposed; they insisted that trust be reposed in the Institute’s faculty to supervise and examine their students. To avert the possibility of malpractice or victimization by teachers, faculty could ‘adopt a moral code to straighten out the teachers.’

‘A heated discussion’ ensued, says Katti – so heated ‘that some senior members walked out on the issue’. At the end of the fiery session the scales tilted to the side of trust; it was resolved that all course examinations be handled by the Institute’s faculty. Only for the final year undergraduate ‘home paper’ and the postgraduate thesis was an external examiner stipulated – principally in order to ‘project to the public the standards upheld by the Institute.’

**SERVICE DEPARTMENTS …AND PURE SERVICE DEPARTMENTS**

From its youngest days, when the Institute has opened its doors to its entrants every July it’s been the science and humanities departments that have swung instantly into action. The engineering departments have taken students under their wing only after the first several preparatory months – all in the interests of kindling in them the broad sensibilities of ‘engineer-scientists’ envisaged by the Sarkar Committee. Ever since, IIT-Bombay’s science departments have had nearly as large a part to play in sculpting its undergraduates as have their engineering counterparts. Yet for many years, the science and humanities departments had to struggle to wrest the status and recognition they deserved – as we hear from Dr P.P. Kane, who joined Physics in early 1959, six months after the Institute admitted its first students. ‘Some of the older faculty came from engineering colleges of the time,’ he relates, ‘colleges which had small science departments, sometimes just one or two faculty strong. Such colleagues looked upon IIT-Bombay’s science departments as a kind of academic support system, openly calling them "service departments". Not that we in the science departments cared too much, but it was certainly a little jarring.’

An upshot of this arbitrarily laid down pecking order, amusing in retrospect but irksome at the time, was the treatment meted out to courses conducted by science departments. ‘We were involved in a very peculiar
situation,’ Kane lets us in on some of the happenings, ‘due to what you may call complicated inter-departmental politics. All Physics courses in the early days were labeled Chemical Physics. Now would you ever slot,’ he says pointedly, but chucklingly, ‘a Theoretical Physics course as being part of Chemical Physics? It required a big fight – so many fights – initially in the Staff Council,¹ and later in the Senate, to get that word “Chemical” out of the Physics.’

Chemistry’s fortunes, over the first few years, were no less chequered. Physics might have had to contend with the foisting on their courses of the ‘Chemical’ label, but Chemistry wasn’t even accorded the status of a separate department – tantamount to not being recognized as a discipline in itself. For five long years, it too fell prey to the all-annexing ‘Chemical’ mantle, being subsumed within the Chemical Engineering department. Dr B.G. Bhat of Chemistry again holds the chief framer of rules largely responsible: ‘It was Prof Kamath who decided all this. And he didn’t want Chemistry to go out of Chemical Engineering.’ Fortunately, however, the inclusive character of academic governance at IIT Bombay saw to it that no one man’s opinion was allowed to hold sway for long, and Chemistry succeeded in weaning itself off from Chemical Engineering in 1963-64. (While Kamath appears to have had his blind spots, he has also been commended highly by students and colleagues alike for the clarity he brought to his teaching, and for his unstinting commitment to the Institute’s early growth, as we’ll see in Chapter 14.)

If the sciences in an Institute of technology should be seen as subordinate to engineering, one might well wonder on the plight of the Humanities and Social Sciences. It comes as no surprise that, in Hariharan’s mild words, ‘Initially, there was some resistance. Because some faculty felt that if we’re an engineering institution, why have Humanities?’ Indeed the quip of the time went that if Physics and Chemistry were ‘service’ departments, then Humanities could only be, well, a ‘pure service’ unit.

What helped in dismantling this academic stratification even as it was being erected was that the sciences and humanities had their champions, too, among the Institute’s custodians, notably its Planning Officer, Kelkar. ‘I recall what Prof Kelkar said in this context,’ Hariharan says. ‘He was a

¹ See Chapter 7 – the Staff Council was the progenitor of the Senate.
teacher-philosopher and was able to see years ahead. He said that if engineering were the muscle for development, science was the brain. And that only with humanities could engineering education have a heart. Because then the instruction imparted to students became, in some sense, relevant to social needs.

‘And of course, much later these days,’ Hariharan slips in a wry afterword, ‘they say that engineering education has direction, motivation and cost consciousness only if it includes management.’

The prejudices weren’t to last very long. When Dr N. Talwar was recruited into Humanities in 1971, by which time Kelkar had returned to IIT-Bombay as its Director, she found the climate not just accepting but also encouraging. Engineering colleagues, she feels, were very open minded, and if they had questions they were not on the place of Humanities in an engineering institute but on its contextualization in the framework of engineering education. As to the ‘service’ tag, she feels ‘it’s true to the extent that when it comes to the teaching programme, one’s ambit is defined by what are felt to be the needs of students. The prime duty of department has been to cater to those needs. The label is not a happy one but,’ she says, ‘we do have to sympathize with students’ needs and difficulties, we do have to function in certain ways required of us.’

The instances of early polarization were in some senses inevitable. Here was a new institute, meant to be fashioned along new lines of thought, a significant departure from those in force in the university system. But faculty for the Institute had to be drawn from this very pool – there was hardly any other available – and would have brought to the table their preconditioned ways of thinking. Collectively, the incidents chronicled here bring to the fore the defining features of IIT-Bombay’s early functioning. They underline the importance of autonomy and participative governance in imparting an early maturity and potency to its academic programmes. If people like Katti and departments like Physics and Chemistry were able to have their way, this owed as much to their own tenacity as to the institutional framework in which they were operating: one which, while still in the thrall of prevailing orthodoxies, was nonetheless accommodating, willing to hear them out, and to yield where necessary. (Unhappily for most Indian universities, this level of adaptability isn’t enjoyed in them to this day.) These traits are echoed in the experiences of very many oth-
ers, including those who joined the Institute over the ensuing decades, and they continue to be perhaps the strongest pillars of IIT-Bombay’s academic edifice.

**The Sheepishness of the Z-O. I-L.G.**

Aside from academic autonomy and inclusive internal governance, a third feature of IIT-Bombay’s operations that stood out as a major departure for the times was the breadth of its engineering curricula. But deviations from convention cannot hope to run to everyone’s taste, and neither did these. Their targets were liable to see themselves often as victims of an uncalled for imposition rather than as the beneficiaries of an exciting experiment. In 1970, an issue of IIT-Bombay’s student magazine *Technik* carried this plaint from reader J.H. Lal:³ ‘The inner drive for the quest of knowledge is sustained only when there is an interest. But the diversity of subjects here kills that interest and then, of course, one tries to just get by. Teaching engineering metallurgy to a person whose sole interest is in the aerodynamics of an airplane can be cited as an example.’ Even the fretful Lal, though, found his loyalties torn, conceding that the diversity ‘unfortunately is very essential for the engineering profession.’

And yet, as described in Chapter 8, there was to come a defining moment in IIT-Bombay’s academic life just a year later, when an overhaul of its curricula saw its course bulletins become even more eclectic than before. It is instructive here to pause a moment upon the spirit in which these reforms were effected, best captured by the words of the ‘Rules Committee’ of 1971-72³ (and echoing, no doubt, the thoughts on the matter of their guiding light, Director Kelkar):

Most of the engineering data and empirical information learnt by a student during his stay at the Institute are likely to become obsolete by the end of the first decade of his professional life; by the end of the second decade, even the physical models and methods of analysis learnt by him may get outdated. However, what sustains the student all through the expected forty years of his professional life is his ability to learn on his own and to independently approach, analyze and solve a problem with which he may be confronted. The curricular content and the methods of instruction, assessment and evaluation have thus to be directed towards developing this ability.
These, in brief, are the liberal views that have informed IIT-Bombay’s exertions in the curricular sphere ever since. Leafing again through the pages of *Technik* to see what students thought of them, one chances on this editorial appraisal in a 1973 issue.⁴

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*The fallouts of continuous evaluation:* Appealing at strategically chosen places, to the kindness of friends before the event (a ‘Tension Test’), top left and right. Below, another place where the milk of kindness could help matters along, through the ‘cooperative’ exam technique.
Today the Institute offers you more flexibility in the selection of your courses than ever before. The idea is to let you decide for yourself what you’re interested in, what you want to be, where you want to head. Strange though it may seem, those humanities subjects you cram up on the eve of the examination are meant to distinguish you from the run of the mill, hidebound engineer. The ideal IIT graduate is one who can talk knowledgeably on most subjects under the sun – one who isn’t fazed by the mention of, say, PERT, or ‘Free Enterprise’. So if you don’t know what ‘Future Shock’ or ‘Planned Obsolescence’ means, find out.

From which it would seem that the intended beneficiaries, whether or not they agreed with the letter of the changes, had absorbed at least their spirit. And here’s Technik taking a jab at the post-curricular desserts of curricular catholicity:

Speaking of flexibility on selection of courses, have you heard this one?

Zapped out Intellectual Looking Guy: ‘I go to a real liberal school, man. I can take whatever courses I want. This semester I’m into Transcendental Meditation, Weaving, Sociology, Ceramics and Aircraft Design.’

Impressionable, Giddy headed Female: ‘Say, really fantastic, man! Like, it’s really outasite afterthought [sic]. And what do you expect to be when you graduate?’

Z-O. I-L. G. (Sheepishly): ‘Unemployed.’

On the operational plane, the reforms of the early 70s ushered in the semester system, continuous evaluation via a string of tests and quizzes that lit up the semesterly calendar and – most crucially – the freedom, within limits, to study at your own pace.

Formerly, we recall that undergraduates who failed a certain number of courses in a particular academic year had to repeat the whole year all over again – including the courses they had passed. The fallout of the regime was the presence, at any given time, of a number of ‘repeaters and failures’ languishing at the Institute, nursing the psychological bruises they’d been dealt. And if you enrolled for an M.Tech., the dispensation was even fiercer. The Institute’s annual report for 1967-68 states (and does one detect a note of chuffed preening here?):

The courses leading to the degree of Master of Technology require a high standard of scholastic participation by the student. No student is permitted
to repeat a course. At the end of the first year when the academic course programme is more or less complete, the student is either eligible for the second year of the course or is required to leave the Institute.

Which meant that you couldn’t afford to let down your guard for even a single course, else you were out, no second chance given. No wonder the Tendolkar Committee was moved to say, in 1971, that ‘most students and faculty’ were ‘totally dissatisfied with the system of examination.’ And to go on to recommend that ‘the year as the basis of promotion should be discontinued, and be replaced by the system in which the course forms the basis for evaluation.’ As outlined in Chapter 8, both the B.Tech. and M.Tech. curricula and rules were soon revamped along the lines proposed by the Committee.

But here, too, not all was greeted with cheers of joy. Though students might have relished the newfound opportunity to ‘study at their own pace’, one attendant feature of the semester system – that of continuous evaluation – wasn’t an unqualified success, either with students or with teachers. For some, it grew to be rather a sore point, best exemplified by two voices raised in *Technik* in September 1973. This submission came from Dr S.K. Banerjee of Electrical Engineering:

I would like to mention that the large number of examinations (3 or 4 per week) in the present system is tending to frustrate the teaching as well as the learning process. An examination (or a quiz test) is distracting the attention of the student from some other topic and as a consequence, the quality of student performance, particularly of the average ones, is likely to deteriorate.

And student Satish Thatte, resorting to technical imagery to drive home his point, penned this critique:

The working of the continuous assessment system is a complicated affair. The director pointed out in his opening address this year that the system was designed to reduce ‘final exam’ tension and make work more regular instead of having an impulse of work at $t = t$ (examination) and a zero response at other times. It obviously hasn’t worked out that way. Instead of responding with a tranquil D.C. the students have responded with an impulse train with big ones for C.T.s [class tests] and smaller ones for quizzes.
Roughly translated (for the benefit of those never admitted to the charms of engineering lingo), Thatte was implying that all that had changed was that students were now diving into their books over several fleeting bursts every semester instead of just one or two; and that between these bursts, they remained as academically quiescent as before. But he did see the good in the revisions, too:

Every one of us has been in the new system for at least two years. We have more or less accepted it in spite of quite a few grumbles, coming mostly from people who disliked the change from a couple of years spent in lazy bliss.

And on behalf of faculty who swore by the reforms, Dr K.P. Madhavan of Chemical Engineering offers this spirited defence: ‘It was definitely a change for the better; it helped us in many ways. It’s not just an exercise in grading, if you take it as that it doesn’t make any sense. I look at continuous evaluation as a means of, first, finding out how students have absorbed the material you’ve taught. Second, at particular points in time you can track individuals, restructuring of course material on the move. The idea is to cover topics in various ways and see how students assimilate them, maybe arrange a tutorial or two to help things along.’

By around 1974, the Institute had a mint-fresh intellectual rubric – and it was to endure over the next three decades largely unchanged. So successful did the regime prove to be that in 1981, then again in 1998, when it was reviewed, the minor changes effected were akin to the act of adding grace notes to a composition already almost perfect.

Perfection, however, is a strangely volatile quality; what’s judged perfect today can all too often become the clumsy of tomorrow. Over the ten years mid-1990s onwards, with India opening itself to the world and its myriad influences, the country’s economy and its aspirations – particularly those of its youth – have changed more than they’d changed in decades together. More restless, anxious, and go-getting than ever, the demands posed by the young of today have rendered the Institute’s curriculum tangibly out of step with the times. So much so that IIT-Bombay has had to put its thinking cap back on and thoroughly recondition its B.Tech. curriculum once again. These reforms, however, have one foot in the present and one in the future, and will be taken up in chapters to follow.
A LIMITED INFLUENCE

When mapping IIT-Bombay’s growth over the 1960s and the 1970s, one finds cause for surprise in a certain quadrant of its academic evolution. UNESCO-mediated aid to the Institute in its early years came in two forms: equipment and experts. As many as 59 experts came. Of these, only 4 were from countries other than the USSR; hence one can speak of the UNESCO programme as having resulted in a preponderantly ‘Soviet’ presence at the Institute. Still more Soviet experts came under a handful of bilateral agreements up until the early 1970s. Moreover, of IIT-Bombay’s faculty who went overseas for their further training, most in the early years went to the USSR.

Given this overwhelmingly Soviet complexion to the human component of the aid, observers have often wondered how IIT-Bombay came to adopt, rather than the Soviet model of technical education, essentially the American one. (Given that IIT-Bombay was only the second IIT to be set up, it could well have opted to go down its own chosen path.) An important determinant here is that, despite the numbers, the human influence turned out to be rather limited in scope. For a start, the Soviet experts confined themselves mainly to setting up laboratories and equipment, and in their teaching to postgraduate courses. Their presence at the Institute, moreover, was dispersed in time. None was here for more than two and a half or three years, and many came for considerably shorter spells, on the order of a year or a little over. Thus, as many as 28 of the 59, or nearly 50 per cent, stayed at IIT-Bombay for less than a year and a half, and another 20 for less than two years and a half.9 The brevity of their sojourns was a documented cause for concern: Brig Bose felt it fit to remark on it at some length in a note he submitted on the working of the UNESCO programme.10 Hardly had experts had the time to settle into a climate and culture a world removed from theirs, than they had to head back again.

The influence they left behind, therefore, was transient, but in some ways tangible. In the postgraduate courses, they did infuse some flavour of the Soviet approach to technical education, marked by narrow specialization in industry-oriented domains. This led to a proliferation of M.Tech. specializations, whose suitability for the Indian educational format was questionable. By 1963-64, for example, just 5 years into IIT-
Bombay’s operations, as many as 30 specializations were being offered, and one could end up doing an M.Tech. in fields as narrow as ‘Cellulose Technology’ in Chemical Engineering or ‘Mechanical Working of Metals’ in Mechanical.¹¹

In the mid-sixties the M.Tech. programmes were reorganized by introducing broader streams, contracting their number from 30 to 19. The Institute’s annual report for 1963–64 remarked:

Some of the engineering departments were offering as many as eight out of a total of 30 electives offered by all departments. ... A critical re-appraisal of the entire master’s degree programme was made during the year. It was felt that the objective of the Master’s degree course could be achieved by grouping some of the existing electives under broader heads.¹²

In Mechanical Engineering, as an example, ‘I.C. Engines’, ‘Thermal Power Engineering’ and ‘Refrigeration’ were clubbed into the single specialization ‘Heat and Power Engineering’, while in Chemical Engineering ‘Cellulose Technology’ and ‘Fuels and Furnaces’ were dropped outright.

But the numbers, Phoenix-like, had contracted only to revive again. A renewed expansion of M.Tech. programmes took place in the seventies, driven by the sprouting of interdisciplinary fields. By the mid-eighties they had swelled once more to their earlier strength of 30 – though in this instance it owed not to another round of sharpening their domains, but to the multiplication of broad, increasingly cross-disciplinary streams.¹³

Other than in the matter of M.Tech. specializations, the curricular pattern adopted at IIT-Bombay stayed true to the recommendations of the Sarkar Committee, which we recall had advocated either the American (essentially the MIT) or the British (the Manchester University) model.

Of these, the American system found greater favour especially in the undergraduate programmes, broad curricula not being the strength of the British university system. Faculty from the period have affirmed that the Soviet experts appeared to be at ease with this leaning, never seeking to establish the Soviet paradigm on the undergraduate curriculum (and nor were they really in any position to do so). In all, if there was any Soviet influence, it was restricted to postgraduate programmes, was short-lived, and came in small doses. IIT-Bombay’s tradition of the public defence of M.Tech. and Ph.D. theses, for instance, is said to be a legacy of the Soviet
The curricular grind at IIT-Bombay, as pictured by its students. The illustration appeared on the cover of the 1983 issue of the students’ annual, Pragati, and was inspired by a line sketch brought out in Technik almost a decade before, when curricular churnings were the burning issue of the day.
influence, a rite of passage that helped strengthen the quality of work turned in by the Institute’s students.

Looking back on some of these elements, alumnus Dr S. Ramani (M.Tech. 1964, Ph.D. 1969, Electrical Engineering) remembers Director Bose, when addressing students after a trip to the USSR, saying he was impressed by the Soviet model of central planning and strong specialization, giving the example of how they produced not just ‘bridge engineers’ (as opposed to Civil Engineers) but also ‘different types of bridge engineers’. Ramani feels the Soviet academic model had its advantages, with its year-long M.Tech. project focused on practical, real-world problems. ‘IIT-Bombay was born with a great asset that way,’ he says, ‘while the US model, with its strong focus on “paperwork” – on courses, on research papers – made you research oriented. It also made you US university oriented, leading in part to the brain drain. The biggest advantage in this,’ he adds on a lighter note, ‘was that everything was done in English, one didn’t have to learn Russian.’ (Ramani had been obliged to undergo a course in Russian as part of his Ph.D. at the Institute.)

‘TOLERATING ALL THE INDIFFERENCE’

We come now to the principal programme upon which is predicated IIT-Bombay’s research effort but which, like an unfavoured child, has appeared to command consistently less attention than its B.Tech. and M.Tech. siblings – symbolic of the fact that research in general came a poor second in the Institute’s priorities for a number of years. Dr S.S. Talwar, who came aboard the Chemistry faculty in 1971, remembers that right into the early 80s senior colleagues of his would return from Senate meetings disheartened at the way the proceedings were dominated, when it came to postgraduate courses, by deliberations on the M.Tech., leaving little space for the Ph.D. (It’s relevant to note here that the mainstay of postgraduate education for the engineering departments was the M.Tech. programme – Ph.D. students in engineering departments were few and far between – while for the science departments it was the Ph.D.)

Up until 1973, the Ph.D. programme had ambled along in virtually footloose fashion, being as unstructured as could be. A feature unthinkable today is that as a Ph.D. student here in the 1960s, you were required
to do no formal course work at all in your area of research: ‘It was assumed that a good B.Tech., M.Sc. or M.A. was adequate formal education’ as preparation for your research.\textsuperscript{15} There was, however, a certain other requirement you had to fulfill; a rather curious one. You had to pass a test in ‘one Senate-approved foreign language’ before you could submit your thesis. A legacy of the Institute’s Soviet era when it was useful to have a working knowledge at least of Russian, this must in later years have struck the hapless Ph.D. student as being rather a dubious encumbrance.

Seeking to iron out these idiosyncrasies, a Ph.D. Review Committee was formed in 1973, convened by Dr A.B. Biswas of Chemistry. Unsurprisingly, it recommended the introduction without delay of formal advanced courses, declaiming, ‘The present programme with too much emphasis on research projects without offering any breadth of background education is narrow, over specialized and possibly isolated.’ Heeding its counsel, the Institute introduced a course programme of between six months and a year to precede the research; and forthwith did away with the pursuit of a foreign language as a qualifier.

Conditions for work for Ph.D. students over the first few decades were uneven, and in surveys of the time the Institute didn’t come out shining. In response to a questionnaire drafted by the Biswas committee, many Ph.D. students voiced their ‘frustration arising from reasons such as economic hardships, bleak future prospects, limited facilities of work and several other academic problems.’\textsuperscript{16}

Economic hardship first: if you arrived boasting an M.Tech. to your name, the monthly scholarship you drew would be the same the Institute’s earliest Ph.D. students had drawn ten years ago – Rs 400 – a sum that might have made you a man of means then, but was less than comfortable now. Yet even that was generous compared with your takings if you came aboard on the strength of a B.Tech. or an M. Sc.: all of Rs 250 a month.

‘It should not be difficult to see,’ one beset soul chided the Institute, ‘that it is impossible to have independent maintenance on Rs 250/- p.m. Besides it is very shameful for research students to be still a burden to their parents.’ The Biswas Committee did, in view of this, recommend that Ph.D. stipends be revised to Rs 500 and Rs 350 for the respective categories, bringing some relief; sadly, however, Ph.D. stipends at the Institute (and in Indian academia in general, for these are fixed by the central gov-
ernment) have continued to be pegged at dishearteningly low levels compared with the starting salaries fresh graduates are offered by industry. For many who might otherwise have been inclined towards academia, this has made the Ph.D. a consistently unattractive option, with predictable consequences for the Institute’s research endeavour.

As for ground conditions for research, the Institute received a mix of bouquets (a few) and brickbats (quite a few) from its present and past Ph.D. students. Most respondents were happy with the library facilities, ancillary staff, and ‘opportunities for contact with fellow Ph.D. students’. ‘Availability of library facilities was excellent,’ said one. ‘We would get almost everything we wanted. I am grateful to the library staff for every cooperation they rendered.’ When it came to the Institute’s administration, purchase procedures and funding for research, however, students leveled stern dispraise. A small cross-section of comments is redolent of the climate prevailing over the 1960s and 70s:

‘Problems are chosen from American journals which do not find ground here. Hence, efforts are in a vacuum.’
‘Laboratory equipment is rather poor all over IIT. We have to select the project based on the facilities available with us. To get anything through our Central Stores within reasonable time is impossible.’
‘The Central Workshop is good for nothing. Months and months it takes to make small things which I find here just a question of one day.’ (This respondent had obviously moved on to sunnier academic climes.) ‘Getting a potentiometer or a hardness tester at IIT is as difficult as getting a Ph.D.’
‘Regarding the settlement of [a Ph.D. student’s] account, he has to go to the departmental office, climb two floors, go to academic office, administrative office, accounts office, hostel coordination unit, Dean’s office, locate the clerk who deals with a particular department … and tolerate all the indifference shown to him.’

By the late 1980s and early 90s, nearly twenty years on, things hadn’t improved materially. The indifference shown towards Ph.D. students wasn’t limited to the offices of the Institute; the academic community, too, wasn’t free of blame. We consider the testimony of two alumni who did their doctoral work during this phase. Dr V. Sule of Electrical Engineering (Ph.D. 1991) minces no words when he tells of how Ph.D. students were
thought undeserving of so much as rudimentary furniture: ‘I had always wished IIT-Bombay became a mature Institute with research as its main focus. I entered as a research scholar and soon realized the status I had in the scheme of things. In the first week I searched for a room and a table and chair for the new research scholar. I was mistaken that it would be available. After running from one office to another I was asked to meet the space committee chairman. This professor told me clearly, ‘Young man the fact that IIT has given you admission does not entitle you to get a table and a chair’. The system gave very poor attention to research during my time.’

And Dr S. Waghulde, a contemporary of Sule’s, speaks of ‘step-motherly’ treatment meted out to Ph.D. students compared with others (Waghulde had the best possible insider’s view to make this comparison, being one of those unflinching loyalists who have taken all their degrees – B.Tech., M.Tech. and Ph.D. – from IIT-Bombay; he did so over a span of 15 years spent in the Metallurgical Engineering department). So hard up was the Institute for resources in his day, he recalls, that even for photocopies, there used to be a departmental quota of 50 pages per month per student, which could leave you high and dry if your reading list ran to more than a few papers a month. Echoing some of the sentiments from the 1960s, Waghulde also recounts the distressing levels of indifference and centralization of procedures, especially in the workshops and Central Stores, resulting in debilitating delays in project work.

Clearly over the first three decades and more of IIT-Bombay’s existence, Ph.D. students and their conditions of work were not uppermost on the Institute’s mind. And the situation today? There is unanimity that things have improved vastly, and on all fronts: institutional attitudes, facilities, and processes are all geared a lot more favourably towards its research scholars. As Sule himself reflects: ‘Fortunately it’s far better 17 years down the line. A Ph.D. student is now a much respected and sought after person.’

**SOME THAT FLOURISHED ... SOME THAT DIDN’T**

Perhaps the greatest shock suffered by the IITs’ academic format was the abbreviation, 1981 onwards, of their B.Tech. from five years to four. This was universally felt to have enfeebled the programme; as will be detailed
in Chapter 13, many felt this governmental order to be an infringement on the Institutes’ autonomy.

But for every cloud, its silver lining. While IIT-Bombay had to adapt in various ways to the enforced contraction, it spurred academic improvisation as well, one of which gave birth to a first of its kind. The department of Physics, which until then had been running a 5-year M.Sc., now faced a grim situation. As Kane puts it, ‘Until 1981, we were getting excellent candidates for our 5 year M.Sc. through the JEE. But when JEE candidates could get that IIT stamp in 4 years, the chances of a good student opting for a 5-year M.Sc. were small, as events proved. Just before the 5 year M.Sc. in Physics was dropped, the number of admissions had come down to two! We had to take up this challenge – and our response was to start the 4-year B.Tech. in Engineering Physics.’ Gratifyingly for the department, the new programme was an unqualified success; high JEE rankers have been seeking admission to it ever since, and finding themselves well placed for prospects when they graduate.

For the numbers of programmes that have fared well at the Institute, there have been those that haven’t enjoyed as good a run. In the mid-1980s was launched a notably experimental programme, chalked out in consultation with the MHRD and the other IITs: the 5-year Integrated Co-operative M.Tech.17 Aimed at promoting industry-Institute partnership (it was these entities that were meant to ‘co-operate’ under the programme’s provisions), it promised to plug a desideratum that had troubled IIT-Bombay from the very beginning: the absence of robustly R&D-based links with industry. For IIT-Bombay, there were several clear advantages to adopting the programme. Industry, by way of supporting students financially (to the tune of Rs 15,000 per year) right through their 5-year stint, would become automatic partners in the experiment. Students would spend each summer as interns with their respective sponsoring industry. The hope here was that at the end of five years, the programme would have created a different breed of graduate, one who had imbibed that unmeasurable but vital thing – industrial culture – during his academic training, and so was primed to take up gainful employment in industry immediately on drifting out of IIT-Bombay’s gates.

The scheme also offered a means of stimulating research at the Institute. In Kudchadker’s reckoning, ‘Research was not catching up here [in the
mid 80s]. And while you didn’t have very good M.Tech. or Ph.D. students, you did have the best possible B.Techs. If through this programme we could enthuse B.Techs – and excite faculty – it offered a back door approach to research.’

Rs 15,000 a year was no great sum to commit; yet industry, careful with every rupee, were not easily convinced. Persuaded by, among others, Drs A.P. Kudchadker and K.P. Madhavan of Chemical Engineering, and Drs S. Somasundaram and N. Ramaswamy of Mechanical Engineering, a handful of firms did eventually agree to participate in the joint venture. Introduced in the Departments of Chemical, Mechanical and Electrical Engineering 1984-85 onwards, some 12-15 students were taken on the programme every year.¹⁸ Laudable as it might have been in its conception, the programme failed, sorrily, to flourish. And what scuppered it was the familiar *bete noir* of the IITs: the fixation among their graduates for occidental pastures. Economic, living and industrial work conditions in the country were still far from appetizing for the typical IIT graduate; for most, the pull of the better paying, better governed, industrially sophisticated West was too strong to resist. The old story repeated itself. In Kudchadker’s resigned words, ‘Of course as it always happens, while we thought this five year product would stay primarily in India, quite a few ended up in the US as the best possible starting material for a Ph.D.’

Industry, seeing their sponsorships going to waste, were increasingly reluctant to participate. A well intentioned, well conceived experiment was brought to a premature end just a dozen years after its inception – when another 5-year invention took its place. Nor was this replacement, however, fated to enjoy success in the measure anticipated for it. Assembled quite differently from the Cooperative M.Tech. programme, the Dual Degree programme was launched in 1996. It was hoped that this innovative, two-for-the-price-of-one offer would attract much attention in years to come, its distinctiveness appreciated. Indeed, the idea at its root was nothing short of radical: ‘that it would grow in size and eventually, perhaps,’ says Sukhatme, during whose directorship it was begun, ‘there would be no need for a B.Tech. programme by itself.’

Sukhatme feels that the Dual Degree programme didn’t succeed quite as well as it was hoped because it fell victim to the established, towering success of the B.Tech. programme, being made to work within the
contours of the latter. One example was the tendency to cobble together the curriculum for the Dual Degree by combining large chunks of the existing B.Tech., instead of framing it anew. Once it became, in this way, subordinate to the B.Tech., its selling point was blunted, and the best students less likely to enroll for it. Others concur, observing how the Dual Degree, meant to be the Institute’s flagship programme, has failed to live up to expectations.

And the IIT Review of 2004 was unsentimental in its assessment, going so far as to advocate its ‘scrapping’.19

The original idea of restoring the 5 year science or HSS contents in the 5 year dual degree has not materialized. The only difference between the Dual Degree and B.Tech. appears to be a few extra P.G. courses and a larger Project work component. This suggests that the Dual Degree programme by and large has not served a greater academic purpose ... and may have incidentally facilitated the entry of lower ranked students who could not make it to the B.Tech. programme of their initial choice. There definitely is a case for redesigning the whole course or scrapping it altogether.

Like a mighty, dense-leaved tree, the IITs’ flagship B.Tech. programme appears to have stifled anything attempting to grow in its shade.

Not everyone reckons the prospects for the Dual Degree as bleak. For a start, it’s still a young programme, and may come into its own in course of time. And some departments have had a happier experience with it than others, as Dr H. Narayanan of Electrical Engineering contends. Dual Degree students, to his mind, have been just as bright and exciting to work with as any others. Their principal handicap has been that they tend to lose steam on seeing, in their fourth year, their B.Tech. counterparts land lucrative placements one by one, leaving them understandably listless in their final year. If ways can be devised to energize them again in the final stages, such as through carefully chalked out, exciting projects, the programme may still outperform the B.Tech. as it was hoped to do.

In cheering contrast to the programmes just described, which the Institute was confident would succeed but didn’t, stands one which the Institute had feared mightn’t fly, but did. Consider the statement below, issued by IIT-Bombay in response to a question from the 1986 IIT Review Committee on the desirability of introducing a management programme:
The institute would not like to take the responsibility of conducting fullfledged courses in the field of managerial sciences either at the degree or diploma level as it feels that there are better equipped and more competent institutions like IIMs for offering these programmes.²⁰

Given the fanfare and sense of breaking new ground with which IIT-Bombay’s School of Management was launched just a decade later in 1995, we have here an instance where the Institute has had to, shall we say, eat its own words – if in the pleasantest way possible.²ⁱ

**COMPUTER CIRCUITS ARE AFTER ALL BASED ON ELECTRONS...**

Subject to the same vagaries as IIT-Bombay’s academic programmes have been the units in which they’ve been housed – its departments, centres, schools, and interdisciplinary programmes (IDPs). For them, too, there has been constant flux over the years, intensifying tangibly in recent times.

Departments in an academic institution often grow in number in the way cells of yeast under the microscope are said to do, by the process of budding. Departments, keen to expand their frontiers, have time and again explored and fostered new subjects of teaching and research. These, at some point dictated by their own metabolism, outgrow their cubhood, become disciplines in their own right, and strain to break away. If conditions are right, fission occurs: and a new academic unit comes into being, with its own codes and customs, its own courses and curricula.

It was in the fission mode – to take a few examples – that Chemistry, Earth Sciences, Computer Science and Engineering (CSE) and Information Technology were formed, budding off respectively from Chemical Engineering in 1963, Civil Engineering in 1982, Electrical Engineering the same year, and CSE in 1999. But the yeast analogy can only be stretched so far. The department, a hive of human emotions, is arguably a more complex organism. The budding off is rarely a tame, amicable affair; feelings can run high. The formation of Computer Science and Engineering from

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²⁰ On an earlier occasion, too – in 1978 – IIT-Bombay’s Senate had considered the idea of establishing a School of Management, only to set it aside for the time being, expressing reservations about its necessity ‘in the face of a large number of institutions in the country running management courses’. Minutes of the 65th meeting of the Senate, IIT-Bombay, 20 Oct. 1978, Item No. 2.
Electrical Engineering is an example in point; one that Dr D.B. Phatak remembers as being ‘a very grudging parting of ways.’

The first trigger for the separation can be traced back to the DIIT in computer science started by the Computer Centre in 1973, then under the auspices of Electrical Engineering. Gradually the realization dawned that Computer Science deserved to be introduced as a separate B.Tech. specialization; the first independent batch of 25 students joined the 5 year B.Tech. in 1980. Next in line of thought came, naturally enough, a separate department. ‘Electrical Engineering,’ says Phatak, ‘did not like it. They held the view that unless you were an electrical engineer you couldn’t be a computer scientist. In fact, I remember one colleague saying, but of course computer science had to be part of electrical engineering since computer circuits after all were based on electrons. I remember having asked that if AND, OR or NOR gates were implemented using hydraulics, would that make computer science a part of mechanical engineering?’

But there could be no stalling it beyond a point; it was a discipline whose time had come. There were several in Electrical Engineering who also agreed that the move would be for the good of all concerned, and the terrain was eventually relinquished, the department of Computer Science and Engineering (CSE) coming into being in 1982.

Poetic justice of a fashion was served upon CSE when Information Technology (IT) in turn splintered off from it, in 1998-99. Many in CSE this time round, recapitulating the fixity of their former colleagues in Electrical Engineering, felt that IT hadn’t yet earned its spurs as a separate discipline; they saw it, Dr A. Sanyal of CSE reminisces, as essentially the applications and deployment arm of Computer Science. But the late 1990s were the glory days of the IT industry, and this played no small part of its own. Impelled by the advantages that might accrue from the timely formation of a separate institutional window for the subject, and accelerated by endowments from alumni Kanwal Rekhi and Nandan Nilekani, the tide swung in favour of the creation of the School of Information Technology.

Seven years later, in 2006, came further cause for reflection when the idea was mooted to paste IT back into the computer science folder again. The arguments for merging KRESIT into CSE ran along expected lines: consolidation of allied strengths, and putting up a broader front before
the external world. Needless to say, it set a number of minds wondering on the advisability of having plucked IT out of CSE in the first place. Still, the reunion was a happily unruffled, amicable event; and what really mattered here was that, as in other cases, rapid adaptive changes had been possible at the Institute in response to winds of change, albeit at the cost of short spells of upheaval.

Academic growth has come in other guises, too: such as when the irrepressible capacity for lateral thinking has asserted itself. Intellectually adventurous faculty at IIT-Bombay have periodically sauntered into new academic pastures while still rooted firmly in their home departments. In these forays lie the origins of many of the Institute’s interdisciplinary programmes (IDPs), examples being Energy Systems Engineering, Systems and Control Engineering, and Reliability Engineering; as also the origins of areas once considered alien to the engineering universe, such as those linked to biology and medicine. More often than not, these have grown organically from within in the manner just described, though the first few IDPs had been spurred by the Fifth Plan offerings of the central government between 1974 and 1979.

Since these units were strung together on the trot in their early days, in some instances there have been tussles for what can be called ‘ownership’ of the programmes; or there has been reluctant acceptance by existing departments of the Institute. Drs S. Durani and K.K. Rao, respectively of the department of Chemistry and the School of Biosciences & Biotechnology (Bioschool for short) sketch the start of bioscience activities at the Institute in the mid-1980s, when governmental funds started to flow for biotech research. Generally in the Institute, recalls Rao, the biosciences were seen in a very limited way (such as chiefly consisting of medical statistics), and as ‘soft’ sciences without much rigour, emphasizing nomenclature rather than mathematical concepts. But whispers of this kind, Rao and Durani are particular about pointing out, were heard only ‘on the ground’, and weren’t something that didn’t allow the biosciences to make headway in the Institute. ‘And there may have been resistance from certain departments, but there was never any negativity from the Institute’s top functionaries; from the Director and Deputy Director [these, at the time, were Nag and Kudchadker] there was only the fullest support.’
Interdisciplinary programmes at the Institute have for the most part enjoyed mixed fortunes, owing partly to their loose-knit structures and small sizes and partly to a wavering commitment on the part of the Institute towards their needs. While IIT-Bombay has always felt it imperative to have such programmes, the infrastructure they’ve been provided has never quite matched their needs. As far back as in 1978 these shortfalls were highlighted, and remedies for them suggested, by a Senate-appointed committee. Convened by Dr J.T. Panikar of Civil Engineering, the committee made recommendations on the administrative machinery needed to optimize the running of the IDPs; more importantly, it also expressed the concern that they would find it difficult to flourish unless appropriate infrastructural support was extended.

The most pressing worry was that of suitable functional space. ‘As there are many IDPs which have been started without making specific provisions for space,’ noted the Committee, ‘the problem is becoming more and more acute.’ It recommended as a remedy the creation of a temporary ‘floor space pool’ for a period of two years, carved out within the existing departments so that IDPs could ‘plan their activities more rationally.’ Finally, the Committee suggested that ‘During this interim period of two years, the Institute might have to plan separate / supplementary facilities for IDPs.’

Unfortunately for the IDPs, the ‘separate / supplementary’ facilities never materialized, and they have continued to lead their unsettled, often physically dispersed existences. Their circumstances are of particular interest as a case study, highlighting as they do IIT-Bombay’s indeterminacy in turning words into action in some domains. While the Institute had consistently spoken of the primacy of interdisciplinary research in the modern era, little has been done to buttress the infrastructure available to the very groups in which such work is explicitly embodied, creating not the happiest of work conditions for their staff and students (though they have never lacked for other forms of support).

Looking back over the growth of IIT-Bombay’s academic programmes and units, it’s striking just how deeply their evolution has been marked by tussles between the forces of academic conservatism and liberalism. One is struck next by how the liberal viewpoint has generally won the day,
even if that day has sometimes been a drawn-out one; and third, it emerges along the way that the Institute’s functionaries have been most often on the side of ringing in the new, even when faculty at large haven’t been convinced of it. The sense of inclusiveness that has eventually prevailed has allowed disciplines that at one time may have seemed irreconcilable with traditional engineering to be braided seamlessly into the Institute’s academic fold. Often, however, acceptance hasn’t been as ready and forthcoming as it could have been, something that can rob the Institute of the chance of a head-start in emerging disciplines. The single most important message in all this is that it is the independence of IIT-Bombay’s academic rubric, expressed at all levels, that has fostered any and all of the dynamism of the Institute’s curricula. It’s a commodity the Institute cannot afford to sacrifice at any altar whatsoever.
Mid-1960s: *Research-wise, IIT-Bombay was nowhere.*
**Dr S.P. Sukhatme**

Early 80s: *This was basically a teaching institute which did a very good job in teaching, conventional style. Research was not the strength of this institute.*
**Dr A.P. Kudchadker**

Early 90s: *Trying to do research at IIT-Bombay was like running a 6-legged sack race.*
**Dr U.A. Yajnik**

2004-05: *In our research achievements, although we are amongst the best in India, we have a long way to go to be counted amongst the best in the world.*
**IIT-Bombay Annual Report**

*And that, in the space of a few lines, just about tells the whole tale. Gyanam Paramam Dhyeyam, runs the Institute’s motto: Knowledge, the Supreme Goal. But while IIT-Bombay had succeeded in recording admirable accomplishment in one province of knowledge – that of imparting and disseminating it – it had fallen consistently short in the matter of creating it anew.*

In previous chapters, we have touched upon the Institute’s pedestrian pace along this vector. Here, we peer a little deeper into the reasons for the sluggishness and why, for nearly four decades, the Institute wasn’t able to shake them off. On taking stock, it can safely be said that much of the slackness owed to the unfavourable climate for research in the first decade...
and a half of the Institute’s existence, leaving a legacy that left it hamstrung for many years more. These were IIT-Bombay’s germinal years and, just as they would for a child, played a vital part in deciding which parts of its genius would blossom, which get blunted.

And while some of the reasons weren’t of the Institute’s own making, some assuredly were. The unsupportive atmosphere for research in the early years can be ascribed at least partly to the Institute’s self-image at the time. IIT-Bombay seemed anxious to make of itself an accomplished teaching institute, with research weighing none too heavily on its mind. In such matters the tone was often set by those piloting the Institute’s fortunes – and amidst them there seemed to be a decided bias, as borne out by incidents from the 1960s. One such is recounted by Dr P.P. Kane, of Physics: ‘I sent a proposal to the Director for an allocation of Rs 75,000 from institutional start-up funds in order to initiate at least some activity in my area of work. Unfortunately, the proposal was rejected on the grounds that only B.Tech. and M.Tech. programmes should receive funding at that stage in the development of the Institute.’

And Dr D.D. Deshpande of Chemistry recollects how, when a colleague who was ‘extremely research minded’ (this was Dr S. Satyanarayana, an electro-chemist) wished to work late into the evening, he had trouble getting key permission for his lab beyond working hours. So acute was the problem (and so unusual his demand for the time) that he had to approach none other than the Director to request permission. This he did – only to be asked by a surprised Brig. Bose, no doubt conditioned by his long years in the army and its attendant emphasis on a full after-hours social life, why at all he should wish to work after the clock had struck five. (Eventually Satyanarayana did have his way, and was often to be seen toiling away till 10 or 11 pm.)

‘Further,’ elaborates Kane, ‘one came to hear statements by senior functionaries of the Institute to the effect that this was a teaching institution and that research was only the personal responsibility of an individual faculty member.’ Invoking the Sarkar Committee’s recommendations, Kane concludes regretfully: ‘A major objective in setting up the IITs had obviously been forgotten.’

And an inadvertent indicator of the spirit of the times spills out from the pages of the Institute’s annual report for 1962-63: it records the orga-
nization in March 1963 of a ‘whole day teaching seminar’ in which the title of one of the principal themes runs: ‘The place of research in a teaching institute.’

Why this lukewarm, almost inclement, institutional stand on research? Perhaps research was seen as a luxury untenable in a country as profoundly poor and crisis-ridden as the India of the 1960s. Documents of the time show that the need of the hour was felt to be the production of quality engineers through undergraduate programmes for India’s industrial enterprise, and in turn to give these programmes the greatest part of the Institute’s attention. Perhaps nobody enunciated this more categorically than an external onlooker, in the form of the 1972 review of the Institute’s performance and prospects. Thrice in its 50 years, at near-equal intervals, IIT-Bombay has been examined closely by ‘high-power’ committees for its performance, problems and prospects. The first Review was exclusive to each IIT, the others (in 1986 and 2004), common to all. Based on extensive self evaluation and external scrutiny, the Review Committees’ assessments provide periodic checks on the account the Institute has been giving of itself. When remarking on the perceived functions of the department of Chemistry, the 1972 Review intoned:

Among the primary functions of this department is the imparting of instruction to the engineering students in fundamentals of chemical science. The Reviewing Committee felt that this may be lost sight of sometimes through proliferation of research activities.

And the prescription for this ill?

The number of persons enrolled for the doctoral programme has to be drastically limited with a view to ensure quality and adequate attention…to the undergraduate and post-graduate engineering courses.

Clearly, a good 14 years into the Institute’s existence, research continued to be seen as a seductive distraction from the Institute’s primary mandate, that of ‘producing quality engineers’.

Even if the ‘proliferating’ research were to be ‘drastically limited’, it hadn’t been advocated to be done away with altogether. And for the limited amounts of research being carried out, what mattered most were the conditions in which to do it. At IIT-Bombay, as elsewhere, at least three ingredients were indispensable to its effective pursuit. Foremost came the
element of human resource: you needed people versed in the art of research to carry it out. Second, these people needed time (or, to use the Sarkar Committee’s word for it, the ‘leisure’) in which to do it; and third, they needed facilities and equipment, or they needed funding with which to equip themselves.

Of people qualified to do research, there was an acute dearth at IIT-Bombay all along the sixties. The ranks of the Institute’s faculty were peppered with recruits without a Ph.D. to their name – and not infrequently without a Master’s. Though they might have been sound intellectual material in other ways, they weren’t yet trained in the rigours of research, and could scarcely be expected to orchestrate it. As Katti puts it, ‘Bright persons from engineering colleges in India without even a master’s degree were inducted at faculty level as lecturers. Civil Engineering in particular and other departments in general were packed with faculty with no postgraduate exposure.’ The numbers bear out his statement. In 1961-62, for instance, when there was a spate of recruitment, of the 38 staff appointed to the posts of Lecturer and Associate Lecturer, only 6 came armed with doctorates. Very many trained themselves in the ways of research on the job. As late as 1969 no less than 100 faculty were working for their Ph.D. in the Institute’s laboratories (and many others had been deputed abroad); and several had enrolled for their Master’s here.

One might wonder why the Institute should have been hiring such a disproportionate number of academic greenhorns. One constraining factor was plain availability: should the Institute have set itself to recruiting Ph.D.s, it would have found them rather thin on the ground. The IITs themselves were among the first Indian institutes to offer training towards the Ph.D. in engineering; the universities of the time produced but a thin trickle. Moreover, since the Institute saw itself primarily as a teaching Institute, it could also see itself getting by with a largely pre-doctoral staff.

Taken together, these constraints meant that subscription to the world of research for many of IIT-Bombay’s faculty would have to await the completion of their in-house training, or their resettlement after their stints abroad. The Institute thus incurred a hefty dead time in actuating its R&D campaign. It needs also to be remembered that once they’d been taken on, faculty found their ‘noses’, as Hariharan has recalled, ‘too much to the grindstone’, formalizing the teaching programmes, setting up infra-
structure, participating in campus development. Even those who might have had research uppermost on their minds had to hold their dreams in abeyance for a while. And for this last category there arose another, and quite unexpected, spoilsport. It took the form of the very ingredient that was meant to give experimental work at IIT-Bombay a flying start: the great fleets of technical equipment presented to the Institute under the UNESCO-mediated aid programme.

AN ELEPHANT FOR A POOR MAN

The figures surrounding these fleets were impressive;\(^{a}\) by the end of the UNESCO project the sum of external expenditures for equipment had run to about Rs 2 crore ($4 million) – no small amount for the time, and one that should have fitted out the Institute in style.

The provision of this aid, and the equipment that rode on it, was naturally celebrated in official documents of the time, on all sides: by the UNESCO, the USSR, the Government of India, and no less by IIT-Bombay. In subsequent documents dwelling on the history of the IITs, too, the purported decisiveness of this aid in getting the Institute started has been remarked upon.\(^{5}\) Here as elsewhere, though, the figures tell only part of the story. On peering beneath their sheen, a number of home truths stand revealed. We recall, for instance, that the UNESCO-channeled assistance was all in Soviet roubles. We recall also that roubles were inconvertible in the 1950s and 60s, obliging IIT-Bombay’s laboratories to be populated with Soviet equipment alone. This umbilical arrangement was held to offer its own advantages; witness this remark in a UNESCO report.\(^{6}\)

Experience gained here can be seen to show the worth of having one major source for expert help and the furnishing of equipment. [this was] far more efficient and effective than would have been the alternative method of obtaining separate items from different sources and then adjusting them all to work together.

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\(^{a}\) UNESCO had expended Rs 1.2 crore (roughly $2.5 million) under the principal aid programme for the acquisition of equipment for the Institute. There was an additional Rs 40 lakh or so ($860,000) as supplementary aid. Simultaneously, the USSR granted Rs 36 lakh ($750,000) under a Bilateral Aid Programme. All of this had arrived before 1966. Indian Institute of Technology, Bombay: Final Report, UNESCO, 1966, p. 31.
But efficiency of procurement or assembly is one thing, and utility of the equipment procured quite another. As time passed it became increasingly clear that not all was as it seemed to be. Flaws in the execution of the aid programme began steadily to manifest themselves, even if they weren’t quite acknowledged; and amongst the Institute’s faculty, what may best be described as a mounting perplexity started to brew.

Fifty years on, when it is possible to view the whole phenomenon with dry-eyed clarity, the causes for this perplexity are brought into sharp focus. On the face of it, IIT-Bombay was in the enviable position of being stocked with an extensive arsenal of equipment from a technological giant of the time, the USSR. The appearance was deceptive. Little of this equipment proved to be usable for research – and in many cases even for instruction and demonstration. When I spoke to those who had had first hand experience of the Soviet machines, they were united in not just questioning their utility, but also in decrying them as more of a hindrance to research than a help. And their chief concerns were broadly to do with the yawning gulf between the purposes proclaimed for the equipment and their fitness for those purposes.

In former Director De’s view, ‘Many of the instruments weren’t tropicalized, so were prone to breakdown. Many went out of order soon, and we couldn’t get spare parts. Spares weren’t shipped with the equipment, and took much time to procure from the USSR.’ Another failing to which he draws attention is that ‘most of the Soviet equipment was unsophisticated compared to that available elsewhere and they lost their currency soon. They were of no use for research.’

In design the equipment was far from universal, indeed peculiarly ‘Soviet’; and this was where the second major problem came in: that of scale. ‘The Soviet Union at that time,’ in Dr S.L. Narayanamurthy’s reckoning, ‘was on a huge mission to match the US, in terms of technology and more importantly, in doing things their own way.’ When asked to elaborate, ‘My concern was on the scale,’ he says. ‘What was supplied was virtually medium scale industry magnitude plants, not laboratory equipment. They were just not suitable for a learning environment like ours. The equipment arrived, but we just did not have the money to feed them. It was like,’ he draws here on an expressive homespun idiom, ‘somebody gifted you an elephant when you did not have money to feed yourself.’
Each department was presented its own pachyderm or two. Chemical Engineering got distillation columns so huge they were never erected and chemical synthesis plants so ravenous the department literally couldn’t afford to feed them with the raw materials they required (tellingly enough, there was a time when industry was interested in buying them off the Institute, for they were virtually production scale plants). Electrical Engineering, remembers former laboratory superintendent Mr U.R. Kasbekar, got ‘giant production scale’ diffusion pumps that couldn’t be used because the moment you switched them on you were enveloped in darkness, their thirst for power having tripped the lines; Mechanical Engineering got its own full blown rolling mill; and Dr S. Narasimhan tells of a mini steel plant bestowed on Metallurgical Engineering that required a separate electrical sub-station to run it – which of course was easier required than granted.

Voracious elephants indeed, for rather a poor man.

‘On balance,’ says Narayanamurthy, ‘if one wants to put numbers to it, I think the Soviet equipment was about 70% hindrance and 30% help in our teaching and R&D effort.’

‘WE WERE NEVER CONSULTED’

What astonishes perhaps more than the fact of the mismatch is that it should have been allowed to occur at all. Didn’t anyone protest; was IIT-Bombay content to be a passive recipient of goods foisted on it? The most mildly worded explanation for the apparent acceptance comes from Sukhatme: ‘Communication with the USSR was never smooth. What came in directly were packets that had to be collected. There was no coordination at all.’

Opinions of a sharper cast apportion the blame more squarely. Narayanamurthy contends that prospective end users of the equipment were never really polled, their views never taken into account. ‘We had very little say in the selection of equipment. At least by the time I joined [this was in 1964], we had absolutely no say. Most of the stuff had been shipped, or had been decided to be shipped. There may have been some notional consultation at some level, but it was definitely not through professional consultation between suppliers and potential users. A lot of
equipment,’ he adds the clincher, ‘came as a surprise to all of us. Once there was the omnibus agreement to help IIT-Bombay I have a feeling nobody really looked at what was on offer, what would be useful to us.’

Narasimhan is equally emphatic in stating that there was no dialogue in the decision-making. As he remembers it, most equipment lists were drawn up by the firm ‘v/o Techno-Export’, the mediating party in the Indo-USSR protocols (they are one of the three signatories to the 1958 agreement, the other two being the respective Ministries) – even though they were a commercial and not a technical firm.

In the light of these testaments the claim made by the UNESCO report – ‘There was indeed very close collaboration between the Indian Government and UNESCO on the one hand and the USSR Government and the Indian authorities on the other’ – takes on a particular moment. The ‘collaboration’ seems to have been all between governments and ‘authorities’, with IIT-Bombay faculty nowhere in the picture.

Where the Soviet stand is concerned, a revealing aside lies buried in the tracery of Brig. Bose’s account of Foundation Day 1959. He quotes a remark made by the Soviet contingent seated in the back of the jeep, during their drive with Pandit Nehru and Kasturbhai Lalbhai around the campus:

The Soviet representatives spoke to the Prime Minister of the need of acquainting the students with machinery to be actually handled by them in Industry after graduating from the Institute rather than simple machines made for educational purposes only. They also spoke of the need for a close contact with Industry during the studentship period.

Although noted without further comment, the observation assumes a distended significance in the light of all that ensued. Clearly the Soviets were in no doubt from the start that IIT-Bombay’s students should be trained principally for the factory floor – and they proceeded to ship equipment of matching description.

In any event, no clear voices of protest were raised at the time; or were so muted as to have gone unrecorded. The Institute’s documents, too, were silent on the subject until as late as the tail end of the 1960s. This is perhaps no surprise. For one thing, it would have appeared churlish, even imprudent, to complain. The prevailing sentiment was one of indebtedness: the general feeling was, after all, that IIT-Bombay had been able to
spring off the blocks at the time it did chiefly because of the Soviet aid. For another, it was a period when the imperfections of the arrangement were only just beginning to be felt.

When the protests did finally find voice, they came thick and fast. From IIT-Bombay’s self-evaluation submitted in 1970-71 to the 1972 Review Committee, here is a representative sample of what the departments said. ‘The department is at present in possession,’ Mechanical Engineering
pointed out, ‘of many Soviet equipments which are suitable for big produc-
tion units... It is to be noted that they cannot be used for teaching and research work. This difficulty has greatly hampered our research and development.’ Metallurgical Engineering pitched in: ‘Most of the equip-
ment at present in the department was received back in 1958 on the basis of a list drawn up before the Institute came into existence. The procedure for getting spare parts being what it is, the equipment such as Electron Microscope is lying idle for the last three years.’ Adding an end-note that conjures a comical picture today but is sure to have packed a poignant sting then, ‘It is an interesting museum piece,’ scoffed the department, ‘at-
tracting visitors but no researcher.’

In sum the Soviet equipment, for all its hoped-for utility in acceler-at-
ing IIT-Bombay’s academic development, placed IIT-Bombay’s faculty between a rock and a hard place. In itself of little use, it yet exacted large amounts of time and energy from IIT-Bombay’s staff – because it was here, it had to be set up, people trained on it – with questionable returns. ‘We used valuable resources,’ feels Narayanamurthy, ‘to put in place some-
thing we knew pretty well we weren’t ever going to use. It was a sense one got right from the beginning.’ And Dr B.G. Bhat of Chemistry reminis-
ces, ‘Virtually the entire Institute was handicapped because of the Russian equipment – our workshops were terribly handicapped. But we worked very hard to get them going. We were gripped by the spirit of starting IIT-
Bombay and that is what kept us working on them.’

And so the coda: the poor man, in no position to turn down his de-
batable gift, found himself spending all his wherewithal maintaining the elephant the best he could.

Nearly as vitiating as the direct effects of the Soviet machines and plants were their after-effects. The provision of Soviet equipment had deleterious, long lasting repercussions: according to De the Indian gov-
ernment, pointing to this alleged bounty in IIT-Bombay’s laboratories, was loth to disburse additional funds to the Institute for modern equip-
ment all the way into the 1970s. IIT-Bombay thus stood disqualified, for no real fault of its own, from equipping its labs as it would have liked. Metallurgical Engineering’s lament testifies to this plight: ‘IISc Bangalore and BHU at Varanasi have received bulk grants for purchase of up-to-date
equipment in recent years which has not been granted to us because of the UNESCO aid made available by the Soviet government.\textsuperscript{8}

‘The Institute’s faculty suffered a lot on this account,’ De adds with feeling, ‘compared with their counterparts in the other IITs.’

A chorus of disapproval as loud and coherent as this can scarcely be disregarded (and the sample presented here is necessarily a limited one). To hear it is to be compelled to conclude that the equipment component of the UNESCO aid programme, on which the highest hopes had been placed, should go down in the Institute’s history as a sterling opportunity lost. It skewed the Institute’s trajectory (some might say ‘damaged’), especially in terms of its R\&D effort; and it was to take IIT-Bombay a couple of decades to stage even a partial recovery from this early handicap.

And if there’s one take-home message lurking in all this, it has to be that top-down decision making of this kind, without consulting the end-user, can come to no real good: something that those at the top would do well to remember, but are all too prone to forgetting. Because addled with unsuitable laboratory equipment (and this was no less true of computers), IIT-Bombay got off to a much slower start in research than did the other IITs. It’s not possible, thus, to speak of foreign assistance to IIT-Bombay in the same breath as that given to its sister Institutes, where there wasn’t the same chasm between intent and outcome.

Yet though this deficit might have delivered a body blow to the Institute’s research endeavour, it wasn’t quite a knock-out either. IIT-Bombay was to go on to stage a resurgence, be it a modest one, after its effects had waned. And if over the years IIT-Bombay has managed to catch up with the other IITs in volume and quality of research, one needs to credit its resilience in overcoming the odds.

\textbf{WHEN HOLIDAYING IN KERALA... REMEMBER YOUR CYRILLIC}

Whatever the failings of the Soviet equipment, they weren’t without their hidden gifts either. And as Narayanamurthy was to discover, these could at times be agreeably financial. Chemical Engineering ended up with such a cargo of platinum on their hands (some six kilograms of it) that it started to pose a security hazard. True to Soviet style, much of it
was in the form of a giant five litre crucible, ‘big as a cooking pot’, says Narayanamurthy. Then when he became the department’s Head in the early 1990s, Narayanamurthy caught himself worrying about being hauled up if the precious metal somehow went missing. So he went about obtaining the Board’s permission to dispose of it by public tender. This fetched the department a ‘handsome amount of money for those days’ – some Rs 16 lakh – which they put into an endowment, proceeding from then on to enjoy the interest on it.

In the realm of utility, too, there were a few honourable exceptions to the rule. Dr J. Vasi of Electrical Engineering gives the example of one of his first Ph.D. students who, around 1985, needed a very high voltage, high frequency oscillator for his work. Vasi was deliberating whether to have it made in-house or to procure it commercially when his lab superintendent, Kasbekar, said he remembered having seen an old high voltage oscillator lying about somewhere. He proceeded to unearth it; ‘but of course because it was this huge Russian thing,’ says Vasi, ‘he had to get two guys to lug it over. Nobody had used it for at least 10 years but when you turned it on it worked just fine, there was no problem at all. In fact we got some very nice results with it.’ (For the Soviet equipment that did in fact get deployed and did in fact work, extreme ruggedness is a virtue most users have attested. Some of these behemoths – and beside them their smaller cousins – still stand in IIT-Bombay’s labs in stately grandeur, mute witnesses to the flux of five chequered decades.)

For some, the benefits could be rather elliptical. Dr Gaitonde tenders this vignette in his droll style: ‘Another problem with the Russian equipment was that all the symbols and labels were in Russian, with the inverted P and the Pi and other unknown characters. But slowly, some sort of automatic image processing happened, and many of us learnt what the symbols meant. That training came in handy when I found myself on holiday in Kerala, where everything was written in those rounded type of letters, and we couldn’t figure out our bus routes. Suddenly at one bus station I found the route numbers and destinations in both Malayalam and English. Five minutes of looking was all it took, my brain had done the mapping, and for the rest of the trip there was no difficulty. So the Russian experiment did have its side effects in real life, it was good training in some ways.’
Going into the 1970s and all through that decade, we find a marginal improvement in conditions for R&D at the Institute. Teaching still took up considerable faculty time – partly because of the Institute’s intensive curricular structure, partly because faculty chose consciously to concentrate their energies on teaching. But the Institute’s infrastructure had been put in place, so there wasn’t that drain on time. In the matter of people qualified to do research, too, there was marked improvement. Most faculty by now had gained their doctorates. And when Kelkar became Director, 1970 onwards, he insisted on a Ph.D. as a minimum qualification for promotion to the Institute’s professorship. Responding to these stimuli, the ranks of faculty were gradually populated with those better placed to conduct research.

Before long, these changes had their expected effects. Between 1970 and 1972 the Institute had only about half a dozen sponsored research projects running, bringing in a meagre Rs 4-8 lakh per year. Subsequently, there were quantum jumps in funding attracted for R&D, such that the decade between 1973 and 1983 witnessed an impressive ten fold rise in extramural funding. Yet these jumps need to be seen for what they were, located in the small universe of IIT-Bombay’s R&D enterprise – which had been virtually non-existent until the early 1970s. On the larger canvas, the figures during this interval pale beside those inked in by sturdier performers on the Indian scene, such as the Indian Institute of Science at Bangalore. There, sponsored research funding throughout the period was as much as four or five fold higher than at IIT-Bombay, with numbers of faculty nearly equal at both places (though one needs to note that the IISc runs only postgraduate programmes, in itself a considerable stimulus for research). As for comparisons on the international scene with institutions in whose league IIT-Bombay has always wished to belong, those would perhaps be uncalled for here. And as we’ve seen in Chapter 9, almost all the overtures for these initiatives had been made by the Ministries, not by IIT-Bombay: the Institute was reacting to externally triggered situations, not creating them within. Other than a few among their number (around

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b IIT-Bombay, Status Papers Submitted to the 1972 Review Committee, DRR.
c In 1974-5 IISc’s extramural accruals were Rs 46 lakh compared with IIT-Bombay’s Rs 9.5 lakh; in 1979-80 they were Rs 1.5 crore against IIT-Bombay’s Rs 42 lakh. IISc data courtesy of Council Section (Unit 1A), IISc Bangalore.
25 per cent), IIT-Bombay faculty were still not geared towards winning competitive research grants.

The condition of relative inactivity continued more or less unchanged into the early 1990s, with a multiplicity of factors keeping the Institute’s R&D levels in suspended animation. Prominent among these were the practical difficulties of doing research. Even if you had the money, it was the devil’s job to spend it. As recalled by several faculty, import procedures could be enormously cumbersome, incurring huge delays involving central government bodies like the DGTD (the Directorate General of Technical Development) for approvals. And up until the 1990s, even where science and technology institutions were concerned, meticulousness in accounting and submission to financial rectitude assumed a dismaying paramountcy over efficiency of research. All this put together could make the pursuit of research a Sisyphean ordeal, severely dimming if not entirely dousing the inner flame that had impelled you towards it.

In the meantime, the simplest of the workings of time had taken place: IIT-Bombay’s faculty had aged. Recruited in the late 50s and early 60s, many were now looking retirement in the eye, and couldn’t see the point in spending their last years toiling away at research – terrain they hadn’t previously trodden, and that was dauntingly steep and slippery in every way. And so it happened that just at the time when significant funding started to become available from extra-mural agencies (this was mid 1980s onwards), IIT-Bombay’s faculty weren’t in a position to bring any good part of it home. Soon enough, that unquantifiable but vital ingredient, the ‘research habit’, too, had been subdued; little wonder, then, that Kudchadker, who joined in 1978, found it ‘hard to spot a research culture’ at the Institute.

d This author recalls, in a personal instance, a long-drawn tussle over the contents of a bill obtained from downtown Bombay in which the amount charged for one particular article out of several had been overwritten. It was blindingly obvious from the total what the amount in question should have been; yet the Institute’s accounts section refused to accept the bill, repeatedly in the face of many written pleas, insisting that the joys of journeying into town be repeated in order to rectify the ‘discrepancy’. And the amount in question? All of Rs 2. The incident captures only the tip of a dismaying iceberg. This was no individual’s fault; and it can most easily be ascribed to the lopsided priorities that reigned nationwide at the time (and at times still do). Yet the blame can also be placed, as we shall see in the next chapter, equally at the Institute’s door for having allowed antiquated codes to remain in force where they could have been phased out. courtesy of Council Section (Unit 1A), IISc Bangalore.
Khakhar, who joined a decade later than Kudchadker, in 1987, formed a similar impression to the latter’s. He felt that at the time he joined Chemical Engineering a significant number of faculty – more than half – were confining themselves to teaching and not engaged in any significant research. With the exception of Chemistry, where research had always been a strong point, he felt this was true of pretty much all other departments.

**TEACHING THEM TOO WELL?**

In the absence of appreciable volumes of research, the Institute seemed to have settled over the 70s and 80s into a comfortable ‘teaching groove’. To speak of teaching as one’s primary occupation was seen to be no commission. Further, once IIT-Bombay’s strengths in teaching, and the market value placed on its products by way of career placements, started to make themselves felt, it wasn’t hard to justify teaching as an end in itself. And with the protective shield of permanency of employment in government sector jobs, it wasn’t easy to bring pressure to bear to ‘perform’ in research.

Yet it would be uncharitable – and untrue – to say that IIT-Bombay’s staff treated their jobs as sinecures. Teaching was taken very seriously, and often done with passion, innovation and experimentation. Dr H. Narayanan of Electrical Engineering reflects on this trait: ‘Our alumni, many of whom are internationally renowned for their academic achievements, would vouch for the fact that forty years ago, even when the institute was not very visible on the professional research scene, much of the teaching had the same intellectual quality as research in the sense of examination of fundamentals and exploration of different points of view, indeed far removed from material directly available in standard text books.’

The innovative bent is brought to the fore in this episode narrated by Mrs. Swamidasan, of Humanities and Social Sciences: ‘At IIT-Bombay,’ she says with evident affection, ‘teaching was fun. I felt spurred to do more, to learn more because when I came here [this was in 1962; she was earlier with Bombay University], I felt I should do something different for engineering students. Then when I met Prof J.R. Isaac – his field was computers – he said, I’m so glad you’ve joined, engineering students should know Truth Tables and symbolic logic, could you start teaching those topics in your course to prepare them for later? I said yes of course and
asked him to put me on to some of the applications of symbolic logic. He mentioned a couple of books and I started going to the library, modified my course. I could do this since I was told I was free to innovate at IIT-Bombay. Gradually I introduced these ideas, the deductive part becoming more mathematical, more symbolic logic oriented...I owe it all to being here.

There are others who feel that the artistry, creativity and innovation that some of IIT-Bombay’s early faculty brought to their teaching possessed the distinct stamp of research (more on this in Chapter 14). However, it is doubtful whether this variety of improvisation, no matter how creative, will be accommodated within the rather narrower definition of research that reigns today; and it’s a debate that will never be settled. We return our attention now to the modern purist’s definition: the creation of new knowledge rather than the imaginative presentation of the old. And find that to the formidable ensemble of deterrents to research enumerated above, we need to add yet another. Moving into the 1980s and early 1990s, faculty may have been attuned to allotting ever larger chunks of their time to R&D, but they couldn’t do it all themselves. Gone were the days when research could be a solitary undertaking, pursued by individuals immersing themselves in lifetimes of abstraction. It was becoming more and more a team sport; and especially with other commitments laying claim to your time, you needed people to help explore your ideas. The usual resources were post-doctoral fellows, doctoral students, and — to fill in a small gap or two — Master’s students. But along these alleys, too, there were roadblocks wherever you cared to look.

To take the last category first: the widely acknowledged difficulty was that the Institute’s M.Tech. programme was generally unable to attract students of the best quality. IIT-Bombay’s own B.Techs were going somewhere else with their scrolls; by far the majority of the Institute’s M.Tech. students were first degree holders from other colleges. The inability to attract its own B.Techs (or those from other IITs) to its postgraduate programmes was a handicap that was to dog IIT-Bombay all along. In its testament to the 1986 IIT Review Committee the Institute grumbled:

At the post graduate level, we have not been able to attract many of the IIT B.Techs though we get quite a few top students from other engineering col-
leges. In fact it is mostly the latter group which has been sustaining our postgraduate research. The career opportunities and incentives offered by the industry and other organizations for the M.Techs are not as attractive as they are for the B.Techs. Hence the student does not feel it worthwhile to get an M.Tech. Degree. The situation at the Ph.D. level is also not very satisfactory.

IIT-Bombay, along with the other IITs, was teaching its undergraduates too well for its own good. And there was no way of coaxing them into staying on.

Compounding the matter, whatever little research the Institute could have hoped to squeeze out of its Master’s projects was dealt a severe blow in the early 1980s when an entire semester was lopped off the two-year M.Tech. A Senate committee of the late 1980s, charged with examining and restructuring the programme, remonstrated, ‘Both quality and contents of the programme have suffered due to its curtailment to three semesters. Not only is there less scope for creative projects, both experimental and industry-sponsored projects have taken a back seat.’ This wasn’t all; the M.Tech. programme was being undercut by other troubles as well, experimental projects taking the hardest blows. ‘There has been a relatively greater build up and easier access to computational facilities,’ said the committee’s report, ‘so that project work involving pure computation becomes much easier to manage. Experimental work has lacked the status given to theoretical and computational work’ – and then came what must count as the most piteous lament ever sounded on behalf of experimentalists – ‘so that any one who dirties his hands is considered as belonging to a lower form of life.’

Echoing, and corroborating, the perceptions formed by postgraduate students presented in Chapter 11, the Committee decried the stepmotherly treatment meted out to them: ‘Postgraduates in most cases do not form an important part of the IIT population. The whole attention is on UGs, whereas PGs are left to fend for themselves. What expansion of our R&D areas can be expected if the main source of research are regarded as outsiders to the Institute?’

There are those who’d say these words ring just as true today.

Moving up the academic ladder, since the post-doctoral cadre wasn’t even a plan on paper then (and hardly exists in India to this day), the on-
ly real human resource on hand was the Ph.D. student. And there were worries aplenty here as well. Just as IIT-Bombay’s B.Techs disdained its Master’s programmes, its Master’s graduates disdained its Ph.D., hardly any staying back to feed into it. So grim was the situation that it inspired a wisecrack that started doing the rounds of Indian academia in the mid-1990s, describing the attrition by a ‘law of exponential decay’. The decaying quantity here was the talent present at the IITs as one went up the academic ladder from undergraduate to master’s to doctoral students. But the unkindest cut for the IITs’ academic staff was the jab that if the dipping curve were to be extended beyond the Ph.D., faculty at the IITs would represent the very dregs of academia: those who hadn’t managed to move on to better things at any stage along the way. Thankfully this proved to be no more than a dig, ungrounded in reality – most faculty the IITs managed to attract had gained their doctorates from some of the best institutions, both in India and overseas, and had chosen the academic calling for the love of it, not as a last, desperate resort.

Which brings us to one of the grouses most frequently aired by IIT-Bombay faculty: that they seem to be condemned for the most part to serve as ‘polishers and packagers’ of the raw material they receive. For its students, the Institute and its faculty had become little more than vehicles to better prospects, especially in academia abroad. Dr A. Mehra, of Chemical Engineering, finds it hard to hide his exasperation: ‘The IITs ended up producing a vast technically skilled force for the benefit of Americans largely – though a small minority has now started going to Europe – and it’s been just that and nothing else for a very, very long time. I used to joke that the American consulate sits too far off, they should open an office within the campus.’

The phenomenon of students moving on from their erstwhile haunts is of course quite common. Graduates of the best universities leave their stamping grounds behind after their courses of study, the chief impulse being the desire for a change of scene, and a wider horizon of experience and exposure. In the creamy layer of universities, however, this happens reciprocally within a self-contained circle, any particular university in the circle gaining as many good students from the others as it loses to them. Talent pools are thus sustained, and hybrid vigour acquired. For the IITs, though, there was no such reviving horizontal give and take. Their stu-
dents simply went abroad, and failed to be replenished by others of equal calibre from anywhere at all (not even other Indian institutions of equal standing). The net effect was a colossal struggle to polish the skills of students coming in from lower tier colleges, only to lose those students, too, to rosier prospects – thus condemning the IITs to be running perpetually hard to stay in the same place.

Indeed Ph.D. students were becoming hard to come by in general, whatever their lineage. Conditions in industry only amplified the problem, openings for doctorates being scarce. The Ph.D. was simply not a sound career option. Add to this the poor conditions for research at the Institute and the financial hardships Ph.D. students had to endure (noted in the previous chapter), and one can see why only the hardiest joined the programme. Dr K. Ramamritham, present Dean of R&D at the Institute, sums up the attendant obstacles: ‘One had in general not the best students and not the most strongly motivated ones coming in for the Ph.D. And to train fresh Ph.D. students coming in from the outside itself takes a year and more. Research output naturally suffers.’

Tied to the national scene, Ph.D. out-turn at IIT-Bombay showed little sign of improving over decades together. Around the mid-70s, the number of Ph.D.s graduating annually hovered around 50; as late as the mid-1980s, it was struggling to rise clear of the 60 mark; only in the mid and late 1990s did this figure ascend into the nineties (for 350-400 faculty all along). Sustaining the trend, the last few years have seen a sharp rise in the graph, the 100 and 150 marks being breached in quick succession, testimony to the Institute’s resolve to promote doctoral research preferentially.

**GROPING FOR THE HANDBRAKE LEVER**

Right from the time the IITs were fitted out, they were given several hats to wear. In the main, they were to turn out higher cadre engineers, to conduct original research, to help improve the quality of engineering education in lower-rung institutions, and to assist Indian industry in technology development; and it is to this last facet that we now turn.

Levels of industry interaction can partly be gauged through the volume of consultancy undertaken at the Institute. A cursory reading of the data from the early 1980s indicates that of the total funding for sponsored R&D
and consultancy (hovering around the Rs 1 crore mark), the bulk came from government agencies, with industry sponsorships contributing only some 10-20%. More importantly, most consultancy for industry was confined to calibration and routine testing of products and little was concerned with research driven technology development. Alarmed at the trend, the Institute in its response to the 1986 IIT Review Committee said:

Over the past few years IIT-Bombay has been discouraging calibration and routine testing (for routine testing faculty does not get any financial benefits) and is placing greater emphasis on creative consultations by faculty… Routine testing should be discouraged and eventually stopped.

We have seen how the IITs were taken to task during this period, by both governmental bodies and the media, for their poor showing in industrial orientation and technology development. Critics did realize, though, that it was unjust to fault the IITs alone. Industry, too, had to accept some of the blame; and there again, the problem was located on a complex historical canvas. Indian industry had grown in the shadow of colonial rule and the conditions imposed by it. All steps in industrial production – be it product design, process development, or fabrication of manufacturing equipment – were carried out abroad. Post-independence India saw rapid industrial growth, but no qualitative change along this dimension. Industry now operated under an umbrella of regulatory protection, continuing to import process know-how and machinery.

There can be few emblems of industry’s estrangement from in-house R&D more piquant than the car for which many people, including my father, had to wait ten long years before they could bring one home. The ‘licence raj’, and the myriad anomalies it had spawned, made sure that just three makes of car held sway on Indian roads for decades together:

e  IIT-Bombay Status Paper, 1984, op. cit., p.35. The Institute also went on to outline ‘two ways in which it could be done’: either by increasing testing fees to prohibitive levels, or escalating the Institute’s share from the income (as against the faculty’s) to the point that it would deter faculty from undertaking it.

f  ‘Since independence’, rued the 1986 IIT Review, ‘Indian industry entered into more than 6000 foreign collaboration agreements. They cover import of not only products, process know-how, and machinery but even trade marks and brand names. Very little investment is made by industry in meaningful R&D. Systematic efforts are rarely made to digest and indigenize the imported technology – or even to update it.’ Ministry of Human Resource Development, GOI, Report of the IIT Review Committee, 1986, Chapter 4, Academia, p.8.
the Ambassador, the Standard, and the Fiat. The Fiat, a 1961 model rechristened here the Premier, sported a truly startling design feature: its handbrake lever was so positioned as to be virtually out of the driver’s reach. It rested, first, on the very floor of the cabin; more astonishing yet, it lay on the far side of the cabin’s midline hump, down by the passenger seat. Which meant that when you needed it most, such as on a steep incline, there was little chance of being able to yank it. So far down and to the left did you have to swivel and bend that you lost sight of the traffic and, absorbed in the acrobatics, pretty much lost control of the car, too.

And the reason for this quaintness? Simply that the Fiat was imported from Italy, a left-hand-drive country, for whose motorists the lever did, of course, lie pat on the correct side. And its Indian manufacturer, Premier Automobiles Ltd. (PAL) hadn’t favoured the Indian public with the elementary adaptation of moving the lever 8 inches to the right – and never did in all the decades of local production. Till the day the Premier faded away, ousted finally by the dismantling of the licence raj, it sported exactly the same engine, body and chassis that its 1961 ancestor had done, sans innovation, sans indigenization or improvement.

What makes this technological stasis particularly mystifying is that even though PAL was based in Kurla in Bombay – a mere fifteen kilometres from Powai – it should never have made that short journey to seek IIT-Bombay’s expertise in the simple engineering needed for the adaptation. On second thoughts, perhaps it’s not so mystifying after all. PAL clearly wouldn’t have felt the slightest pressure to do so: in what was overwhelmingly a sellers’ market for cars, Premier was guaranteed to sell every sedan it made, and then at a good profit.

Premier’s complacency with their Fiat serves as a graphic metaphor for much of Indian industry’s disdain for local technology development until around the late 1990s. So inimical was the milieu for industry-IIT interaction that even those of IIT-Bombay’s alumni who took up careers in industry rarely if ever looked back at their Institute to strike up a technical partnership.

Two such alumni are Dr S.G. Kane and Mr P. Rele, B.Tech. 1966 and 1969 respectively, both in Chemical Engineering. We listen to the younger first: ‘There was no compulsion to develop products here,’ says Rele, who headed electronics major Aplab’s operations for a number of years.
‘It was much easier to sign up an agreement, take the trips abroad, bring a product, manufacture it here and sell it in a market where there was no competition.’ Vasi, who was one of those leading the microelectronics lab at IIT-Bombay at the time, ‘actually came and visited our facility but only out of interest, because it was microelectronics based, and because we knew each other. And we didn’t see a reason for striking up a collaborative alliance.’

Kane, who like Rele is a distinguished alumnus of the Institute, dissects the situation a stage further. ‘Industry was heavily governed by licensing. If I said, maybe I’ll rope in IIT to do something long-range together, and even if we did succeed in developing something, there was no guarantee we’d be allowed to manufacture it. Thus there was a lot of disincentive for industry to engage in collaborative R&D.’ The net result, in Kane’s view, was that Institute-industry interaction got limited to the ‘testing mode’, industry asking IIT-Bombay to analyze their samples and products, treating it virtually as a test laboratory (this constricted view of IIT-Bombay’s utility to industry is explored further in Chapter 18). ‘And that,’ says Kane firmly, ‘was all’.8

If industry’s sights were set on international tie-ups rather than local collaboration, IIT-Bombay’s faculty’s priorities, too, lay emphatically elsewhere. They revolved around publication in foreign journals, visits to international conferences, and teaching assignments in foreign institutions.12 ‘There is some reluctance on the part of research scholars and faculty members,’ noted the Institute, ‘to work on industry oriented problems. This may be due to their perception that theoretical and analytical work gives them a greater and surer academic recognition compared to their efforts in development of products indigenously.’13

8 The occasional creative measure aimed at boosting industry-oriented research, too, came a cropper. The Institute’s scheme of external registration for the Ph.D. was initially open only to IIT graduates, a constraint that was removed in 1973 to welcome those working in industry into the IIT-Bombay fold. By around the mid 80s the scheme had been around for a dozen years, over which time some 165 candidates had registered – but a mere 15 had managed to gain their degrees. ‘After the initial enthusiasm of sponsorship,’ ran IIT-Bombay’s disheartened analysis, in 1984, of the dismal record, ‘many of the candidates and their sponsoring organizations showed no sustained interest. This resulted in the waning of the standard of work and sometimes even total stoppage of further progress which has forced the institute to cancel registration in about 60 cases.’ IIT-Bombay, Status Paper in Reply to Questionnaire from S. Vedantam, 1984. This was in answer to Q. 5, ‘On Some Aspects of the Post-Graduate Programmes’, p. 22.
And so, although IIT-Bombay was favourably positioned to provide solutions to Indian industry and in turn profit from the interaction, sited as it was in the country’s richly developed western industrial belt, this synergy wasn’t fated to happen. All told, IIT-Bombay was as if functioning in a West-facing bubble, its growth and development unmediated by the Indian industrial and economic scene.

For IIT-Bombay’s academic staff there were other reasons, of a purely worldly nature, for according no great priority to industrial technology development. These stemmed from the question of which sphere of their endeavours would receive the readiest appreciation from their employer. Until recently, practically the only recognition extended by the Institute to its faculty has been professional promotion; in a rule-bound set-up, there was precious little top-up incentive a government organization could extend. Faculty were naturally tuned in most sharply to those attainments which would fetch them their promotions. It devolved upon each IIT, then, to lay down the ground rules for reward. Inevitably in an institute of science and technology, the question that rang out loudest was to do with measurement. Which contributions could be most robustly and objectively measured?

Until the early 1970s teaching, being the predominant activity, was the predominant criterion too, together with some weight for contribution to the Institute’s corporate functions; but this gradually made way for research. And there were two kinds of research in contention – basic and applied, the latter allied to technology development. The difficulty applied research posed was that it didn’t lend itself to objective measurement. Industry, because not engaged in forefront R&D, were in no position to offer challenging problems that might also result in research publications. And how was one to evaluate designs and prototypes for equipment, or get testimonials for them? The criteria therefore got narrowed down to basic research, measurable via journal publications. Witness the Institute’s own stand on the subject, voiced in 1984:

It is not easy to evaluate the quality of unpublished research – say developmental or applied research – unless its impact is directly observable through, for example, patents. On the other hand published work in ‘reputed’ journals is reviewed and thus attains a certain mark of quality.
The absence of a mechanism for rewarding good quality unpublished or unpatented work had, the Institute admitted, acted as ‘a deterrent to some faculty for not choosing ‘relevant’ problems for their work.’

With this, the die had been cast. If it was ‘esoteric’ research that would be rewarded, this was what faculty would try to do, no matter where their interests really lay, or what the hurdles in the way.

Which meant that another kind of research was dealt a hard blow: that connected with the development of technology customized for the vast Indian countrysides.

‘India lives in her villages’, Mahatma Gandhi had said; demographically, some 70-80% of India literally did until the 1990s. Precious little was done, however, to advance the antiquated technology the rural populace used for their agrarian livelihoods. With the IITs designated the nation’s fountainheads of technology development, expectant eyes turned in their direction once more, only to be disappointed. The 1986 IIT Review remarked on the lacuna: ‘Problems of rural relevance are generally seen now as separate from the technological scene but they should be seen equally as areas of application of engineering and science’, and went on to recommend ‘that the IITs should diagnose problems/needs of nearby rural community and work on their solutions through application of technology.’ They identified, among others, areas like ‘construction of rural roads of houses, water management or post-harvest operations, cooking or lighting or the running of village smithies or foundries.’

At IIT-Bombay, as at other IITs, development of ‘relevant’ technology of this type took a back seat for the usual reason: mechanisms didn’t exist to reward it adequately. Only a resolute few took up its pursuit. One of these was Dr A.W. Date, who joined Mechanical Engineering in 1973 (and went on in the 1980s to spend two years in outback villages to get a hands-on idea of the kinds of technology solutions needed there). The reason why, in his view, not many took this route was because ‘rural’ technology was generally looked down upon as low-tech, not lending itself to publications in flagship journals or the doors of opportunity they threw open. If someone did embark upon rural technology development, it was thought to be an emotional decision, not a scientifically pondered one. Date dismisses these perceptions as ill-formed, as does the younger Dr M. Sohoni, of Computer Science and Engineering, who has also taken up
the challenge of deploying technological know-how appropriate to rural conditions. They feel there are just as many technical brainteasers lying in wait, and ‘Eurekas!’ to be discovered, in this domain as in those considered conventionally to be hi-tech. Date recounts that while he found rural conditions to pose very noteworthy problems, the single most interesting part of the experience was that these were utterly unrepresented in technological libraries.

Date is of the opinion that at institutes like IIT-Bombay it has also been a matter of organizational anatomy. ‘You won’t find a focus for rural engagement,’ he says, ‘in our present structure. A rural technology problem is not a Mechanical Engineering or a Chemical Engineering problem, it’s just a problem-in-itself, requiring innovation cutting across several disciplines.’ And faculty in any one department can often be daunted by the breadth of expertise this demands. In 1985, the Institute did try to create a custom window for rural technology development – the Centre for Technology Alternatives for Rural Areas (CTARA). And here, the claim that research into devices and processes for rural use was incompatible with high-end R&D was at least partly refuted. Ph.D. theses done at CTARA, Date and Sohoni point out, have resulted in research publications in respected international journals.

Summing up, ‘We do have structures and mechanisms for rewarding excellence,’ says Date, ‘but not for rewarding relevance.’ He wonders, by way of example, if IIT-Bombay would ever officially invite developers of ‘low-tech’ solutions that have nonetheless revolutionized life for millions. (He picks for particular mention Dr Bindeshwar Pathak, founder of the Sulabh Shouchalya movement that has helped put public sanitation within easy reach on a massive scale where almost none existed previously.) If region-specific technology solutions are to succeed, therefore, they will need to be assessed on their own merit. And the Institute, for its part, will need to take a call on whether it supports and commends these genres of technology development as warmly as it does their standard counterparts.

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h Another perception proved misplaced was that IIT students were uninterested in engagement with rural problems – for a number of IIT-Bombay’s B.Techs have in fact bucked the trend and enrolled for their Ph.Ds at CTARA. Possibly, then, the earlier perception had more to do with the fact that such opportunities weren’t previously available in IIT-Bombay’s laboratories than with a universal indifference on the part of students.
Despite all of the above, the cupboard of IIT-Bombay’s achievements in technology development hasn’t been entirely bare. There is the Supercritical Fluid Extraction Plant designed to recover herbal fragrances and extracts of pharmaceutical utility, which was transferred to industry in 1998-99 for commercial deployment. When driving along Mumbai’s roads, one of the least inspiring sights used to be that of petrol stations, which bore a battered, seamy look, as if daring you to turn in and tank up. All that has changed now — and the slick, capacious look many of them wear today was set off by the Institute’s Industrial Design Centre, which designed the first of the new-look stations. A recent publicly visible success recorded by the same department is that ubiquitous symbol of old-world communication, the post-box. The new post-boxes, all plastic and stainless steel, will start replacing their half million steel progenitors found across the country today. An artificial arm developed first at IIT-Bombay’s laboratories in the 1990s is now finding gratifying deployment at the Christian Medical College and Hospital, Vellore. Lost to contemporary view are the many geotechnical surveys carried out in the early 1970s by Katti, of Civil Engineering, which culminated in earmarking the construction-worthy tracts that today go by the name of Navi Mumbai. And faculty today are increasingly engaged in ‘real-world’ projects across a spectrum of areas. Widely visible success stories of this kind are admittedly small in number, but may act as beacons for the future and could do with being showcased wherever they can.

**Graph Ascendant**

We’ve seen in Chapter 10 how, in the 1990s, a clutch of synchronous developments, breaking the stranglehold of inclement conditions and low morale, at last set IIT-Bombay firmly on the road to research. First, many of IIT-Bombay’s first generation faculty, inactive in research either from choice or from force of circumstance, retired, and were replaced by a crop who had been screened for their commitment to research. Second, for these latter recruits, conditions for R&D were steadily, if not dramatically, improving. On the national scene, economic liberalization 1991 onwards ushered in better financial health all round, translating into far better funding for IIT-Bombay, both intra- and extramural, and the elimination of a
host of procedural obstacles (though several procedures still remain cum-
bersonsome). Third, mid 1990s onwards, steered by Sukhatme and Misra, 
IIT-Bombay started both to demand research output from its faculty, and 
to take steps to facilitate it, reinforcing the research climate all round.

In recent years all trends and indices point to an upswing in research, 
and to happier prospects in store. These include – to start with the most 
basic resources for research – the reversion of the M.Tech. to its two year 
version, and a healthy increase in the subscription to this programme. 
Today, close to 600 M.Tech. students enroll every year, as against half that 
number in the early 1990s. More significantly, Ph.D. enrolment and out-
turn have both registered smart climbs, being close to 250 and over 150 
respectively in 2006-07, as against around 80 and 70 in the early 90s. The 
Institute for its part has been more willing than ever to invest in its doc-
toral students, for example by way of providing greater support to attend 
conferences overseas. In parallel, the mosaic of intramural initiatives on 
Thrust Areas, Central Facilities and Cross-Disciplinary Research Groups 
have helped percolate the benefits of the Institute’s newfound prosperity 
to a wide range of faculty and students.

Other indicators of the Institute’s well-being in R&D also show en-
couraging trends over the last 15 years or so compared with the first 35, 
signalling a shift of inner ethos. Funding for research, noted in Chapter 
10, rose sizeably every year mid 1990s onwards. Coupled to this has been 
a steady rise in the number of research publications emanating from the 
Institute – and in that somewhat intangible quantity, IIT-Bombay’s ‘pres-
ence’ on the R&D map, especially in the form of recognition notched up 
by its faculty. Until the mid 1990s, for instance, IIT-Bombay boasted just 
three Bhatnagar award winners among its 400-odd faculty – and the last 
among them had been felicitated in 1983. Mid 90s onwards, in contrast, 
there have been six more, trebling the number to nine. When the DST’s 
Swarnajayanti Awards were introduced in 1997, the Institute recorded im-
mediate success, and now has six recipients. On other fronts, around 20 
faculty have won ‘Young Scientist’ or ‘Young Engineer’ awards, and up-
wards of 50 have been conferred Fellowships of National Academies of 
science or engineering – with much the larger part of these tallies, too, 
having been run up in the last decade and a half.
What these figures essentially say is that IIT-Bombay can now claim to have a robust presence on the national science and engineering scene. On the international scene, the Institute’s visibility can be said to be limited but slowly growing – mainly by way of papers published by faculty in respected journals and their inclusion on some of their editorial boards, through chairing sessions at international conferences, and being called upon to give invited talks. These indeed are the elements that will need to be built upon and ramped up in order for the desired end to be achieved – which is for IIT-Bombay to start cropping up in people’s minds as a notable performer in research.

Improvement along a separate axis is reflected in the magnitude and flavour of collaboration with industry. The rise to prominence of the ‘IIT Brand’ in the late 1990s caused industry to sit up and take notice; they started seeing IIT-Bombay as a storehouse of expertise, talent and infrastructure that could well provide solutions to their R&D questions. Industrial consultancy has become, as a result, progressively more research oriented and sophisticated, with multinational majors sponsoring laboratories and students at the Institute for high-end research. This may finally, if the Institute continues to play its cards right, betoken an end to the days when industry used to see IIT-Bombay as no more than a glorified ‘testing laboratory’. The proportion of faculty active in research is also steadily on the rise, and the office of the Dean R&D has been doing what it can to facilitate their work. Procedures have been streamlined; a number of awards instituted for quality and productivity in research, both basic and applied; and several ancillary incentives have been drawn up to amplify the benefits of being active in research.

Over its first five decades, significant achievements in IIT-Bombay’s research enterprise – whether basic or applied – were like a mirage that kept receding out of the Institute’s reach, for a host of reasons. In this mesh of cause and effect, the impression that crystallizes is that every node in the mesh – the Institute, government, industry, and people including the Institute’s faculty and students – could each claim in some way or other to be a helpless victim of circumstance, and with good reason too. The net effect was to rob the Institute of the synergy so vitally needed between its three broad functions – education, research and extension – to become
a lead player in R&D, particularly of the kind envisaged for an IIT. The synergy that had for so long been missing, has in recent years gained a good bit of ground. Today, therefore, the Institute can entertain hopes of extending the excellence it has achieved in its classrooms over into its research laboratories, winning for itself the status of an acknowledged hub of R&D. Although many auguries on this front are heartening, the measures the Institute will need to take in order to translate them into reality are numerous and challenging, and will govern the extent to which its ambitions are realized.
It may sound trite to begin a chapter so titled with a truism of the type ‘Freedom: who doesn’t cherish it above all things?’; equally, it feels an omission not to say it at all. Not as trite perhaps is the idea that next to the gift of freedom, what matters crucially is the use to which its is put, to what ends and with what sense of responsibility: ideas upon which these pages will dwell.

We have seen how IIT-Bombay wavered, in its formative years, between distinct modes of operation available to choose from, before gradually reaching an equilibrium agreed upon by its early architects. Two traits of functioning can be seen to have animated this evolution. One was the gift of autonomy, which IIT-Bombay seized upon with zeal, imparting to its academic offerings their own distinctive stamp. The second was the advent of a style of vigorously participative functioning that offered a fairly level playing field to its academic constituents, starting from the individual and moving up to research groups and departments.

These characteristics – autonomy and participative governance – have been cornerstones of IIT-Bombay’s operations ever since, and central to the vitality those operations have enjoyed. Yet they are blessings that can by no means be taken for granted. The former, in particular, has been continually under pressure, if not under open threat. But before moving on to the ways in which autonomy at IIT-Bombay has both been exercised and infringed upon, a brief detour into the structures that embody it; for, tedious though the contemplation of structures often is, much of the Institute’s autonomy is a direct outcome of its administrative scaffolding.
IIT-Bombay’s governance framework consists essentially of three regulatory bodies and a cluster of individuals. The bodies are the Council of the IITs, the Board of Governors of the Institute, and its Senate; the individuals include the Director and Deputy Director backed up by a Registrar, an array of Deans, and the heads of academic units. In the IITs Act of 1961 and the Institute’s Statutes are spelt out the roles of these entities.1 Up at the top is the IIT Council, an apex body that concerns itself primarily with broad policy matters. Chaired by the Minister of Human Resource Development, the Council includes the Chairmen of the Boards of Governors of all the IITs as well as their Directors; it makes for a useful cushion between the IIT system and the government. The Council lays down policies applicable to all IITs. By way of example relevant to this chapter may be cited one of its most far-reaching and visible actions: that of decreeing from time to time the durations of the IITs’ B.Tech. and M.Tech. programmes.

Nothing less will do: The overriding importance of autonomy, as viewed by IIT-Bombay’s first Board of Governors, is vividly captured in this extract from a Board Meeting of April 12, 1961. The statement was instigated by a draft note prepared by G.K. Chandiramani, Ministry of Education, setting out the powers for the proposed central body of the IITs (here termed the “IIT Corporation”, later to become the IIT Council), once the IIT Statutes had come into being. This draft was considered by the Board in their 13th meeting and their response doesn’t mince words on the importance they attached to independence in all matters academic.
At the institutional level, IIT-Bombay is overseen by its Board of Governors. The IITs Act states that the Board is responsible for the 'general superintendence, direction and control of the affairs of the Institute'. It is thus the single most important body so far as IIT-Bombay’s day to day running is concerned. Moreover, it is the thoughtfully wrought composition of the Board – and of the Senate – that has predicated the considerable independence and robustness of functioning the Institute has enjoyed. Consider the Board. The one feature that stands out in its make-up is that although the central government meets most of the financial needs of the Institute, there is no government representative on the Board present in an ex-officio capacity. Since the final authority for all matters academic rests with the Board, the Institute is in principle free to select, without governmental interference, its teachers, its students, the courses they follow and the nature of its examinations. And, as one commentary puts it, ‘The Central Government had adopted a wise policy in not being associated with the Board of Governors’, adding that ‘the composition and functioning of the Board are crucial and can spell the difference between success and failure for an IIT.’

For the academic work of the Institute, the Senate is the sovereign body. In it is vested control and responsibility for maintenance of standards of education, the framing of curricula, programmes and courses, and the conduct of examinations. The Senate is mainly constituted of the professors of the Institute; the Director is its Chairman. ‘The ex-officio membership of all professors,’ reflects Dr P.P. Kane of Physics, ‘eliminated the undesirable consequences of elections that are noticeable in the functioning of academic bodies of some universities.’ Also included are a small number of outstanding persons from outside the Institute whose ‘valuable experience and advice is thus available to the Senate without the possibility of outside domination.’

The Board’s Chairman is invariably an eminent scientist or industrialist nominated by the Institute’s Visitor – the country’s President. The Institute’s Director is a member on the Board, and the Registrar its secretary; from within the Institute the Board also includes two professors nominated by the Senate. Besides this, there are four experts in the domains of education, engineering or science nominated by the IIT Council, and one nominated by the government of each of the states in the Institute’s purlieus: Maharashtra, Madhya Pradesh and Gujarat.
**The Exploration of Latitude**

We’ve seen in Chapter 7 that one of the facets of the Institute’s work that left the deepest impression on a mid-sixties faculty entrant – Dr S.P. Sukhatme – was the autonomy of functioning, especially in the academic sphere such as formulation of course content, styles of instruction, and student evaluation. To which another of Kane’s musings is an apt supplement: ‘There was no rigid syllabus set down by an outside body. Rapid responses to changes in knowledge-base and emphasis were thus possible. All this I think did help us in evolving and developing good academic programmes. This feature of academic work in the Institute is now taken for granted by its students and is also highly valued by its teachers.’

The rapid adaptability and flexibility made possible by the Institute’s academic autonomy didn’t escape the notice of a UNESCO observer, who in 1966 wrote:

> Once admitted to the institute a student may find his studies leading into new paths, for the undergraduate course programme has undergone continuous modifications. Experience gained in presenting one course or another has often prompted the initiation of new courses either as logical extensions of the existing courses or as essential background material.

An example of this interplay, encountered in the previous chapter, is the introduction in the mid-1960s of symbolic logic in her Humanities course by Mrs N. Swamidasan at the urging of Prof. J.R. Isaac of the Computer Centre; and for any such example noted here, one can be sure there will be scores of others in the Institute’s pedagogic treasury.

Students were the direct beneficiaries of the flexibility; alumnus Dr S. Ramani was an early example. Having done his M.Tech. from IIT-Bombay in 1964, he wished to enroll in 1966 for a Ph.D. on a computational topic, but as an external candidate. There were hurdles. For a start, he was already working at the TIFR and knew that, because it possessed a superior computer, most of his doctoral work would need to be done there. Moreover, external registrations hadn’t yet been formalized at IIT-Bombay. He recalls gratefully how Profs Bedford and Isaac, of Electrical Engineering, ‘pushed it through IIT-Bombay’s Senate’ at short notice, enabling his enrolment, and thereon left him free to explore his ideas at TIFR, ‘not holding on to me although I was registered at IIT-Bombay.’ Having benefited already
from similarly supportive gestures during his M.Tech., Ramani is moved to say, ‘Without this informality and flexibility, and all the trust, warmth and encouragement shown to students like me, I don’t know how my life would have shaped up.’ (As it happened, Ramani’s career shaped up splendidly; he was on the founding team and then Director of the National Centre for Software Technology in Pune, and went on to head the Science and Technology Labs at Hewlett Packard India. One commentary has called him ‘the father of internet networking in India.’

The comprehensive reconstitution of the Institute’s curricula in the early 1970s is another outstanding example of the zealous use of academic autonomy. Indeed it was cause for such profound satisfaction that, when I asked colleagues if they could single out an interval in the life of the Institute they felt was particularly vibrant, one unhesitating response was: “There were moments in 1972 and 1973, during the revision of curricula, when I felt particularly happy because IIT-Bombay was showing what could be achieved by dedicated faculty if they used academic autonomy well.”

Academic freedom has also helped kindle the vital faculty that has enabled the introduction of novel, imaginatively framed programmes along the years: laterality of thinking. To take but one example – this from the 1980s – the postgraduate programme in Biomedical Engineering, flagged off in 1989, was unique in the country in admitting students from a remarkably wide range of backgrounds, including engineering, the physical sciences, the biological sciences and – most unusually – medicine. Equally eclectic has been faculty composition here, staff with first degrees in engineering, medicine and basic sciences all working under one mantle. Such latitude in student intake and faculty expertise would be unthinkable in most university setups to this day, where admissions and appointments tend to be confined to holders of degrees in the same discipline. And it brings to vivid life the broadest interpretation of academic autonomy: the freedom to choose who will teach, whom to teach, and what to teach.

It’s safe to say that flexibility of precisely this kind has enlivened the interdisciplinary programmes at the Institute, many of them launched in the 1970s. From more recent times we have the examples of the Schools of Management and of Information Technology. Also in the last few years IIT-Bombay has seen a slew of novel integrated programmes being launched – an M.Sc. dovetailed into a Ph.D. here, a B.Tech. into an M.Tech. there,
crafted to suit a spectrum of needs and tastes. Autonomy has clearly been indispensable for adaptive functioning, rendering the Institute alive to evolving trends and agile in aligning itself to them. It would be superfluous to try to describe, then, just how profoundly cherished autonomy of functioning has been at IIT-Bombay, and how dismayed those who’ve savoured its charms have felt when, from time to time, academic independence has been threatened or eroded: twilight zones into which we now tread.

**AN UNFORTUNATE, GROWING TREND**

In the mid-1980s, the second IIT Review Committee was compelled to record, on the strength of the evidence before them, that ‘a common perception of all IITs is one of interference with their autonomy by the Ministry’.

At first, in light of the preceding sections, one may wonder on the provenance of such a perception. An IIT’s Senate is truly autonomous; its Board of Governors is free from direct governmental representation; and as for the IIT Council, though there is governmental presence, it is slight against that reserved for academia.

But interference there has been. In broad terms, as also chronicled by the 1986 Review, it has taken the form of the bureaucracy in the Ministry shaping decisions that affect the IITs, securing ministerial approval for these decisions, and issuing peremptory orders to the Institutes – without inviting their participation or opinion. (From here on, IIT-Bombay’s experiences will be melded into those of its sister institutes, since policy decisions have affected all equally.) In addition, there were several attempts to force the IITs’ hands on specific issues. Incidents of these kinds prompted IIT-Bombay to say, in its deposition to the 1986 Review Committee:

> Unfortunately, there is a growing trend towards reducing the freedom of action of the Institute. While this may seem desirable in the short term, it will in effect lead to erosion of the working and smooth functioning of the IIT.

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b There was the case of a student who, on the verge of being sent down for poor performance, was readmitted under pressure from the Ministry (no coincidence that the student’s father was an officer of the Cabinet Secretariat). Likewise, Members of Parliament were known to have written to the Minister urging the reinstatement of a student or pleading the case of an employee. Documented in the Report of the IIT Review Committee, 1986, op. cit., Chapter 6: Governance and Management Structure, pp. 79-80.
As the degree of autonomy is reduced, the need for taking decisions on one's own is also reduced and there is a tendency to pass decisions on to higher authorities. In the case of IITs, this could be disastrous.7

Twenty years on, things hadn’t changed materially. The Institute felt obliged again to remonstrate, in its evaluation submitted to the 2004 IIT Review Committee:

Across a wide range of actions – academic, administrative and financial – the Institutes are simply required to comply with the directives of the Supervising Ministry, irrespective of whether the issues are of strategic nature or purely operational. There are several examples to support this. While there is no denying that as centrally funded [organizations], the institutes have a high degree of public accountability, it is critically important to examine whether this calls for so much control and supervision of the Institutes by the government.

Many shackles on autonomy are implicit, nested as they are in the labyrinthine government rules to which IIT-Bombay has been bound. Up until the 1990s, the Ministry’s permission was required on the smallest of initiatives faculty took, even if purely academic in nature: such as whether they could receive grants from foreign academic foundations, or if they could travel abroad, or if their counterparts from overseas could visit their labs or departments.

While such regulations in themselves repressed academic vitality, they impinged mainly on the efforts of individuals and departments. Possibly the greatest shock to the IITs’ academic rubric came in the early 1980s, when their flagship programmes were clipped: the B.Tech. from five years to four, the M.Tech. from four semesters to three. The abbreviation was universally felt to have dampened the vigour of the programmes; it was seen also as a serious infringement by the Ministry on the Institutes’ autonomy. On the cropping of the B.Tech. programme, we have this icy look-back by Drs P.V. Indiresan and N.C. Nigam, both former Directors of IITs (Madras and Delhi respectively):

This was done against the unanimous view of the IIT Senates, and has resulted in the reduction of the core programme and erosion of science teaching – a key feature of the integrated curriculum proposed in 40’s. Its impact on the curricula has been profound – generally to their detriment. Besides aca-
demands, the decision to change over to a four year programme to fall in line with other engineering institutions in India, is a set back to the special status and academic autonomy of the IITs.8

And halving the duration of the M.Tech. project couldn’t but severely impair its output. The projects became unproductive, abortive; and this primed them for qualitative change of another kind. Over the 1980s, computers became progressively more powerful and affordable, and offered a tantalizing alternative to the multiple adversities of experimental research. Despairing of being able to conduct successful experimental M.Tech. projects in the time available, more and more faculty switched over to framing computational problems that offered logistical simplicity and easier returns: a trend that was to skew the complexion of R&D at the Institute.

The decision to shorten the programmes was defended in these terms:

Erroneous notions about powers had also given rise to a feeling of erosion of autonomy. For example the IIT Council alone has the power and not the Senates for fixing the duration of courses ... In all these cases, there was adequate participation by Senates of IITs but authority for decision-making was with the Council.9

But this argument cuts little ice. The central question here was not whether the provisions of the law allowed the imposition in question, but whether the decision should have been taken against the IITs’ wishes, given their status as autonomous institutions. Statutory sanction does not automatically render a decision tenable on all counts. Had the IITs’ academic autonomy been respected, the statute in question could have been amended and the Institutes allowed to be masters of at least their own academic fortunes.

Much to the IITs’ relief, better sense was to prevail on one of the programmes, the M.Tech.: twenty years later, in 2002, it was restored to its 2-year version. The B.Tech., however, hasn’t yet enjoyed any such revival of fortunes; and for all such decisions, the IITs remain at the mercy of governmental thinking – and all the extra-academic compulsions that attend it.

Such alleged compulsions have resulted in interference also at the entry point for the IITs, their Joint Entrance Examination (JEE). In 2006, the IIT-JEE was changed from an exam that had once contained pure-
ly analytical (the so-called ‘subjective type’) questions, to a single, purely objective type paper (the JEE’s fortunes will be tracked more closely in Chapter 17). The change, promulgated by the Ministry, provoked outpourings of concern at the Institute. Not only was it seen to be academically regressive, it had been executed against the wishes of the IIT community (at least those of the IIT-Bombay faculty). Dr R. Varma of Physics remembers IIT-Bombay’s Senate having debated the wisdom of the objective type questions and ‘rejected it on the grounds that it does not test the ability of the student.’ Dr K.D. Joshi of Mathematics similarly recalls the change being vehemently opposed when it came up for discussion in IIT-Bombay’s Senate. And Dr Dipan Ghosh of Physics concurs that ‘the objective type of question paper was thrust on us by external forces’ – reactions that establish this move as another instance of infringement on the IITs’ academic autonomy.

Heavily dependent as they are on state funding, the IITs have never enjoyed any great financial autonomy, and have had to bow to the clumsy and unyielding codes of financial conduct drawn up by successive governments. Before 1993, for instance, the Institute was forbidden from retaining any portion of its governmental grants towards a fiscal reserve. Then mid-1990s onwards, the IITs were permitted to create their Corpus Funds, encouraging them to build up a financial bulwark and achieve a degree of self-reliance. But in 2002, just when these corpuses were starting to blossom, the Institutes were instructed to limit their holdings to Rs 25 crore each; and ministerial money could no longer be diverted into the corpus.

The very next year, in 2003, came the most glaring attempt to trample upon administrative and financial autonomy: in the shape of the Bharat Shiksha Kosh formed by the government. The promulgation prohibited alumni and other benefactors from passing on their endowments directly to the IITs. They were enjoined instead to route them through the Kosh. This sparked off a major controversy; the IITs were unable to see any good in the Ministry’s plans. Alumni for their part, including some of IIT-Bombay’s, reacted to the idea with cutting derision. ‘It is the most asinine thing I ever heard in my life,’ Kanwal Rekhi, lead donor for the School of Information Technology at IIT-Bombay, was reported as saying. ‘Donors are making voluntary gifts because of emotional attachment or commitment to the institutes. They will not hand out money to a name-
less bureaucrat or a feckless politician.’ When asked if he’d consider giving donations in future, ‘Absolutely not!’ he retorted. ‘You can kiss the donations goodbye if the BSK happens. This will kill the golden goose.’ (For the record, the Ministry, confronted with an outcry as massive and indignant as it grew to be, did a speedy about-turn the very next year, repealing the Bharat Shiksha Kosh. It had been a close shave for the IITs.)

INVITATIONS TO INFRINGEMENT

Several sectors of the IITs’ autonomy, it’s evident, are hotly contested terrain; on what counts does the government feel it fit to intrude and interfere? Possibly the most frequently advanced reason is the one that invokes ‘national interests’ and ‘accountability’. Here’s a sample, put forth in the 1986 IIT Review report:

IITs are not completely divorced from the society. They are being watched by the Parliament … It must also be realized that accountability goes with autonomy and the IITs are accountable to the Parliament and the people through their Council, whose decisions cannot be considered an infringement of the autonomy.

Like its sibling of a few paragraphs ago this argument, rhetorical stone-wall that it is, fails to impress. Perhaps more convincing than the ‘national interests’ argument is the contention that the IITs have been inviting infringement of autonomy by some of their own actions. Specifically, the Institutes from time to time have worked at cross purposes between themselves, creating unpalatable annoyances for each other—and for the government; and which government has a taste for gratuitously inflicted headaches?

The root of the problem lies in the high degree of freedom enjoyed by the respective Boards of Governors of the IITs, allowing any given Board to take decisions that may favour its own Institute but affect adversely the morale of other IITs, ‘creating problems for them and financial commitment for the Government’. To cite a few instances: an IIT awarded a B.Tech. (Arts) to students who could not complete the full programme satisfactorily; likewise, another IIT enhanced the scholarships to its post-graduates, resulting in strikes in the other institutes over the issue. Then
again, one of the IITs unilaterally implemented promotion schemes for its employees before the IIT Council so decided; this again caused unrest in the other Institutes.

Government could justifiably claim, therefore, that to obviate unrest arising from the dissonant actions of the IITs, it needed to keep the Institutes on a tight administrative leash: the IITs’ autonomy ‘could not be absolute’ and ‘had to be moderated’. Viewed from another angle, the sisterhood of the IITs, while doubtless affording strength in numbers, also stands to become a liability every now and then, as when any one Institute gets carried away by the spirit of ‘friendly competition’, spelling unease for all. As an antidote to the tendency, the IITs’ Directors took to meeting periodically on their own so as to iron out differences in approach and bring about coherence of thought and action. IIT-Bombay Directors both past and present, Sukhatme and Misra, have spoken warmly of how very useful these conclaves – the ‘Directors’ Meetings’ – have proved to be in charting collective action by the IITs and smoothening their inner governance.

Every bit as deserving of contemplation as the autonomy exercised by the IITs is that part of it which has been left unflexed. The 1986 Review Committee’s view on this point is telling: ‘Whilst on the one hand the IITs emphasized the need for absolute autonomy and non-interference by the Ministry, on the other hand many pointed out that IITs are not able to utilize even such autonomy as they have’. On seeking the reasons for this charge, one discovers that although the IITs are widely accepted to have utilized autonomy to the hilt on academic matters, they’ve been found wanting in its exercise in other domains. The Review ran on: ‘The acceptance of government rules in toto is the cause of much of the rigidity felt by the academics. The IITs could have over the years framed their own rules but they did not do so. Likewise many of the Statutes need revision in the light of experience.’

The revisions, however, failed in most cases to happen. Examples are most notable on two fronts: financial rules, and personnel management. As in any other autonomous institution funded by government, one of the greatest problems related to autonomy in IIT-Bombay is the rigidity of the financial rules the Institute has to abide by. The 1986 Review, however, assured the institutes that many of their financial procedures were amenable to being tailored to suit their own specific needs. Technical Institutions
like IITs,’ advised the Review, ‘need not be wedded to the rules of the funding organization.’ Asserting that ‘in all autonomous bodies there is provision for them to frame their own rules’, they pointed out that such institutions adopted government financial rules merely as the safest course.

And this subscription to the ‘safest course’ resulted, soon enough, in adherence to archaic, rock-hard rules inimical to the very spirit of research. As Dr Dipan K. Ghosh of Physics says, ‘The Statutes are a directive of the Ministry; they can be changed via suggestions from the Board. I think it’s a matter of the Directors of the IITs jointly making up their minds on this and representing to the Board the urgency of the reforms.’

In the realm of personnel management, the one deficiency in governance that stands out is that of career advancement. Virtually the only avenue for rewarding faculty performance at the Institute has been professional advancement by way of promotion (of late a basket of awards has also been assembled, but these don’t pack anywhere near the same psychological punch). An oddity that has often come in the way of faculty contentment is the ritualistically complex process to which they’re subjected when they present their credentials for promotion. In practice, IIT-Bombay faculty can only apply for promotion against an open advertisement, in response to which anybody else of suitable academic weight may also apply. It’s as if the Institute’s faculty are being recruited afresh to the next post rather than being promoted, and pitted against external competition to boot. If they cross the first filter – that of being summoned for an interview – they need to present their work before their peers and are then interviewed, often by elaborately constituted selection committees which then judge whether they’ve earned themselves the higher honorific.

The whole process is as if carefully designed to be fallible. To see why, you need only put yourself in the shoes of a contender who is ‘nearly ripe’ for promotion – but not quite – at the time a particular open advertisement appears. So you don’t apply. You do meet the criteria soon thereafter, but until the next advertisement appears you simply cannot apply. And if this is delayed by, say, two or three years (as has occasionally happened), you languish in limbo for that entire duration. Then when those years

c Currently IITs predominantly follow rules and regulations of the Government of India for their administrative purposes,’ averred the Review, ‘They should evolve procedures suited more to their needs.’ Ibid., p.85.
have passed, there is still no guarantee of promotion: if you have a bad day at the interview, for instance, or if the selection panel isn’t for some reason the most favourably disposed towards you (as has also happened), you might easily be held up again – until the time for the next advertisement.

Ghosh judges the process ‘extremely faulty’, asking, ‘How can we let a half-hour interview decide whether someone qualifies to be a professor or not?’ More witheringly, he says that in pitting faculty against external candidates (ostensibly in the interests of unprejudiced comparison), ‘we are deceiving ourselves. This is never correct… I think we need to totally decouple the process of promotion from the process of fresh recruitment.’

There is also the question of the criteria for promotions, which have customarily been drawn up in ad-hoc ways for each round of interviews, and communicated to faculty only informally. Dr A. Mehra of Chemical Engineering speaks for many when he says, ‘Faculty promotions are the one thing that can mar an otherwise satisfying professional existence at IIT-Bombay. I feel it necessary to point out to new colleagues that in this domain, they may not be assured of timeliness and fairness. The Institute really has to work out a better structured process to minimize disheartenment among its staff.’

The present system, then, is manifestly no recipe for the psychological well-being for those who have to run its gauntlet. The Institute, too, has suffered: which disenchanted employee is likely to give of his best? What is particularly disturbing is that nothing has been done, over decades, to set right the flawed process – when it has been perfectly possible to do so. Some changes, for example, do not require amendments to the Statutes before they can be implemented. The existing clauses, if interpreted creatively, already provide room for case based (rather than advertisement-driven) faculty promotion, as borne out by this extract:15

All posts at the institute shall normally be filled by advertisement but the Board shall have the power to decide on the recommendation of the Director that a particular post be filled by invitation or by promotion from amongst the members of the staff of the Institute.

It’s simply a matter of entrenched custom, therefore, that the Institute does not normally do something allowed by the Statutes, which is to recruit to a particular post by promotion rather than through advertisement.
Practices for promotions could have been different all along but weren’t made so, and IIT-Bombay has to accept its share of blame for tardiness in reforming a perfectly reformable process.

If dissatisfaction among faculty about the Institute’s style of ‘personnel management’ has been appreciable, among the Institute’s support staff it has been rife, and has engendered deeper grievances still.

Along with its academic functions, IIT-Bombay was given the charge of ‘running’ its campus: its own water and electricity supplies, drainage and roads, gardens, hospital, and so forth. For each of these the Institute required staff; ‘support staff’ were also needed for the library, academic recordkeeping, and general administration. Soon enough, these ranks of staff came to outnumber the Institute’s faculty several-fold. None would doubt that their commitment to the Institute’s cause is a key pre-condition to the realization of its ambitions. Yet over the years, scant attention has been paid to enthusing them to work to the best of their potential. A direct means of motivation would have been the standard one: career advancement via promotions. Indirect incentives might include opportunities for on-the-job training, performance rewards, and a sense of participation in running the Institute.

It turned out to be virtually impossible for the Institute to provide adequate career paths for the large numbers of support staff on its rolls; this persisted for many years as the single greatest cause for disheartenment IIT-Bombay’s non-faculty staff had to deal with. Things weren’t helped along by the fact that career advancement schemes are usually central government driven, mediated through the IIT Council. Indeed if any one IIT heeds its own instinct in the matter it can end up, as indicated above, creating more problems than it solves. These factors rendered IIT-Bombay to a large extent helpless; but collectively among the IITs, too, little thought was given to ladders of promotion. Many years into their existence, a so-called ‘personal promotion’ scheme was introduced – which simply took staff to a higher salary scale after a number of years on the job. But ‘advancement’ of this form could hardly substitute for the joys of job satisfaction.\(^d\)

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\(d\) The career advancement bottleneck can only be addressed by a comprehensive review of the cadre structures of the non-academic staff in the IITs – for which IIT-Bombay, along with its sister Institutes, will need more autonomy of action. This was recognized by the 2004 IIT Review, which prescribed ‘greater freedom to be given to the IITs in terms of non-academic staff structures’. 
Though IIT-Bombay’s hands were tied where it came to creating new cadres or rungs for promotion, there were other avenues along which it could have helped matters, but didn’t. The Institute never did much towards opportunities for on-the-job training, a failing which has predictably bred stagnation and disgruntlement. And awards? When asked if there were enough mechanisms in existence to reward support staff, one of the officers of the Institute, former Public Relations Officer Aruna Thosar Dixit, said (and her tone can be gauged from her words), ‘I don’t think there are any reward mechanisms. None whatsoever. There is no recognition unless at a personal level some immediate head of section may commend you. But there’s no systematic mechanism, either by way of promotion or work related bonus.’ Her views are echoed by pretty much any member of support staff one chooses to ask – or for that matter any faculty sensitive to their needs.

Meanwhile, awards for faculty have proliferated over the last few years, endowed both by the Institute and by alumni. Governmental agencies, too, come up with a new scheme every now and again to reward scientific or technological accomplishment. Seeing the gulf widen before their eyes, non-academic staff have had good cause to feel discriminated against and neglected. Dr D.B. Phatak is one of those anxious to alleviate such sentiments. ‘Today IIT-Bombay has an opportunity of rushing forward – but we need to take faculty, students and staff together. My emphasis in this Golden Jubilee year is to create a corpus from which we’ll be able to give sizeable cash rewards to staff who perform.’

‘FREE AND FRANK DISCUSSIONS’

Having branched out for a while into the byways of staff management, we return now to governance: and to the second of its defining traits, at IIT-Bombay, over the decades. In the days of their infancy, IIT-Bombay’s academic activities flourished in their freedom from external constraints; and they drew equal strength, internally, from a model of widely participative governance. Some of IIT-Bombay’s early ‘catches’ were lured by this very prospect, one such catch being Dr P.P. Kane of Physics. Astute and trenchant tracker that he has been of the Institute’s evolution, we turn to his testimony once more.
In July 1958 Kane returned to Bombay from the US holding offers from both IIT-Bombay and TIFR, and needed to choose between the two. TIFR was relatively well established already, having been in existence for nearly 15 years, and to Kane ‘it wasn’t clear that joining IIT-Bombay would be better’. What decided him was the allure of newness at the latter. For him, ‘the organization at IIT-Bombay at the time was rather suitable for a young recruit.’ The Institute was still in the first year of its operation, there were only two full Professors, the rest were junior faculty. ‘There were essentially a large number of young people, at more or less the same level. It wasn’t a top down arrangement and it seemed better suited to my nature than the TIFR, which already had its hierarchies in place.’

Though he was in fact to encounter other forms of institutional hierarchy, such as the arrogation of supremacy by the engineering departments over the sciences, his hopes weren’t belied, and he has recorded his profound appreciation. ‘Free and frank discussions among faculty,’ he remembers, ‘led to a rapid evolution of academic course structures. This was very unusual for an Indian institution at the time. The university structures were very different. They did not allow this type of participating implementation. The administrative structure here was also fairly democratic.’

Time and again has this exact sentiment been reprised by those who joined the Institute in its early days, expecting something along the lines of the universities of the time, only to be pleasantly surprised by the open, accepting governance structures here. And as seen in Chapter 11, attitudes in these formative years might have been rather traditional, but there was one crucial difference. In the words of Dr A.K. De, ‘all the departments of science and engineering functioned within a framework where academic decisions could be a matter of in-house debate with a short time lag. Because of this academic innovations were possible, and academic freedom was ensured.’

Yet for all its virtues, broad based participation has at times been seen to come in the way of efficacy of functioning. Consider this plea to the 1986 IIT Review Committee, commenting on the constitution of the Senate:

When it was envisaged in 1961, it is likely that the framers felt that the number of Professors at the Institute would be small. However… At the moment there are about 150 Professors. As a result the Senate has now become un-
wieldy body. The need for reducing the size of the Senate and yet providing effective representation for the Professors of the Institute is thus clear.17

The plea was made, interestingly enough, by IIT-Bombay. The Institute went on to suggest a quota of no more than 6 to 10 professorial representatives from each department in order for the size of the Senate to be pruned to manageable levels. Fortunately for the Institute (and equally so for the other IITs), the Review Committee was cold to its idea. Stating in no unclear terms that it was ‘absolutely essential in academic circles that all faculty should together constitute the Senate and the larger the participation the better are the academic policies evolved’, the Committee ‘examined these suggestions and felt that there was no need to change the composition of the Senate as existing.’

As in wider polity, so in academia. The Institute’s proposal of 1984 is an example of the temptation ever present in institutions to lapse into centralized functioning by an oligarchy of a few – with all its attendant dangers of shrunken ideation and credibility. Symptoms of centralization at the Institute persisted well into the 1980s. When he arrived at IIT-Bombay in 1978, Kudchadker found to exist what he dubs a ‘Main Building Syndrome’. In the Main Building, set apart physically – and no less symbolically – from the academic departments, was concentrated the Institute’s administrative apparatus: here you had the Director, the Deputy Director, the Deans, the administrative offices. The whole structure struck him as much too top-heavy; the Main Building had become a metaphor for centralization. As detailed in Chapter 9, Nag and Kudchadker tackled this through a succession of administrative reforms in the mid and late 1980s, seeking to decentralize and delegate. Twenty years on, can one say that IIT-Bombay functions in a robustly distributed manner? The appraisal of a committee formed recently to look into IIT-Bombay’s governance structures provides some straight answers.

IIT-Bombay’s governance structure, says the 2007 committee in its interim report, ‘has evolved into one marked by the defining trait that most of the important decisions rest with the Director. Various functionaries such as the Deputy Director, Deans, Heads of Departments and the Registrar act as his assistants’.18 Put another way, distributed governance had simply not struck root in IIT-Bombay’s soil; and, going by certain
kinds of institutional moves, it would appear it wasn’t for lack of trying. One example of steps in the right direction is the creation of successive deanships 1972 onwards, so that now there are seven deans keeping an eye on the Institute’s academic and corporate affairs. This cavalcade of deans should, on the face of it, have relieved the Director of most of his mundane load even as it kept multiplying with time. As it transpired, the measures proved only so much of a solution and no more. Though the posts had been created, processes had been left largely untouched. Thus, if in the past two or three deans might have been ‘putting papers up’ – as it’s phrased in delicate administrative dialect – for the Director to peruse and sign (or not sign), the main difference today may be that seven deans are putting those papers up – with the Director still having to peruse and sign/not sign. Meanwhile, the large expansions that have taken place in R&D, external relations, and academic programmes have broadened the Director’s spectrum of work, exacerbating the situation.

**THINKING OUT OF THE BOX**

The pace of change being what it is today, the unwary can easily be caught napping. Take your eyes off the action for but a day, and you can be left embarrassingly adrift of the competition. As the Institute grows, both in size and in the mosaic of its endeavours, so does the need to keep pace with the times; and to constantly strategize and plan. Challenges that have never been faced before call for novel ways of tackling them; likewise, opportunities that have never before knocked on the Institute’s door, need to be seized swiftly and with imagination. The structures and processes in place may often not allow the speed and agility called for, and will need to be reworked or supplemented. Some anticipatory steps have already been taken. Towards the end of the 1990s an Advisory Council was formed, its terms of reference being, as current Director Misra puts it, to ‘think out of the box, see how IIT-Bombay can be made a front line Institute in its goals of education and research.’

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*e In 1972 were created the positions of the Dean of Academic Programmes and Dean of Research; in 1977 and 1978 came the Dean of Planning and Dean of Student Affairs. 1995 saw the induction of the Dean of Resource Development (now, Resource Mobilization); and in 2002, two more portfolios were created: a Dean of Faculty and one of Alumni & International Relations.*
New initiatives brewing in the Institute’s corporate mind are often tabled before the Advisory Council which, having examined them, helps firm them up. In composition the Council includes prominent exponents from the worlds of industry, academia, management and entrepreneurship (some of them drawn from the ranks of the Institute’s alumni, who’ve started to play a visible role in chalking out its course). The seed for an inclusive think tank of this sort was sown by Sukhatme towards the end of his Directorship. The proposal he drafted for the formation of the Council highlighted the benefits to the Institute of ‘harnessing the collective experience and wisdom of the alumni and well wishers who have attained positions of eminence in academic, research, and corporate and entrepreneurial areas both in India and abroad.’ Such a body, the note went on to say, could ‘help the Institute effectively spell out and articulate its vision, growth perceptions and strategies’; the Council was envisaged also to ‘catalyze synergistic international linkages and resource generation efforts aimed at realizing the Institute’s visions.’

Members were hand-picked for their commitment to the Institute’s interests; when first formed, the Council included names like Dr P. Rama Rao, Vice-Chancellor, University of Hyderabad, industrialists Mukesh Ambani and Dr Naushad Forbes, and alumni Nandan Nilekani and Rajesh Mashruwala. Subsequent members include industrialist Adi Godrej, media person Alyque Padamsee, and alumni Parag Rele, Arun Dravid and Victor Menezes. Expectedly, the Advisory Council has already started to make its mark on the Institute’s functioning. Its members, especially alumni, have found it a useful forum through which to infuse fresh outlooks on a variety of the Institute’s transactions, be they in its negotiations with the external world, its internal governance, or its efforts at mobilizing resources as much in the form of funds as of new academic staff.

**ON BEING ‘BOLD ENOUGH’ – OR NOT**

Over the decades to come IIT-Bombay seeks, amongst other things, to become a global forerunner in R&D while retaining its pre-eminence in teaching built up over the last fifty years. This will call for far-reaching changes on several fronts, not least in the ways the Institute is run.
Revised institutional mechanisms are needed to address the areas of ground level concern, many of which are clamouring for immediate attention. The present administrative structure, less than ideal even for the 1980s, is now creaking under the strain of the varied and novel demands placed on it. So much so that the Institute’s present Deputy Director, Dr J. Vasi, saw it fit to present the case for change before his colleagues at an Institute Faculty Meeting early in 2007.

A major cause for concern is that faculty, with the efflux of time, have come to participate excessively in administration, even when the tasks in question are better suited to specialized professional governance. And while the importance of faculty engagement can’t be denied, ensuring as it does that decisions are taken with the Institute’s best academic interests in mind, many have started resenting the ‘overburden’ of mundane administrative tasks and the proliferation of committees that guzzle their time.

Another source of worry are the Institute’s support services and systems. Here too the battery of administrative reforms effected in the late 80s have been outpaced by rapid changes in demand and expectation. When I asked Dr K. Sudhakar, present convener of the Institute’s Strategy and Planning Committee, if the Institute’s support systems were geared to meet the challenges of the future, ‘The general feeling we get is that we are not geared for the present,’ he replied, ‘what to speak of the future.’

It was in the wake of Vasi’s presentation that the committee for a revised governance framework was formed; this committee, in an interim report, has also delineated the measures it feels are needed to iron out the drawbacks. Foremost, a change in administrative anatomy, aimed at decentralization, has been proposed. The suggested layout has three deputy directors, one each for academic matters, administration, and external affairs; and administration is proposed to ‘be left largely to professionals who have no direct involvement in academics.’ In order to tone up the functioning of support systems, greater levels of delegation as well as accountability are proposed. In the arena of personnel management, the urgency for reform in those old bugbears, faculty promotion practices and the dearth of performance incentives for support staff, was reiterated.

There is also the strong view, however, that these proposals fall short in that they put the cart before the horse: that it isn’t so much the gover-
nance structure at fault as flawed administrative processes, the dampening effects of which will continue to exert a drag on the Institute no matter how effective the new governance templates might be. This line of thinking contends that it’s the processes the Institute must first remedy, before turning to structures. Yet it’s likely that if the ideas on reworked governance meet with the approval of faculty at large, and if they’re implemented hand in hand with an overhaul of administrative processes, they could go a long way in equipping IIT-Bombay to meet the demands of the years to come.

Disturbingly, though, one of the strongest auxiliary sensations these recommendations evoke is one of *déjà vu*. The ideas in themselves aren’t new. 20 years and more ago, on the subject of decentralization for instance, the 1986 IIT Review had stated: ‘There is also a need to inject greater autonomy in the normal functioning of the Institute. To this extent there must be decentralization of administration and delegation of powers, accountability and responsibilities.’ When addressing new governance and management structures, it too had advocated the creation of the posts manned by people with ‘professional qualification, competence and experience’.f

In short, the clearly articulated recommendations of the 1986 IIT Review are an uncanny mirror of today’s proposals. Yet, over all these years, IIT-Bombay has not applied itself to bringing them to life. The Review had gone on to remark, ‘The absence of adequate administrative leadership is one of the reasons why necessary amendments of the Statutes leave alone a comprehensive study of them by the institutes, has not taken place.’g The time has surely come, then, for IIT-Bombay to systematically examine its Statutes, and press for exhaustive revisions where needed.

One is left in no doubt, on surveying the subject, that if there’s one thing more than any other that has enabled IIT-Bombay to function in

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f Today’s proposals envisage a Chief Financial Officer, a General Manager for constructions, and a General Manager for campus maintenance, all with a view to relieving faculty of superfluous load in each of these areas. The 1986 IIT Review had proposed a Chief Administrative Officer, a Finance Manager, and an Estate Manager, again comprised of professionals. It’s interesting to see how closely these suggestions map on to the present proposals for decentralization and the creation of administrative posts staffed by professionals.

g The IITs Act states explicitly that the Institute’s Board of Governors ‘may, from time to time, make new or additional Statutes or may amend or repeal the Statutes’, provided they meet with the Visitor’s approval. IITs Act, Section 27(2).
ways that promote academic well-being, it is its autonomy. It is equally obvious that what the Institute dreads most is the continual erosion of autonomy on one pretext or another. When I asked colleagues what they felt was the single greatest threat to IIT-Bombay’s prospects in times to come, Dr Shiva Prasad, faculty in Physics since 1980, wrote: ‘I think the greatest threat is diminishing autonomy and freedom. I personally feel that these are the two things for which a faculty may prefer to join IIT-Bombay, in spite of the high market price outside. And this is precisely what we are losing.’

Yet it has to be said, on balance, that while IIT-Bombay has had good reason to resent intrusions on its autonomy from time to time, it cannot be absolved of blame for not doing enough to leverage all its possibilities. The Institute has not been assiduous in customizing rules for the benefit of its staff and in the interests of its own vibrancy of functioning, whether in the sphere of finance or of personnel management. The exhortation of the 1986 IIT Review remains as poignantly true today as it was two decades ago: ‘IITs must be bold enough to experiment and create their own culture, management style and structure to fulfill their own needs. We found nothing in the Act and Statutes which prohibits them to do so.’ One can only hope that IIT-Bombay will be ‘bold enough to experiment’ and ‘create its own culture’ before too long.

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Kindlers of the Flame...

It has been as unexpected as it has been, in fact, near-universal. Whenever I’ve asked someone to reminisce in freewheeling mode on the Institute’s evolution they have, sooner or later, and quite spontaneously, drifted into speaking as much of IIT-Bombay’s Directors as of the Institute itself. This has been just as true of academic as of non-academic staff. And when speaking of ‘eras’ in the Institute’s growth, they’ve more often than not identified these with its Directors again: thus one hears of the ‘Bose era’, the ‘Kelkar era’, and so on.

This has been surprising because one expects people at an academic institution with democratic traditions to be least in thrall of those at the top. That IIT-Bombay’s Directors have rendered themselves synonymous with eras suggests that they have each left on the Institute’s growth their own distinct stamp – even if their judgment on some fronts might be called into question. And this imprinting has likely been possible because, as a former IIT director puts it, ‘To this day, IIT Directors exercise authority to an extent unheard of almost anywhere else in the government. They are virtually free to select faculty, apportion the budget, and… except for a couple of aberrant occasions, they have been left free to manage academic programmes without political or bureaucratic interference.’

It is fundamentally the people an institution attracts to its rosters – its ‘human resource’ – that make it what it is. This chapter is about the individuals who have been pivotal in shaping the Institute’s evolution: its Directors, and the most distinguished of its faculty and other staff (students are allotted their own chapter, the next). We take up IIT-Bombay’s
Directors first – and since they’ve engraved themselves in people’s imaginations as deeply as they have, we hear about them in others’ voices, and see something of the men behind their official seals. (Biographical details, and lists of awards and honours – of which they’ve all been conferred aplenty – are kept to a minimum, as are elements of their functioning that have been remarked upon already.)

**HUMAN DYNAMO**

‘He is a balding, burly man of fifty-three of great simplicity and mildness. Only when you talk to the people who have worked with him do you realize that he can be a human dynamo generating sparks without heat.’ This sketch, penned in 1966 in a UNESCO report, captures crisply one of the facets of IIT-Bombay’s first Director, Brig. Sisir Kumar Bose; and we’ve seen that but for his dynamism and imaginative circumvention of hurdles, IIT-Bombay may not have settled into its campus as speedily as it did, in time to keep its pledge to SASMIRA.

Once he had got the Institute going, other facets of his personality started to find lively expression. First amongst these was his penchant for discipline – and for presuming students guilty of the intention to bunk until proved innocent. To curb the truant instinct his suggestion, recalls Mrs Swamidasan of Humanities and Social Sciences, was that a certain seating arrangement be prescribed for students in class, that they be photographed in that order, and that attendance be taken daily with that photograph as reference. Thus, by mapping face to position, faculty could eliminate all chances of proxy. Though radical in itself for an academic institution (Bose had borrowed it from military practice), the idea wasn’t as radical as the next one Bose came up
with – geared towards instilling in students’ mind the awe and respect for teachers he felt was lacking.

‘He also conveyed to faculty, through their heads of departments, that they take classes wearing gowns,’ Swamidasan smiles fondly at the memory, “Oxford-style”, because then we’d be more impressive and it would make it easier for us to maintain discipline. Some of us who had no problems with discipline never thought this was needed, we managed our students perfectly well.’ But at the next faculty meeting, Bose proceeded to illustrate what he meant. ‘He came into the Lecture Theatre dressed in a gown and declared, “This is how we should go to our classes, it’ll help us look more impressive.” The entire faculty was very quiet. Then he said, “Those who are in favour of this, please raise your hands.” Not one hand went up, not even the Heads of Departments. He was so annoyed he went red in the face, took off his gown and flung it aside, saying, “If you don’t want it, I don’t want it either!”

The incident serves to capture another sliver of the quintessential Bose: disciplinarian and quirky, but capable also of backing down in the face of dissent. Which is perhaps why he’s remembered unfailingly with a mixture of bemusement and affection. Bose’s disciplinarian ways didn’t stop at students; faculty too felt the reforming touch. Sukhatme recalls a meeting for which a few faculty arrived late; Bose peremptorily asked them to stand and apologize to the others for having kept them waiting; and such was the awe he commanded that the latecomers had no choice but to comply. As may be imagined, his imperious style was a mixed blessing. A boon in terms of getting things done for the Institute in its fledgling days, its flip side was a paternalistic, near-autocratic demeanour, not entirely suited to academia – to the point that some have described him as ‘dictatorial’.

One wonders how he came to rule with such an iron hand in an academic institution with otherwise liberal leanings. Faculty from the era have ascribed it partly to the fact that, as Dr S. Narasimhan of Civil Engineering puts it, ‘He was so senior, while in his time most faculty were new and young. The age difference mattered. He became a fatherly figure for most of us, and in turn he treated faculty like boys.’ It’s an impression Dr B. Sabata of Chemistry corroborates. Only in the late 60s, he feels, with faculty growing in self-confidence, were they able to assert themselves, or express...
opinions at variance with his. ‘He wouldn’t take faculty into confidence,’ adds Narasimhan, ‘on major administrative issues,’ thinking they were too callow for weightier matters. Others have contended that he had little in-depth vision of how the Institute should grow academically; and research, as we’ve seen, was accorded low priority in his time. Prof J.R. Isaac, then of the Electrical Engineering, says: ‘He was responsible for the initial physical presence of IIT – “must get the job assigned done, and that is that!”’ But he wasn’t really meant for academia.’ Off the academic field, Bose is widely acknowledged to have been ‘very social, very friendly, and affectionate’. Many have spoken warmly of the ‘family atmosphere’ he helped foster on campus in the 1960s – with he the kindly, patriarchal figure at its centre.

His regimental ways had other effects, some of them agreeably cosmetic. ‘Faculty in the early sixties,’ reminisces Swamidasan, who seems to have a limitless fund of ‘Brig. Bose stories’, ‘were formally dressed, again because the Brigadier was always tidily dressed and so was the Registrar, also a military man, Colonel Nehra. When I joined, faculty [the men] used to wear at least a tie, and many came in suits and tie. So there was this atmosphere of order, but it was carried to an extreme in terms of the incident I’d like to tell you about…’ That incident will not, however, be related here but elsewhere, to illumine relations between Bose and another spoke of IIT-Bombay’s human wheel, its students.

After ten eventful years at IIT-Bombay’s helm, Bose became Director of IIT-Kharagpur for the next five. Subsequently, he worked for the Shri Sathya Sai Institute of Higher Learning in Andhra Pradesh and Bangalore. His later writings show him to have become increasingly spiritual – and somewhat mystical. Puzzlingly for someone who had led two IITs, he grew to be increasingly skeptical of the effects of technology on society. After a long and varied life, in the course of which he ‘got the job done’ for IIT-Bombay when it most needed doing, Bose died on 5 February 2000; in 2005, IIT-Bombay’s alumni honoured his larger-than-life memory by instituting the Brig. S.K. Bose Memorial Lecture.

**ALCHEMIST, SAVANT, DREAMER, MISSIONARY**

No two Directors could have been more unlike each other than Bose and the man who succeeded him, Dr Purshottam Kashinath Kelkar. If Bose
was gregarious, Kelkar reclusive; if Bose a physical ‘dynamo’, Kelkar the paragon of the ‘thinker’. Students, too, noticed the difference when Kelkar took office: ‘In contrast to the military bearing and imperious eye of our last director,’ they remarked, ‘we have a slightly stooped figure and a slightly tired looking face which, however, lights up most engagingly.’

Kelkar was, of course, no newcomer to the Institute, having been its chief architect in its embryonic days in 1957-59. Brief though that spell was, his influence on IIT-Bombay’s growth was profound, especially in the matter of attracting the best possible faculty to its rolls. From the very start, remembers Narasimhan, Kelkar was keen on recruiting faculty from as many different schools of thought as possible, aiming to make the Institute a melting pot of educational canons: he kept an eye out especially for people who had trained in the leading European centres of technology of the time – in the UK, Germany, and France – and not just in the US.

Every single person from IIT-Bombay’s early years I’ve spoken to agrees that Kelkar should, by all rights, have been IIT-Bombay’s first Director. Bose’s appointment to the office by the Ministry is remembered to have estranged him from the Institute. ‘Prof Kelkar was very hurt,’ says Narasimhan, ‘because of which he never moved to the IIT-Bombay campus, continuing his work from SASMIRA. “I won’t have anything more to do with IIT-Bombay,” he said.’ Knowledge of Kelkar’s bitterness seems to have been no secret. Former IIT-Madras Director Indiresan, writing 40 years later in 2003, had this to say: ‘Krishna Menon, who was closest to the Russians, was then Defence Minister. He got Brig Bose appointed the first Director of IIT-Bombay, superseding the local expert Dr Kelkar. Dr Kelkar was naturally miffed.’

Fortunately, in a fallout of the Cold War, the Americans offered to help set up the third IIT at Kanpur, and Kelkar, appointed its first Director, was recompensed.
Time healed Kelkar’s wounds. By 1970, he was no longer so cut up as to decline appointment as IIT-Bombay’s second Director. Kelkar’s ten years of experience in setting up IIT-Kanpur and imbuing its academic programmes with his ‘magical’ touch were brought over to IIT-Bombay. Catholicity remained his trademark, as much in shaping curricula as in faculty composition. Most of IIT-Bombay’s veterans have described him as a ‘visionary’ who thought ‘ages ahead’ of his time. Elsewhere he’s described as a ‘combination of a dreamer, missionary and doer’. Sukhatme’s sketch of his alchemical touch is apt: ‘Prof Kelkar had a philosophical outlook, a tremendous feel for education. To him a curriculum meant the sciences taught for their own sake. And humanities taught for its own sake as a beautiful subject – and of course engineering taught first as a science and then as an art. To him this was education. He believed in it passionately.’ (And we’ve seen what a lasting legacy he left behind.)

Socially, Kelkar is said to have been restrained, even aloof. ‘He wouldn’t mix with students,’ says Narasimhan. ‘Only if you went to him would he talk, and only then would you realize his depth and erudition. But he was difficult to meet. Indeed the reason why he instituted two Deputy Directors was that he was keen on absorbing himself in academic matters, and shielding himself from routine chores.’

Where Bose had turned spiritual in his later years, Kelkar turned metaphysical. He spoke of himself, of his colleagues, and of entire institutions like the IITs as ‘agents of the Spirit of History,’ cosmically pre-ordained to come into being as they did, and to play out the roles they did.

In sum, it was not just the posts Kelkar occupied, but the acute erudition and telescopic sensibility he brought to them, that marked him as exceptional among his peers. IIT-Bombay could count itself doubly blessed in being placed in the charge of one such as Kelkar over two separate time-spans. And yet, towards the end of his second term at IIT-Bombay, something started to gnaw away at Kelkar’s spirit again – but this time round, unlike fifteen years before, nobody knew quite what it was. When he retired, he was firm in declining all farewells and, according to some, vowed once more never to set foot in IIT-Bombay again. Silently as a mist he exited the Institute’s gates, telling no one when he’d be gone.

\[a\] In touching recognition of the scale of his contribution to its growth, IIT-Kanpur in 2001 renamed the one unit that symbolizes the pursuit of scholarship above all others – their central library – the P.K. Kelkar Library.
And this time he was true to his word. Though he’d retired to Matunga, a mere 12 km away, he never retraced his steps to IIT-Bombay. Kelkar’s second, profound, unconfided estrangement from IIT-Bombay remains one of the most enduring human mysteries the Institute has known. When his time came, the Spirit of History conspired to remove him from the scene in just as hushed a manner as he might himself have wished. The day he died, 23 October 1990, there was a bandh in the city. At his cremation, held soon after the hours of the bandh, just some twenty people were present. From the Institute he had first founded and then led with such distinction only two faculty managed to turn up to feel the benediction of the flames: his long-time admirers Dr S.P. Sukhatme (who had also been asked to represent IIT-Kanpur) and Dr P.P. Kane.

‘N O B B E R H A S W O R K E D H A R D E R’

Voice 1: He was most sincere, committed, and hard working. He wasn’t the visionary Prof Kelkar was, but he gave of his fullest. He did everything he could to improve the Institute’s facilities and its image. But his lack of command over English and his personality created the wrong impression about him. Some faculty were very hard on him. The Faculty Forum showed its ugly side in those days, opposing everything he did. He had no support from the Ministry either.

Voice 2: Here was a person who did little for himself while trying his utmost for the Institute. He was mindful in particular of the interests of non-faculty employees like no other Director before him or since. He took the trouble to visit them at their workplaces – laboratories, hostel messes, offices – to get to know first-hand

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b Years later, during Dr Nag’s directorship, the Institute offered Kelkar an honorary doctorate. Its emissaries, Drs Narasimhan and P.P. Kane, called on him and, says Narasimhan, ‘begged him for 3 hours to accept it’; Kelkar refused. The Institute was welcome, he said, to deliver the doctorate to his address, but he would not enter IIT-Bombay’s gates again.
the problems they faced. And he followed this up with concrete measures to improve their lot. Actively representing their interests to the Board of Governors and to the Ministry, he won them a number of improvements in work conditions and welfare measures. He had no airs about him, was easy to approach, and accorded everyone’s work and aspirations the recognition and respect they deserved. And he cared for the Institute and its staff with all his heart. Even today, when he comes to the campus, people rush up to him to pay their respects; he won’t be easily forgotten.

Voice 3: He had a very difficult tenure, in two respects. It was difficult in the sense that unions started to get organized. And they got organized initially to make their presence felt. The Faculty Forum was formed and it may seem like an innocuous body today but at the time it did one or two things it wouldn’t do today. And the Ministry’s control over small things seemed to have increased during the Emergency. So Prof De’s tenure I consider as a period in which the Institute went through a fairly difficult period because of all these undercurrents. There were also gheraos, and threats of violence personally directed at him. But when you have a Director who is firm, who knows how to act and acts with the interests of Institute at heart, these things get resolved. It is to Prof De’s credit that he never lost his cool. His handicap was that he didn’t present his viewpoints well in public, but at heart was an exceedingly fine person.

Voice 4: Nobody at this Institute has worked harder than Prof De. He was two hundred per cent committed. He would start his day at 8.15 am, and go on till 8 at night. And he was famous for doing the rounds of the campus afterwards, looking into the smallest details: were the roads okay, were the tube-lights working? De was good at administration and cultivated the support of the non-academic staff. But with many of the faculty his equations weren’t as good. Despite the Emergency during the mid-1970s and all its vagaries, he kept the Institute going smoothly all along, shielding it to the extent possible from governmental whim and diktat. Even in these troubled times, he facilitated the growth of research along a number of avenues, foremost among them the Institute’s Centres for Advanced Studies and its interdisciplinary programmes.

‘Two hundred per cent’ committed; trying his level best for the Institute but thwarted by either his own colleagues or the Ministry; the hardest of workers but not the most visionary or eloquent of men: having
listened to these voices – of Dr Narasimhan, a cross-section of non-academic staff, and of Drs Sukhatme and Sabata respectively – there is little one needs to add save the formal touches. Dr Arun Kumar De joined the Mechanical Engineering department in early 1959, after a stint in industry. He was Director of IIT-Bombay between 1974 and 1984, except for a period between 1980 and 1981 when he went to Delhi as chief controller for R&D at the Ministry of Defense. His tenure also saw, as Isaac says, ‘the first serious student problems at IIT-Bombay’, which led to the infamous closure of 1980; but students (and the campus) also got their swimming pool, their plush new Activity Centre, and their first Dean of Students’ Affairs. He did all he could to stimulate R&D at the Institute but was hindered by the increasingly precarious condition of the nation’s economy. On completing his tenure at IIT-Bombay, De took office as the first Chairman of the Atomic Energy Regulatory Board. Dr De now lives in Ghatkopar, Mumbai, still looks spry and half his age in his sneakers, and continues occasionally to drop in at the Institute.

A GREAT PROFESSOR, NOT REALLY CUT OUT FOR ADMINISTRATION

During the year and a half De was away, there stepped into the Director’s shoes a man who has been said to be ‘ordinary’ in that role, ‘because he wasn’t made for administration.’ Yet he’s someone who is universally admired for many other qualities that made him a brilliant academician, if not the best suited for the Institute’s Directorship.

We hear about Dr Rangaiah Emmanuel Bedford from two people who saw him at close range in a dual capacity: both as students and, later, as colleagues. In Dr H. Narayanan’s eyes, ‘He was a dramatically different person. He was not your standard professional researcher, in the sense
that while he’d do a lot of research he didn’t see publishing as the end-point of the activity. But he was top-notch in terms of attitudes, of intellect – very scholarly and a very, very fine person. That sort of talent I don’t see now, I don’t see anyone as fantastically brilliant.’

Vasi reinforces and supplements Narayanan’s impressions. ‘Prof Bedford definitely was one of the great professors of IIT-Bombay, not only in teaching but in terms of scholarship, of attitudes. I think there are many people on campus today who would still try to emulate what they remember of Prof Bedford. For example, the way he would talk to a student. I don’t remember that so much from my undergraduate days as from what I saw later. Treating the student as an equal and always willing to hear things from their side. So as a professor, as a guide, I remember him as a person not so much advising the student or telling them what to do but more gently guiding them along a path. Now that is not very common. Especially when you consider that Prof Bedford was already, in the mid-60s, one of India’s leading experts in two areas, Machines and the related area of Networks and Network Theory. And he did a huge amount of reading by himself not only in these but in many other areas as well. So he could really be classified as a polymath.’

Narayanan takes up the thread from here: ‘Prof Bedford was the first teacher we encountered in our basic circuits course in our third year, and he became the person who impressed us most. I found the subject very slippery; understanding the basic concepts was hard. But he was extremely clear teaching it. He understood it well, and made his lectures into a kind of art form. It was not only the content, the content would be good of course, but he’d be free ranging. And he used his voice like an actor. He had a very good voice, was fond of theatre, and would do all kinds of oratorical tricks to hold our attention – and he succeeded, while also enjoying himself thoroughly. Not only was he technically extremely good, he was intellectually honest too, never blurred, never hesitated to say he didn’t know all the answers.’

But Vasi feels there may have been little occasion for Bedford to exercise that honesty. ‘In many areas you could be sure he’d gone into things to a great depth, had looked at the uncertainties in the subject. He absolutely knew what he was talking about. And if you went to him with a difficult
problem, there was no doubt he’d be able to give you the solution. So one had complete confidence in his technical expertise.

‘And of course the other thing which he was well known for,’ Vasi adds another dimension, ‘is that by the time he came in for a 10.30 lecture, he would have solved the Times Crossword. There were a few people including me who’d be trying it out, left with many blanks still to fill, and here, too, he would be ready with all the solutions. He was definitely a great professor overall.’

People by and large seem to have no outstanding memories of Bedford’s tenure as Director. This is where one of his staunchest admirers says, ‘I thought he was comparatively ordinary as Director,’ before adding, ‘but then he was bound to be somewhat ordinary. He simply wasn’t made for administration. It isn’t that he wasn’t giving it enough attention. He was a very good academician, so he had this approach of starting from scratch, and thinking very freely. But I don’t know if he had the vision as to what an administrator should be doing. And those days you were hampered enormously anyway, you couldn’t take initiatives as Directors can do now, money was in such short supply.’ It also bears repeating that Bedford was Director for but a short while, the kind of time it takes for most to merely slip into the groove, and so couldn’t really have been able to give the fullest account of himself in the post.

Bedford’s reactions when he was appointed President of the Students’ Gymkhana in 1973 reveal his somewhat tepid opinion of administrative posts and his preference for the company of students. In an interview with Technik he said:8 ‘You cannot call my appointment as President of the Gymkhana a surprise to me, because Prof Sarkari had sounded me out on the issue and, well, found I was not averse to it.’ Perhaps the Directorship, too, was something he was simply ‘not averse to.’ And in a comment that speaks as much of the system he was working in as for where his own preferences lay, Bedford said, ‘You know when I became President, I thought my main job would be to have such conversations with students. Of course, I discover now that quite a bit of time is taken in signing sanctions and vouchers for money. Anyway, I hope I get the chance to talk to more and more students.’
‘IF YOU GO TO JAIL, I’LL BE GOING WITH YOU’

His diet during his working hours was unfussy and spare: cigarettes and tea, followed by tea and cigarettes; his teeth bore stained witness to the chemical assault. Tall, slim, large-eyed behind lenses of ferocious power, he looked the epitome of impatience and irascibility – and often was. But although he appeared aloof, ‘once you got to learn to work with him,’ says Narayanamurthy, ‘he valued you as a colleague. Then he gave you total responsibility and supported you to the hilt.’

And this perhaps is the one singularity of Dr Biswajit Nag, who took over from De in 1984 and held office for a decade till September 1994, that has been remarked upon most frequently. ‘There were no ifs and buts with him,’ continues Narayanamurthy. ‘There were many instances when he said, you are on the spot, you take the decision and I’ll back you. He made us reach out and take initiatives. He was certainly not there watching over your shoulder. On the other hand, he was there watching benevolently over your shoulder and see if you needed a further push or support.’

Nag’s yen for delegation is evoked as sharply by Prof R Hazra of the IDC, who takes us back to the time he was asked to redesign the administrative sections of the Institute, and was confronted by the numerous bottlenecks spawned by governmental regulations. ‘Just go ahead with what you think is best,’ he recalls Nag saying to him. ‘We know we’re doing it in the Institute’s best interests, and that’s what matters. And I’ll be signing all the papers, so if you go to jail, I’ll be going with you.’

Nag’s impatience with rules was patent everywhere – such as in the matter of faculty recruitment where, as an expeditious dodge, he decided the Institute would consider time spent on a Ph.D. as research experience towards a faculty appointment. Nag also ‘went out of his way,’ recalls Kudchadker, to finance the trip the latter made to Europe and the US in
search of new recruits, and to facilitate his head-hunting process during it. Kudchadker was free to conduct phone interviews, ‘may be half an hour to 45 minutes with anyone anywhere, from India or elsewhere, and charge it to IIT-Bombay. This kind of thing was unthinkable in the mid 1980s,’ Kudchadker reminds us. ‘Prof Nag’s view was that for recruitment we’ll do anything because IIT-Bombay was in the danger zone as far as faculty were concerned. At the most, he said, we would get a rap on the knuckles, but at least the job would be done. The freedom given by Prof Nag was phenomenal if he knew you were not going to abuse it.’

But Nag’s brusqueness with those who tested his patience often landed him in tight corners. This could happen with faculty, or the Institute’s support staff, or the world at large. We recall that he was Director during what continued to be a difficult phase in the Institute’s existence. In these conditions, his plain-speak with the press, where he appeared to hold compulsively emigrating IIT students in plain contempt, could further lower the media’s already dim opinion of the IITs. To Business World in 1985, he said of IIT alumni that most of them took up ‘second rate jobs in industry in the US, but prefer this to returning home. The North American system generally does not permit these immigrants to rise beyond a point. And yet our graduates stay on.’ And speaking to the Illustrated Weekly he fumed: ‘About 30 or 40 of the students who go every year do excellent work. The others have gone so they can get their house and their two huge cars. We have little to regret if they stay on in the US.’ Acidic words; little wonder then, that reacting to Nag’s statements, Business World should have seen the IITs’ attitude towards the brain drain as ‘cocky and scornful.’

Likewise with unions: Nag had little time for their demands he personally felt were unreasonable. This didn’t, naturally, endear him to them, for if there’s one thing unions are created to do, it’s to make demands on management. Former Registrar Dilip Ghosh remembers: ‘Once during Prof Nag’s time, early 90s, there was a big morcha, about a thousand people on the lawn. They even snapped the telephone and electricity lines. What was the reason? The union had been to Nag’s chamber, they had been a bit too demanding, and Prof Nag had told them to get out’ – not the wisest of moves with a contingent that was already agitated. (It took a great deal of coaxing and cajoling by Ghosh, on both sides, to restore calm that day.)
No write-up on Nag would be complete, it’s been said, without a men-
tion of his love for the game of cricket. ‘He loved to watch it, discuss its
nuances and reel out statistics about the game,’ says an obituary on Nag.11
‘He often said that there was no better sight than to see a fast bowler run-
ning in with the new ball from the Maidan End at Eden Gardens, Kolkata
on a cool winter morning at the start of an innings.’ Technocrat, rule-bend-
er, cricket lover, Nag passed away after a long illness on 6 February 2000
– the very day after IIT-Bombay lost its first Director, Brig. Bose.

THE ‘RAYMOND’S COMPLETE MAN’ FOR ACADEMIA

Everything about him is compact, methodical, precise – and well cogi-
tated. The impression begins with his physical appearance: neat and comp-
act. It builds when he speaks: each phrase is balanced, each word care-
fully weighed. ‘Meticulous’ is the word most often used to describe him – followed close on its heels by ‘thoroughly academic’.

His unswerving commitment to the academic calling is best illustrat-
ed in his own words, delivered at the first Institute Faculty Meeting he ad-
dressed on taking over as the Director (and which lodged firmly in many people’s memories): ‘On certain mornings of the week,’ Sukhatme said, ‘I will not be in the Main Building, I’ll be in the department because if you read my letterhead carefully it says “Director and Professor of Mechanical Engineering”. It’s the first time it has so been written, to indicate that I am both. As a professor, I will be in the department, and when I am there, I would request you not to call me up.’ Sukhatme meant it: he didn’t give up his teaching all through his Directorship.

Sukhatme also carried forward the tradition of delegation Nag had developed, something Dr K. Sudhakar of Aerospace Engineering remem-
bers: ‘Prof Sukhatme hadn’t been Director for long when he asked me
to take over as Head of the Computer Centre. He asked me not to call him for any inaugurations and other formal functions... he wasn’t after publicity, he was that type of person. I think I never had to meet him for decisions, I had a completely free hand.’

As noted previously, Sukhatme was clear that IIT-Bombay had to make a mark for itself in research. During his tenure, the idea that research was an indivisible part of academic life had been driven home, and it could be hoped that it had taken root among a good portion of academic staff. ‘The most important hallmark of the Sukhatme era,’ Dr B. Ravi of Mechanical Engineering sums it up, ‘was the recognition that excellence in research is as important as excellence in teaching. The Dean R&D’s office became more proactive in facilitating new projects. Publications started playing a decisive role in promotions.’ And as Dr H. Narayanan says, ‘The statement, “research is important”, could not be ignored once it was linked to promotion. For this Prof Sukhatme deserves credit.’ And Sukhatme led by example: known for his substantial contributions in the areas of heat transfer and energy research, he supervised 19 Ph.D. students, published nearly 70 papers, and authored two widely known text books. His academic slant also prompted him to carry out seminal studies on the career choices of IIT-Bombay students, and on the real versus the supposed magnitude of the brain drain. And it was he who reinstated thoughts of ‘excellence’ in the Institute’s mindset when setting goals for itself.

Added to these traits was his intimate familiarity with the Institute. Over the 35 years he’d spent on its faculty, he had cared deeply for IIT-Bombay, as much for its campus (in the 1980s, he is said to have planted saplings near his lab and watered them personally) as for academic or administrative developments. Ex-Registrar Ghosh remarks on this facet: ‘He knew all the background, in fact I had to prepare myself to meet Prof Sukhatme on administrative or historical matters. He would have all the facts on hand, he had already handled so many things at the Institute.’

Among Sukhatme’s perceived failings was that once he had made up his mind on something, he was hard to budge. Described by some as ‘very obstinate’ and by others as ‘autocratic’ or ‘headmasterly’, rendering him less receptive than he could have been on certain issues, he has yet been described by the very same people as ‘very effective as a Director’ – and because of those very traits. Narayanamurthy’s portrayal fills in the remaining
details with a personal touch: ‘For Prof Sukhatme, I have absolutely unalloyed admiration. He was a “Raymond’s Complete Man” for academia. As an internal person, he knew the system, all its strengths and weaknesses. He was very decisive. There were many pending problems for which he said, enough is enough, we’ll go and solve them. There were so many court cases which had gone on for years and years against IIT-Bombay and he decided to review the whole lot, get those people to talk to us, see what could be done. He had a great working technique with the Deans; he was the one who started the Deans’ meetings. We would never have these meetings without a written agenda and a one page write up on each item. He said if that wasn’t there, we wouldn’t discuss it. Very methodical, and if I were to hold out one model faculty member including the Director, it would be him. Since he knew the system, he helped us consolidate. The vision that Prof Nag built, Prof Sukhatme helped us consolidate.’

Born in 1938, Dr Suhas Pandurang Sukhatme obtained his Bachelor’s degree in Mechanical Engineering from Banaras Hindu University in 1958, and his M.S. and Doctor of Science from MIT in the US. Joining IIT-Bombay’s Mechanical Engineering department in 1965, Sukhatme was Deputy Director between 1983 and 1985, and Director from early 1995 to early 2000. He then served as the Chairman of the Atomic Energy Regulatory Board for five years until January 2005. He leads an active retired life from his base in Powai, where he has settled. Bestowed the Institute’s first Lifetime Achievement award, he continues to stroll into the campus from day to day, helping the Institute navigate its visions for the future by sitting on the Institute’s Advisory Council, or simply catching up with its unfolding present.

**BRINGING IIT-BOMBAY UP TO INTERNATIONAL STANDARDS**

‘Prof Misra’s culture is different. He is more a corporate President type, an absolute charmer, and very friendly. He has helped things go forward at the Institute.’

If Narayanamurthy is persuaded to say that Dr Ashok Misra’s ‘culture is different’, or that he’s the ‘corporate President type’, it’s because Misra is one of those who has fashioned himself so. From his IIT-Delhi days, he cultivated a proclivity that marked him as unusual in the ranks of Directors
of technological institutions: an interest in management. This was no armchair interest either. In 1999, he worked his way through a formal Executive Development Programme at the Kellogg School of Management at Northwestern University. And he did so while still on the faculty at IIT-Delhi, going on leave to acquaint himself with the precepts of robust executive practice.

There, at Chicago, Misra subjected himself to the rigours of accounting, marketing, planning, governance and strategy – all of which ‘helped me a lot,’ he reflects, ‘because you start seeing the bigger picture rather than the smaller one.’ The bigger picture, in his reckoning, was always the Institute: ‘What’s good for the Institute and at the same time good for all its constituents.’

This slant became evident from the start. Taking over in May 2000, at the first few Institute Faculty Meetings Misra addressed, he spoke of trying to bring about a ‘win-win’ situation for all the Institute’s ‘stakeholders’, to ‘raise the bar’ in a variety of domains, and to ‘take IIT-Bombay to the next level’ along the many coordinates of its endeavours. This was a vernacular associated more, in academic minds, with the board rooms of private corporations than with a public educational organization, but Misra was keen to uncover its relevance to academia as well. ‘Raising the bar’ for research, for example, Misra scaled up the minimum criterion for submission of a Ph.D. thesis – requiring publication of the work in international journals or conferences. More stringent criteria for prospective thesis examiners were also drawn up. But along with the stick was extended the carrot: ever more funds have been allocated to enable Ph.D. students to attend international conferences, something both students and faculty have welcomed warmly.

Nor have non-academic staff been left unattended during his tenure. Sudhakar points to the way they have been empowered as one of Misra’s main accomplishments. ‘I never felt that the rest of the staff got enabled...
the way faculty did during Profs Nag’s period. Year 2000 onwards, suddenly I found staff members starting to feel they were also being kept in mind, the way their professional environments and opportunities were addressed. Technical staff who never had the chance to, say, go to other IITs and visit their labs, are now finding such things within their reach, and their work conditions have improved. I find this to be a substantial change in recent years.’

A facet of Misra’s functioning remarked upon frequently are his efforts to project the Institute, in a number of ways and at a range of fora. Both past and present Chairmen of the Institute’s Board of Governors have been struck by, and have recognized, this. ‘What Prof Misra does do on behalf of IIT-Bombay,’ says former Chairman Dr M.G.K. Menon, ‘is to project it externally – internationally, nationally, with industry, with other educational institutions. He is truly making an effort to bring IIT-Bombay to international standards, to be competitive with the best in the world.’

And present Chairman Dr A. Kakodkar speaks of him as ‘a personality of varied interests who has been very successful in taking IIT-Bombay to greater heights, through both a much larger level of research activity at the Institute, and also through a much larger interaction between the Institute and other institutions dedicated to academic and research activities, both in India and abroad.’

One disadvantage of being a Director in office is that you can be called upon to field questions about ways of working that have left your constituency unconvinced. There is the comment, for instance, that Misra was ‘initially overcautious, resulting in delays in decision making.’ When brought to his notice, Misra concedes the charge. But he does have his reasons for exercising caution, and they speak for his style of functioning. ‘When you take over the position of Director after having been for several years on the faculty,’ he says, ‘you move suddenly into, if I may so put it, a different zone. And so you have to tread with a little caution, you have to carry people with you. You can’t railroad decisions. One of the most difficult things,’ he contends, ‘is to bring about change and if you don’t want to bring about change and just be a paper signing Director, then of course everything is easy. So while I could have taken decisions quickly, if there were decisions which could have had implications, then I had to see the ramifications. I needed to consult people who had been here much longer.’
In course of time, things seem to have swung to some degree the other way. Today, Misra is seen by some as taking certain decisions too fast, especially in the academic realm, with new measures appearing not to receive the depth of cogitation to which the Institute’s faculty had become accustomed over the previous decades.

For a Director incumbent, a second key question that quite naturally crops up is how he’d like to be remembered in years to come by the Institute he’s been heading. To which Misra readily says, ‘In brief, it would be for my tenure here of two terms to be seen as a time during which IIT-Bombay progressed to a higher level in its education and especially in its research programmes, and alongside went forward in entrepreneurship and distance education. Having said that, it is really the Deans, the Heads of the Departments and other faculty who are making it all happen, and I’d like to be remembered as a person who left them free, enabling them towards our goals. That’s what I’ve tried to do and if it’s perceived thus, I’ll be satisfied.’

Even as this book was being readied for the press came the news that Misra has decided on a change of vocation and of scene. He’ll be relinquishing IIT-Bombay’s directorship at end-September 2008 and moving on, in keeping with his métier, to join as Chairman of Intellectual Ventures India, a ‘private company which seeks to create invention capital network by developing a large patent portfolio’.

Two Directors who took on the mantle in stop-gap mode – as ‘acting Directors’ in the hiatus between the end of one Director’s tenure and the start of the next’s – were Prof R.P. Mhatre and Dr S.C. Sahasrabuddhe. Mhatre, who helmed the Institute in the interval between Bose and Kelkar, was a civil engineer, very much a ‘buildings and works’ person who oversaw much of the great spurt of construction on campus during the 1960s. Sahasrabuddhe, of Electrical Engineering, was an electronics and telecommunications man. While Mhatre was Director for nearly a year, between June 1969 and April 1970, Sahasrabuddhe stood in over two separate spells, each lasting some four months. The first was between September 1994 and January 1995, transitioning between Nag and Sukhatme, the second between January and April 2000, filling in the pause between Sukhatme and Misra. Both Mhatre and Sahasrabuddhe had previously functioned as Deputy Directors for considerable spells of time;
both were known to be soft-spoken, mild mannered and technically accomplished in their fields. Mhatre was widely experienced by the time he came to IIT-Bombay, having had a long stint with the CPWD previously. Sahasrabuddhe was recognized in industrial circles for his work, while also widely admired for his gifted teaching, informal in style and effortlessly drawing students ever deeper into the subject. He appeared to have limited taste for attending to paperwork, though, and this didn’t endear him to those who expected quick decisions on pressing matters. His strengths lay in deploying the ‘human touch’: in bringing people round to the Institute’s point of view. He was often called upon, therefore, to co-opt colleagues into tasks for which few offered themselves willingly, prominent among them being the convenership of committees.

The Institute’s tabula rasa of the late 1950s was inscribed over the years that followed by its faculty: it is they who etched in its academic programmes, its fields of research, and above all what can best be called the spirit it came to possess. The Institute’s autonomy gave them the leeway to work with self-determination and inventiveness. Had it not been underscored, however, by a commensurate commitment on their part to the interests of the Institute, things could easily have gone awry. And commitment, on the whole, seems to have been in good supply. Just about everyone I’ve spoken to from the early decades has commended the dedication IIT-Bombay’s academic staff (with some exceptions, as will be noted below) brought to their tasks.

This dedication took several shapes. It could be teaching in the broadest sense of the word – starting with the chalk-and-blackboard craft of it, ramifying into allied orbits such as experimentation in techniques of instruction or a keen attention to the academic welfare of students. It could be the setting up of laboratories and the installation of equipment, as in the Institute’s earliest days. It could be administration, in which faculty at IIT-Bombay have always been intimately involved, keeping the Institute from sinking into the bureaucratic morass that has been the sorry lot of many public organizations. It could also be, despite the conditions over much of the time, research. Finally, it could be a combination of these, and indeed there are examples of people who have left an imprint on all that they’ve touched.
With the Institute now touching fifty, and all faculty recruited in its earliest days having retired through the 1990s, around 800 have already served on its rolls, many of them over decades together. From the galaxy of people cited as having served the Institute with distinction, the best one can do in a book of this size is to depict a few that have sprung most frequently and in the most lambent terms to the thoughts of their colleagues and their students – while knowing full well that there are many others who could just as easily have featured here.

THE MAN ALLERGIC TO MIND RUST

In SASMIRA, where the Institute was installed for its first couple of years, there wasn’t the provision to set up proper classrooms, leave alone laboratories. Yet one person who couldn’t see himself twiddling his thumbs until the Powai campus came along, set about taking exigent measures of his own. ‘He started his work before we moved to Powai,’ recalls Narasimhan of this person, ‘setting up his first lab right there in SASMIRA.’ And where in SASMIRA? ‘After taking Prof Kelkar’s permission, he set it up in a toilet.’

The man who installed a laboratory in a lavatory, Dr R.K. Katti of Civil Engineering, defends the oddity of his choice. ‘There was no place to keep even a single piece of equipment in SASMIRA,’ he says, ‘though there was ample money to acquire it. To start any academic activity it was clear that we’d have to wait for two years until the Powai buildings came up. I was very clear that during such waiting period my mind would rust and enthusiasm would dwindle. I decided to start my research work there and then.’ Katti looked around – and found no option but one. ‘SASMIRA was still under construction and an 8’ x 6’ toilet wasn’t yet fitted with the normal fixtures. With the approval of Prof Kelkar, I converted the 8’ x 6’ into three areas of development, Soil Engineering, Highway Engineering, and Geology. Three boards were posted on the wall. This was achieved by December 1958. Though notionally all three were located in a corner of the room, I was imagining them to grow into big internationally famous scientific thrust areas.’

Three cutting-edge areas, destined for global renown, in an 8 foot by 6 toilet: surely this was a first of its kind, perhaps worldwide? Katti, from all
accounts, was the perfect example of a man with an unquenchable ‘fire in the belly’, bristling with nervous energy in all he undertook to do. And so keen was his involvement with his M.Tech. programme (which he started, we’ve seen in Chapter 7, against a stack of odds) that he personally ferried each student, as he arrived, from the Bombay railway station over to SASMIRA. Being the sole instructor for the programme he had launched, the volume of teaching Katti had to do was formidable: he took four courses a week for two years. And so bright did his enthusiasm for teaching burn that, recalls Narasimhan, Katti was to be found teaching IIT-Bombay’s staff at SASMIRA even as he waited for his first students to arrive.

In later years, he was ‘totally committed to research and consultancy,’ recalls Sukhatme. ‘The consultancy he did ranged all over India. He was continuously on the move, at the same time he did his teaching too.’ Katti, restless, fiercely committed to the tasks he took on, was to go on to win many distinctions, and become the second Dean of R&D at IIT-Bombay, from 1975 to 1977.

**NOTHING YOU COULD DO BUT PRAY**

When it comes to zeal for teaching – and being creative at it – perhaps no one has been mentioned quite as repeatedly as Prof M.S. Kamath, of Electrical Engineering. In the eyes of those who have passed through his hands, he seems to have attained legendary, almost mythical, stature.

‘If you bring up dedication,’ says Dr M.V. Hariharan, ‘you must speak of Prof M.S. Kamath for his devotion to teaching. He started the year after I completed my course – a narrow escape for me! Though of course, it would have been enjoyable to sit in his class. When Victor Menezes visited the Institute to give a talk, he recalled some of the faculty during his time and he said, “Facing Prof Kamath’s paper, all you could is to pray, there’s nothing else you could do.”’

Why should it have been a narrow escape for Hariharan, and why should the likes of Menezes (batch of ’70, Electrical Engineering, and thirty years later to become co-CEO of investment banking at Citicorp worldwide), have had to pray? ‘Kamath’s grading system was a punch in the nose for students who fancied themselves as the best and brightest in India,’ Menezes has been quoted as saying. ‘Often, only one student per
test got an A – the top scorer. The second-best score got a B. Everyone else got Cs, Ds, or Fs.” Menezes recalled Kamath as ‘the most dreaded professor’ at IIT-Bombay. No wonder alumnus Dr A.L. Ravimohan, Institute Gold Medalist in 1967, when asked to mention faculty who had made the greatest impression on him, chose Prof M.S. Kamath as one, saying: ‘Who does not remember him? Especially his high voltage shocks to intellectual sloth.’ Another alumnus a decade younger (K. Sinha, batch of ’78), describes Kamath’s grading as ‘draconian’. Sinha, who felt he had done well in Kamath’s course but only got a B, thought he should lodge a protest. ‘Normally, I had stopped caring about grades by that time, and hardly went to professors to ask about them, but this course was different. I had worked for this course and thought I deserved an A. I went to see M.S. Kamath. He told me that in his opinion there could not be more than one genius in one class and therefore, only one could get an A.’ Sinha adds, ‘It seems Kamath had his reasons. He was quoted as saying, “I used to tell my students, IIT is a centre of excellence. I don’t want you to be third-rate products”.’ And alumnus Kanwal Rekhi recalls how ‘MSK made fun of everybody and everything. He could humble you in minutes, no matter how sharp you were.’

But Kamath was the stuff of folklore on campus not just for the stringency of his grading; it was also for the quality of the teaching that went with it. ‘He was definitely a very good teacher,’ recalls Vasi, ‘well known for his very tough exams and vivas. I must say, a lot of our teachers put in a lot of effort those days…teaching was taken extremely seriously. They were passionate and even obsessed, for instance Prof M.S. Kamath, I came to learn later, would spend days literally, two weeks or so, formulating his question papers.

‘Things were so free and flexible,’ Vasi takes the occasion to reflect, ‘that there were people who used all their enormous, really enormous, creativity – Prof Kamath was a very creative person – to focus on teaching. He would set highly complex papers and what could be called very intimately-connected-together questions, which you knew could only arise after hours and hours of thinking about them. So that was research in its own way if you like.’ But if there was one person who disdained research in the less spacious sense of the word and for whom it was teaching, and teaching alone, that counted, it was Kamath. He made no bones of the fact, and
when research started to be weighed towards promotions, he scorned those promotions too. An accomplished hand at bridge, Kamath pitted his wits regularly against students at the table, and wasn’t averse to a bit of theatre, either, once essaying the unlikely role of Col. Pickering in a spoof on My Fair Lady – instigated into doing so by the person we hear about next.

A FANTASTIC LEARNING EXPERIENCE

Bring up Prof J.R. Isaac – successively of Electrical Engineering, the Computer Centre, and Computer Science and Engineering (CSE) – and Dr D.B. Phatak, of CSE, comes up with this spontaneous salute to someone he clearly considers a personal hero: ‘He was both physically very strong and strong willed. And what an influence he had on us! I think he was the greatest motivator I have seen. He could work tirelessly and I remember a dialogue where I once said, “Why are you killing yourself and trying to kill us with you?” “What is your expectation, Phatak?” he asked. “Unless you can work three days and three nights continuously at least once a week, you are in the wrong profession, you don’t love it enough.” His other argument was, the West is so far head of us, if we want to catch up with them, we have to do something extraordinary. Now they are as intelligent as we are, they work just as hard, so if we work 8 hours a day as they do, we are never going to catch up. Work 24 hours, and you will move three times faster. I am very proud that I still carry the Isaac credo today, I still work tirelessly. He taught me to train my body and mind for it.’

Isaac coruscates in Vasi’s memory for different, but equally vivid, reasons – to do with his virtuoso teaching. ‘Definitely the person I remember most fondly,’ Vasi begins, ‘is Prof Isaac. You could never accuse him of, shall we say, being well prepared for a class. And that’s what made his classes really so exciting. They were sort of impromptu. His whole point would be: okay, we are looking at digital circuits, so let’s start off without preconceptions. So he would draw a circuit and he’d say, let’s look at this circuit differently. Instead of that resistor there (he’d rub it out), why don’t we put in a transistor. And he would just take it on from there, analyze the effects of the substitution. So the advantage I am sure for him was – and if you knew Prof Isaac this was a significant advantage [Vasi’s aside here al-
ludes to Isaac’s established reputation for being not the most organized of souls] – that he did not have to prepare for his classes.’

The kind of class Vasi is describing is, of course, the kind most difficult to pull off; you have to be right on top of the subject. ‘Which Prof Isaac definitely was,’ Vasi says. ‘You also have to be able to take it where the student wants, and be willing to display your ignorance, which isn’t always possible with instructors. Obviously for students it was a fantastic experience because whatever you suggested got tried out, was proved either a bad idea or unworkable or maybe actually a better idea than the circuit he had originally drawn. So it was a great learning experience, a very experimental learning process.’

(The effect did seemed to have rubbed off. From others I have interviewed, Vasi’s teaching is admired just as deeply as he admires Isaac’s. Alumni Dr S. Tyagi (class of 1984, now with Intel, Bangalore), and Dr M.B. Patil (class of 1984, now faculty in Electrical Engineering at the Institute), have recalled how Vasi similarly emphasized the grasp of concepts rather than facts, helping them see how facts fit into the bigger picture.)

Isaac also pioneered the lofty tradition of open-book exams, often with the header: ‘Begins 2.30 pm’, with end-time left undefined. And often only page 1 of the question paper would be handed out. When baffled students asked about the other pages, Isaac would rejoin, ‘What’s the matter? There’s enough on page 1 for you to get going with.’ And Isaac would disappear – for, so thoroughly disorganized was he, he’d be busy cyclostyled page 2 (photocopiers hadn’t infiltrated IIT-Bombay’s spaces yet) while students wrestled with page 1.

A man of strong views, Isaac, when it came to the subject of students’ career choices, could be caustic. ‘Prof Isaac was a purist on engineers staying engineers and not betraying their country or their profession,’ remembers alumnus Arvind Sanger (Chemical Engineering 1984), ‘with all the money that had been spent on them, by wandering off into other fields. He gave many speeches in this regard and talked about examples of how a former IITian in the US was ‘selling watches’ (now that I look back I am not sure what he meant) to show how people chose such intellectually undemanding careers and what a tragedy that was for all the money and effort the country and IIT had spent on them.’
Known affectionately to his students as ‘Jimmy’, or even ‘Jimmy da Boss’, Isaac was a man of remarkably many parts, and it is impossible to so much as touch upon all of them in a page or two. One can only mention, in passing, his keen interest in dramatics (he was a prime mover of the vibrant theatre scene on campus in the 1960s); or that he helped launch Technofair, a student tech festival that can claim to be the unacknowledged progenitor of Techfest; or that he stands out in the Institute’s history for his extraordinary involvement with student life outside the classroom, and his popularity amongst them (on the strength of which he was made the first Dean Of Students’ Affairs in 1979); or that he was one of the most ‘hands-on’ faculty IIT-Bombay has seen, taking apart and re-wiring the Institute’s Soviet computers of the time to customize them, to the consternation of visiting Soviet experts; or that he was a man with of the most generous of spirits and the most infectious of smiles.

AN ICONOCLAST, WITH A READY STORE OF POINTED JOKES AND COVERT WINKS

Over the Institute’s first six years, Heads of Departments (HoDs), once appointed, held that office until they retired. It was in November 1964 that the Board of Governors amended the practice, decreeing that henceforth HoDs ‘be appointed by rotation for a period of two years in each case’ (the two years was later raised to three).14

Thus started the healthy practice of ‘rotating heads’, an essential part of the democratic tradition at IIT-Bombay. One department, however, stood out for thumbing its nose at egalitarianism. The following note made by the Board of Governors in mid-1965 tells us the how and why of it: ‘The matter of appointing a head of department of Chemical Engineering (in accordance with the new rules of headships by rotation) was discussed. In view of the fact that the Board had previously appointed Prof N.R. Kamath as Professor and HoD Chemical Engineering Department, a change in the head of this department is not possible unless Prof Kamath agrees to it himself.15

This was a euphemism for the uncomfortable fact that Prof N.R. Kamath had refused to comply and allow the next in line to take the reins
– taking the unassailable position that since he’d been appointed as Head, a new Head could only take over after he retired. And he became a legend of his own kind in IIT-Bombay for sticking to his guns and becoming the Institute’s only ‘HoD for life.’ We recall, here, that this is the same Kamath who had teamed up with Kelkar in IIT-Bombay’s earliest years to draft its academic offerings, was IIT-Bombay’s ‘father of all academic things’, and strode its corridors with the ‘rules on his tongue’.

While his intransigence on this matter, as on some others – such as his early insistence on conventional academic practices – earned him his fare share of notoriety, he was just as widely respected and admired by colleagues and students for a number of other qualities. Bringing up some of these, Narayanamurthy says: ‘In my initial years, in terms not so much of teaching prowess as of ability to provoke, Prof N.R. Kamath stood out. He made many of us much better teachers than we would have otherwise been, if he had not been asking all the hard and inconvenient questions. Because of him we knew the limits of so-called knowledge, how much more we needed to learn, and that became a huge challenge. He’d throw hundreds of questions at us...it sent you scurrying and looking around for answers and that was something I practiced later in life in my teaching. He taught, but I did not think as a student, I received a lot through the lectures. The provocation was what made him stand out.’

In course of time, Kamath acquired a reputation of being somewhat peremptory with his colleagues, but indulgent and extremely popular with students. The following testimonials from alumni (all of Chemical Engineering) bear out Narayanamurthy and show us why. D. Dahanukar (B.Tech. 1964) describes him as ‘a wonderful orator who held the class captive.’ Dr A.L. Ravimohan (B.Tech. 1967) lauds him for his ‘inimitable style of debunking all that was not from the ‘real’ world outside.’ And Dr A.N. Dravid (B.Tech. 1966, and an Institute Gold Medalist that year), writes of him as ‘an inspiration, a motivator as much as a knowledgeable teacher and encyclopedic store-house of information in his field.’

Finally, here is what Technik said of him in 1974, tying together many of these facets:16 ‘Prof N.R. Kamath was known to students as an iconoclast, with a ready store of pointed jokes and covert winks. As Head of Chemical Engineering his name became synonymous with that of the department.
As Deputy Director (Academic) he was considered sympathetic towards students in academic deep waters which ensured a steady stream of supplicants at his door.

‘WITHOUT A THOUGHT FOR THE HOURS INVOLVED’

And for sheer stamina for teaching (in addition to his gifts at it) there was Dr M.N. Vartak of Mathematics, described by Sukhatme as ‘one of the most unassuming persons you can ever meet, never seeking anything and willing to teach as many hours as you want him to teach.’ Just how many hours would ‘as many as you want’ be? By way of example, he adds, ‘You start a new course for an M.Tech. programme and you say that you need 15 lectures, in all probability Prof Vartak would agree to give those lectures, you just had to ask. That’s how Prof Vartak was. There was a time when he used to teach four courses in a semester. Here was someone who would teach without a thought for the hours involved. And very clear in his dictation and in his teaching.’

Dr U.N. Gaitonde, while confirming Vartak’s unfailing willingness to teach, has this to add: ‘Prof Vartak should be given a medal just for his patience as a teacher. You ask him any number of questions, you go away, somebody else comes and asks the same questions, he will never say no. Maybe he had 48 hours a day to spend with his students, we didn’t know how he managed. One of the most approachable and most lucid teachers, he’d be ready to answer whatever you came up with, either from mathematics or from statistics.’

Another distinctive presence on IIT-Bombay’s formative landscape was Dr G.S. Tendolkar, who fostered the department of Metallurgical Engineering from its nascent days. Other faculty of the department regarded him as its de-facto founder, and as a kind and inspiring mentor to many of them, while they were finding their feet professionally. At the institutional level, it was Tendolkar who, amongst his many other contributions, wielded the baton to ring in the comprehensive academic overhaul of the early 1970s inspired by Kelkar. Carrying out a methodical analysis of the system then in place, pinpointing its prevailing shortcomings, the ‘Tendolkar Committee’ went on to delineate both the need for academic reform as well as the educational philosophy that would permeate the
changes. It went on to lay down the broad features of the revised curriculum and examination system which were then fine-tuned by the Mallik and Hira Lal committees. Tendolkar’s memory continues to be celebrated by the Institute annually in the form of a memorial lecture in his name.

‘EXPECT NOTHING’

Some of the many other names that have cropped up time and again – and who deserve individual mention but will have to be bunched into a club of notables for want of space – may be listed by working our way along departments, not alphabetically but in the order in which they flank the Institute’s long corridor from its southern end. From Physics, we have Drs P.P. Kane, J.S. Murthy and, from a generation later, Dipan K. Ghosh; from Chemical Engineering, Drs K.P. Madhavan, S.L. Narayanamurthy and G.S.R. Narasimhamurthy; from Chemistry, Drs Hira Lal, S.C. Bhattacharya, A.M. Mehta and A.B. Biswas. Moving along to Metallurgical Engineering, we have Drs G.S. Tendolkar and A.K. Mallik; from Humanities and Social Sciences, Mrs N. Swamidasan; from Electrical Engineering, Drs G.N. Revankar, H.B. Kekre, K.C. Mukherjee, K.B. Pradhan and M.V. Hariharan; from Civil Engineering, Drs S. Narasimhan and J.T. Panikar; and from Mechanical Engineering, Drs B.B. Parulekar, B.S. Jagadish, A. Jaganmohan, N. Ramaswamy and S. Somasundaram. And these are just some of the older lot, most of them retired a decade and more ago. Among the younger crop (if ‘young’ be the word for the 40-55 age bracket) we have another roster of names, too long to list. Significant here is the impression, gleaned from responses to questionnaires, that for virtually every student the Institute seems to have had a faculty member who answers to their conception of an exemplary teacher. Thus, student temperaments of every hue seem to have been satisfied – something that has doubtless played its part in shaping the competence IIT-Bombay’s graduates gone into the wider world armed with.

Before moving on, it needs to be said that not all faculty have been as dedicated to their profession or as committed to the Institute’s cause as the likes of those mentioned above. In the interviews I’ve conducted there have been frequent allusions to ‘mistakes in hiring’: and mistakes in recruitment to jobs in the government sector can be costly. Once made
permanent, indifferent performers are near impossible to weed out. It was thus perfectly possible, for those who so wished, to treat the IIT-Bombay job as a sinecure; and some certainly did. And the deadwood so accumulated lingered over lifetimes, leaving it to others to shoulder the burden, be it in teaching or research or administration, a lop-sidedness that could be quite demoralizing to the conscientious.

Alumni and students who’ve been at the receiving end of the apathy have expressed their displeasure in no uncertain terms. Dr A.N. Dravid’s words are representative of a wide section of opinion cutting across generations of students: ‘In my times, the quality of some teachers was very questionable. There was no pressure for them to perform. They had a life-long assured job, and therefore little motivation to excel either in teaching or in research.’ As a prescription against the phenomenon, Dravid adds: ‘A “publish or perish” pressure, or the concept of “tenure” should be introduced that keeps teachers on their toes, and weeds out mediocre teachers.’

And here is an example of the kind of thing that Dravid perhaps means; alumnus Vivek V.C. Achary (B.Tech. 1993, Metallurgical Engineering) recalls these flashes of reverse-brilliance that are at once comical and disturbing: ‘Once a professor in class said, “Typically the value is 3-4 but generally it is around 11.” We went into orbit after that. I used to take notes religiously in his class and repeated whatever he said in the exam. He asked me, “Who told you all this nonsense?” I didn’t reply but I stopped taking notes after that.’

Fortunately, however, the slack and listless have always been in a small minority; and it is to the credit of the majority that they have not allowed themselves to be infected – or even distracted – by the apathy of a few.

It needs also to be said that today’s faculty do, on the whole, work harder than their predecessors; they have to. The demands are greater today, both more multifarious and more insistent in each domain. Faculty are engaged in a great deal more R&D (which takes its toll not just in the performance of the technical work but also, unfortunately, in administering the projects, battling unwieldy procedures, and managing their staff); there are ever more students and ever greater dialogue with industry and other academic institutions; and the number of faculty hasn’t been growing in step with the demands.
Yet it’s true to say that if the modern generation’s efforts are effective today, it’s in large part because they’re building on the rugged foundations laid earlier. It was through the exertions of people of the kind sketched above, each to their own genius, that the Institute was built. For those who gave the better part of their lives to shaping IIT-Bombay, there was little reward in return. For decades, there were no institutional awards for excellence in teaching, research, technology development, industrial consultancy, and so forth. It was the rare person who got to go to an international conference. There were few accolades one could look forward to from national agencies and academies either – many of these were still finding their feet, or were newly formed. And, as seen in Chapter 8, most faculty at the Institute had been denied a reasonable shot at R&D for years together owing to the legacy of the Soviet equipment. The lines of Alice Walker’s poem ‘Expect Nothing’, with a couple of adaptations, make for an apt rendering of this state of affairs:

*Expect nothing. Live frugally
On reward.*
*Become a stranger
To need of applause
Or, if praise be freely
Given out
Take only enough
Stop short of urge to plead
Then purge away the need.*

In this age of short attention spans and collective amnesia, the contributions of these pioneers can all too easily be lost to view. It’s also an age in which money speaks the loudest. Rights to the names of laboratories, lecture halls, or sections of the library, have become, quite literally, easy purchase. Before it’s too late, the Institute and its departments may do well to recognize the contributions of their early pioneers, and set aside spaces to honour their largely unsung memory, without waiting for them to be first linked to endowments.

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c The lines of the original poem speak of the negation of romantic expectation. The first stanza reads (‘/’ denotes a line break): Expect nothing. Live frugally / On surprise. / Become a stranger / To need of pity / Or, if compassion be freely / Given out / Take only enough / Stop short of urge to plead / Then purge away the need.

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‘WE ARE GOOD PEOPLE, WE WON’T DO THAT’

They go by the variety of names seen in the previous chapter: support staff, non-academic staff, administrative staff and – perhaps the term that describes them best literally – non-faculty employees. And they have been the real behind-the-scenes ‘runners’ of the Institute: the lubricants that have kept IIT-Bombay’s academic and housekeeping engines chugging. From the very start, while IIT-Bombay has depended on them for ancillary services, it has had reason to be indebted to them also for keeping the campus’s pastoral life going.

Narayanamurthy’s warm commendation of this facet of their involvement brings it alive for us: ‘As a residential institution running a township, we had to attend to every little need. There was a lot of life outside the formal educational sphere we needed to address, and that at a time when almost everything was in short supply, be it milk, bread, sugar, or power. We needed to find problem solvers. We have to thank our non-academic staff for this, they kept all the supplies running beautifully, day in and day out (and they ran the film society too). Only when they ran into very major problems did they go to faculty or the Director for intervention. It was enormous, what it did for student life, what it did for us as faculty. It gave us a comfort level, kept us free from petty concerns, enabling us to focus on what we thought were our key functions.’

Gradually over the 1970s, IIT-Bombay’s non-academic staff, in step with industrial workers all over the country, became ‘organized’, forming their ‘Non-Academic Staff Association’ (the NASA). And although the Association did press for its demands from time to time, its most striking attributes at IIT-Bombay, as against the often tempestuous mood in the country as a whole, were restraint and reasonableness.

Former Registrar Ghosh, remarking on this quality, reminisces: ‘From time to time the non-academic staff would sit in protest in the Main Building, for instance if all the IIT unions had agreed that so many protests had to be made for so many days, because such-and-such provision had not been implemented. They’d say, “Sir, we have to do this, we have to show solidarity. We guarantee you that one hour out of the two we are supposed to protest, will be the lunch hour and we will only raise slogans once at the beginning and once at the end. At other IITs they raise slo-
Teachers at work... and at play. Top left: Profs J.R. Isaac, Electrical Engineering, posing before the newly acquired 3rd generation Russian-made computer EC-1030; Top right: Dr G.S. Tendolkar, Metallurgical Engineering, known globally for his contribution to powder metallurgy; Middle left: Dr K.K. Mani, Physics, in the process of editing an educational movie on solid state physics; Middle right: Dr P.P. Parikh, during a lecture on internal combustion. The scenes at the bottom are from a spoof on “My Fair Lady” conceived and acted out by faculty of Electrical Engineering, including J.R. Isaac, R.E. Bedford, and M.S. Kamath, for the benefit of their students, circa 1964.

gangs continuously for two hours, you know, but we are good people, we won’t do that”...and they were true, says Ghosh, to their word, keeping the Institute’s best interests in mind while staking their own claims.
Next to Registrars, it’s the Directors who have to deal with organized workforces. Sukhatme, too, has no unpleasant memories of these dealings. ‘Access to you as an Institute functionary,’ he says, ‘is important for them. They must know that they are being heard, that the functionaries are concerned about their welfare. That the authorities may not be able to do everything is another matter, and IIT-Bombay’s non-academic staff have realized that. Here we never really had extreme situations, like at IIT-Delhi where things get a little out of hand or IIT-Madras where there was more rough behaviour.’

Again, while efficiency of work at some support sections of the Institute has consistently fallen short of the mark, IIT-Bombay can count itself fortunate that, by and large, these services have performed better and more professionally than at most other Indian institutions of similar standing. Part of the credit for this has often been given to the city in which the Institute is situated, the Bombay of yesteryear and the Mumbai of today standing out in Indian urbania as a byword for enterprise, efficiency and cosmopolitanism. As for shortfalls in the performance of support staff, some of them may have as much to do with shortcomings in institutional management practices as with the personnel themselves. Dr K. Sudhakar raises an important point when he poses his predicament: ‘If you just talk to support staff one on one, you find they’re all very nice people, you simply don’t feel like complaining about them. And I have never come across an attitude of negativity that says, “why should I be doing this for you?” They want to help you but sometimes can’t, and they seem to be at a loss as to why they can’t. Something comes in the way – what it is I don’t know, but it really needs to be looked into.’

The question is an important one; and in my conversations with support staff, several ‘things that come in the way’ were pointed out by them, as we’ll see now.

**EQUAL PARTICIPANTS IN THE INSTITUTE’S JOURNEY**

The term ‘non-academic staff’ comprises many layers. And we’ve seen in Chapter 13 that their interests haven’t, over the years, received the kind of institutional attention they’ve deserved. Amongst a certain layer of non-faculty employees, those known as the Institute’s ‘D-Category’
staff, resentment against institutional indifference to their needs can be fierce. Speak to them, and a number of live-wire issues find swift and vocal expression. The following impressions are based on a range of interviews conducted, in particular one with the following group: Mr D.J. Bagul (Messenger), Mr R.B. Wankhede (Mess Worker), Mr H.B. Singh (Departmental Library Attendant), Mrs M. Shetty (Clerk), Mr V.L. Kshirsagar, Mr R.R. Deshpande, Mr V. Jetiya, Mr N.Y. Mohite, Mr A.V. Khandekar, Mr K.B. Singh, Mr S. Datta, and Mr V.B. Khapre (all Lab Attendants). Perhaps most embittering is their perception that they are openly, if unwittingly, overlooked. In several realms of the Institute’s operations they are automatically considered unfit to participate – often for no sound reason. An example, they tell you, is their exclusion from the list of those eligible to perform invigilation at JEE and GATE examinations – this despite the fact that they help conduct all internal exams, and therefore have the necessary experience and knowledge-set. And when it comes to institutional events of broad interest, they are often the only ones not to receive invites.

Also widespread is the feeling that the Institute hasn’t seriously addressed concerns peculiar to them, such as long-standing anomalies in salary structures and promotions. A further grouse is one that’s socially tinted. The ‘D-Category’ label is all-encompassing, staff with varying degrees of technical skills and qualifications being clubbed with, for example, sweepers, watchmen, or messengers. No distinction is made in the official treatment they receive from the Institute – with obvious blows to the self-esteem of those better qualified or better skilled than others. One of them relates his predicament thus: ‘When my son is asked by a classmate in school, “What does your father do?”, he is ashamed to have to say, “He is a D-class employee at the Institute” – even though I’m technically qualified and experienced. He should have to suffer no such complex.’

Then again on the professional front, they feel they haven’t been given their due. With handsomely funded consultancies and sponsored projects gushing into the Institute in recent times, they’ve seen faculty benefit visibly in many direct and indirect ways – including financially. Little of this benefit, however, percolates down to them through systematic provisions, although they are called upon to do ‘extra work’ to smoothen the execution of projects. In sum, these staff amongst the Institute’s employ-
ees have had special cause to feel aggrieved, and have ended up feeling left out and unwanted – and as if they aren’t included in the Institute’s list of its stakeholders.

And when you add aspirations to needs, the grievance is doubled. These staff have signed on at IIT-Bombay with varying levels – sometimes very little – of formal education. In common with others, they have aspired to elevating their social and economic station through their children, by educating and professionally enabling them. But living conditions on campus have tended to thwart these aspirations; housing is one of the greatest concerns. A one-room apartment is the most they get; and no child can reasonably be expected to study effectively in a one-room ‘quarter’ shared with parents, siblings – at times grandparents too – and in an atmosphere where discontent constantly festers.

This is not to say that non-academic staff (including those in category D) aren’t alive to the benefits of an IIT-Bombay job, or the trouble-free lifestyle it affords them in many other respects. They would, however, like their problems to be heard for what they are; and the loudest of their pleas is that the Institute’s Golden Jubilee, while certainly cause for celebration, should also be a stimulus for introspection. In broad terms, they would like to see an end to the (often inadvertent) neglect they suffer by way of institutional policy; better housing; and mechanisms – perhaps a Human Resources unit, which the Institute has so far lacked – to address their professional concerns.

The wider body of non-faculty employees would also like to have a louder voice in decision making bodies. Mr. G. Jayachandran, of the Institute’s Telecom Section, has been active in representing the interests of his non-faculty colleagues, having been President of the Non-Academic Staff Association (NASA). In the same breath as he accords credit to IIT-Bombay’s ‘system of working’, characterized by committees many of which include representatives from several categories of employees, he sees room for improvement in the inclusion of non-academic staff on bodies of higher authority such as the Board of Governors. ‘The Board’s set-up, both formal and informal, needs to be modified,’ says Jayachandran, who has also been a member and officeholder in the All-IIT Employees Union. ‘Since non-academic employees aren’t represented, they normally don’t get to know of decisions taken by the Board until after the event, and feel
powerless in influencing the outcomes’. Given the otherwise democratic set-up of the Institute, the Board of Governors too should be made more inclusive, he feels. Reprising another widely voiced grievance of his compatriots, he wishes the Institute would ‘recognize outstanding employees and award them annually just as it does for faculty, and also provide performance-oriented promotions apart from time based promotions.’ There are others who are more forthright in expressing their feeling of being hard done by. C. Viswanadh, Technical Assistant in Civil Engineering, has this to say: ‘The attitude towards supporting staff, particularly the technical category, needs prompt attention. Their share in building the Institute’s reputation is altogether neglected. Pity indeed!’

In sum, nothing less than a transformation of institutional mindset in relation to non-academic staff is what they’d like to see: one that regards them at all times as equal participants in the Institute’s journey towards its avowed goals.

And while these ranks have had their many discontentments, they’ve had their own star performers too. Among those that sparkle in people’s memory from the Institute’s first decades are the likes of Senior Technical Assistant Mr E.T. Randelia, Laboratory Superintendents Mr U.R. Kasbekar, Mr V.K. Tandon and Mr V.S. Vaishampayan, and telephone operator Mr G. Jayachandran. Two administrative officers of the Institute also stand out, the former Public Relations Officer Ms Aruna Thosar-Dixit and former Registrar Dilip K. Ghosh. We glimpse some of them through the eyes of others, a paragraph at a time.

Narayananmurtthy’s testimonial is typical of the applause Ghosh has garnered from many observers: ‘Looking at one outstanding staff member, I would mention Dilip Ghosh, the Institute’s Registrar from the mid 1980s until the turn of the century. Without trying to play down the importance of others, we had for the first time at IIT-Bombay a thinking Registrar, one who was also academically inclined. He knew what the role was; but he enlarged its scope. He knew the limitations of faculty and non-faculty, what the equations were. Within that framework, he contributed a lot, and also in terms of liaising with the MHRD, where he built up excellent relationships. Money was hard to come by those days in two ways. One was the quantum and the second was its timely delivery. Ghosh made sure of the timely delivery of money, through establishing numerous contacts.
He is someone with whom you could, as faculty, as Dean, talk one on one on many problems facing the Institute.’

Dr U.N. Gaitonde sketches E.T. Randelia, who was famed for ‘his’ IC Engines lab, and his cut sections of the engines that explained how they worked. ‘He was someone who could take even the simplest component of a diesel engine,’ says Gaitonde, ‘and tell us detailed stories about what it did and how it worked. He would make the whole thing come alive in front of us. And after that everybody was ga-ga, wanting to work on IC Engines. I haven’t seen any other staff member take so much interest in his work and in explaining to students, hours at a stretch, how each and every component works.’

This tribute from Dr H. Narayanan to V.K. Tandon: ‘He has been outstanding as a laboratory superintendent. I admire him for his technical capability, his dedication, his maturity and sophistication as a human being – the way he faces life. In fact among all my colleagues over all these years I have not met a person whom I admire more. It is to our department’s credit that we manage to use his services even after retirement.’ (Electrical Engineering, valuing Tandon’s commitment and skills, have hired Tandon on a post-retirement stint.)

Dr J. Vasi, when talking of the establishment of the microelectronics laboratory, often held up as an example of a lab at IIT-Bombay that has turned heads on the national and international stage, credits U.R. Kasbekar with being the bedrock for this success: ‘I can say without any doubt that without Kasbekar’s presence none of this would have really happened, because he was a marvel in many ways. Firstly he enjoyed a good reputation academically. He had done his M.Tech. from IIT-Bombay, so he was knowledgeable about many things technically. Secondly he had done his M.Tech. on the job, which implied that he wanted to learn more – and that actually was pretty much true throughout his career; he kept updating his knowledge. Third, he was very meticulous, he kept a very good record of things and he knew the processes inside out. Those years, frankly, I used to feel that ordering equipment and so on was quite easy but it was actually smoothened out by Mr. Kasbekar. And when equipment came in he would make sure it was all set up correctly, everything moved so well with him around. Setting up the microelectronics lab was not really as difficult
as, unfortunately, I’d expect it to be today. Today I would find it more difficult because I learned from experience that without facilitators like Mr. Kasbeker, things actually don’t move that easily.’

The faces in this chapter, then, have been the notables of yesterday. Just as they’ve left their mark on the Institute’s journey to its 50-year milestone, there are several in the younger generation today who, assiduous each in their own way, are accelerating the pace at which the Institute presses onward. They, surely, will be remembered with equal warmth another 50 years on. Faculty who stand out for their teaching, or research, or administrative acumen; staff who bulwark these efforts and, hopefully, will have the chance to contribute ever more of their own imagination and skills. Over the forthcoming decades, the academic standing IIT-Bombay enjoys will be decided directly by their efforts, and by the measures it takes to derive the most from those efforts.
In the sixties they left the Institute just as fresh-faced as they came in, innocent of any clear notions of where they were headed, or why. They wore hair-oiled, schoolboyish (or girlish) looks, and wrote in a locally flavoured Queen’s English.

In the seventies and eighties they were more sure of themselves, and – now in khadi and floor-sweeping bell bottoms, the boys in hair as long as the girls’ – were sure also of the prospects the IIT-Bombay education opened up for them. Meanwhile, those who had graduated in the 60s had worked away creatively and enterprisingly – yet quietly – at their chosen callings, and were by and by making their presence felt in academia, industry, and public bodies, both within the country and overseas.

From the mid-eighties until the mid-nineties they gained in self-assurance until they became almost cocky, believing the world lay at their feet. Late 90s onwards, the graduates of the 60s and 70s vindicated the notion, as they took the world by storm with some of their virtuoso exploits, pitchforking the Institute into the global limelight; and they thought nothing of parting with good chunks of their wealth – and time – to enrich their alma mater. Today, they’re amongst the most prized resources the Institute banks upon for its prospects in the decades to come.

Thus the way the Institute’s students and alumni have brushed, and been brushed by, IIT-Bombay’s spirit. This chapter is about this two-way exchange, and we begin it as we did the last: with a small Hall of Fame (or should one, as might become apparent below, call it a Rogues’ Gallery?). We move next to a montage of memories, largely in their own words, of
their times at the Institute, times which they eventually grew to hold in astonishingly profound affection.

(UN)DERNOURISHING THE ENTREPRENEUR – SCRIPTING A SPARKLING SUCCESS STORY

It’s the rare IIT-Bombay alumna who won’t remember the NCC Canteen. Known also as ‘Chinko’s’, basic and scruffy in appearance – and equally scruffy in its fare – it offered, over decades, material sustenance to the hostels’ night-birds into the small hours of the morning. In the 1960s, however, it also served a somewhat more exalted purpose. Despite its dowdiness, it doubled as the venue for corporate Board Meetings and Annual Shareholders’ gatherings.

Which firm in its right mind would operate from this unlikely locale; who was its CEO? The moving spirit behind the affair was an IIT-Bombay student, citizen of Hostel 2, and one described as ‘a person with a huge appetite for life – and in fact for food too.’ It was a bit of a curse, however, to have a huge appetite for food in mid-1960s IIT-Bombay. Your gastronomic sensibilities were more likely to be insulted than gratified. Partly because of the customary quality of mess fare, but also because the Institute’s director, Brig. Bose, had taken it upon himself to impose a ‘basic diet’ upon his wards. This consisted in a uniform, unvarying Spartan fare – daal, rice, chapati, vegetable – a diet meant to steel their bodies, edify their souls.

The youth with the massive appetite figured that some nutritional dodge had to be devised – and dreamt up the idea of a canteen. A hostel canteen, where you could buy food you liked any time you wished. (Hostel canteens might be taken for granted today, but were an untested idea then.)

The idea was all very well, yet how did one go about rigging up such a thing; where would the money come from? A second idea flashed in his mind: why not try public funding, and an IPO? He went around the hostel asking fellow sufferers if they’d consider investing in the new venture. And found several takers for the scheme. ‘I for example,’ recalls Dr J. Vasi, the teller of this story, and at the time the dreamer’s hostel-mate, ‘I think I bought five shares at Rs 10 each, putting up the handsome sum of Rs 50.’ Not bad, given that in the 1960s premium companies’ shares used to be floated at Rs 10 apiece.
The project proved an unqualified success. Able to raise the money, the budding entrepreneur was able also to convince his hostel to give him a small room to operate in. Here he installed an employee – read, a thambi – and some basic kitchen equipment: mixies, kettles, a stove. So every evening and after dinner you could have milk shakes, chocolates, savouries, snacks... the priceless institution of the hostel canteen had come into being.

The venture, a public limited firm by nature, was run to exacting professional standards. Semesterly dividends were paid. ‘And they actually made reasonably good profits,’ recounts Vasi – but his flair for understatement masks the real scale of success. Shareholders found themselves richer by no less than a splendid 200 per cent per annum (a semesterly dividend of Rs 10 was given out).

Corporate protocols, too, were scrupulously followed. An Annual Report was issued; an Annual Shareholders Meeting called; Board Meetings held. And the corporate chambers for these high-powered meetings? Why, the ncc Canteen – which happened, conveniently, to be right across Hostel 2. This wealth creator’s entrepreneurial instinct was to grow, grow, and grow some more. Today, Dr Romesh Wadhwani (B.Tech. 1969, Electrical Engineering) is renowned – and here we quote the citation for the Distinguished Alumnus Award he received from IIT-Bombay in 1996 – for having been ‘an outstanding entrepreneur in high-tech areas for over twenty years. He is Founder, Chairman and CEO of Aspect Development, Inc. Aspect’s customers include 50 of the world’s largest electronics and mechanical manufacturers with combined annual revenue of $400 billion.’

Wadhwani, irrepressible entrepreneur, inventor (he also fabricated during his student days the homespun Coke-dispensing machine mentioned briefly in Chapter 7), is now a generous benefactor of the Institute, having sponsored the Wadhwani Electronics Lab in Electrical Engineering.

THE REBEL WHO FOUND HIS CAUSE

In the last chapter we had interrupted Prof N. Swamidasan abruptly in her reminiscences just as she was about to launch on another of her Brig. Bose tales; here, making amends, we ask her to complete it.

‘There were two doors to the class,’ she resumes, ‘one at the front and one at the back. I had closed the front door. Suddenly at the back door ap-
peared Director Bose. I ignored him, continued my teaching. Somebody asked me a question – some interruption as usual – and I said something, and the students laughed. Even as this laughter broke out, Brig. Bose walked up to the platform where I was standing and said, “Excuse me, I want to talk to the boys. I have been observing you,” he said to them, “how you have been troubling this lady teacher of yours and I know this is what you do to every teacher. You’ve come here to study but instead you trouble your teachers, you ask unimportant questions and behave badly. Next time there’s any report about you, I am warning you I will throw you all out of IIT!” Then he turned round to me and said, “Madam if these boys misbehave again please let me know.” I said nobody had misbehaved, and that this was as usual. But he wasn’t prepared to listen, and walked out. I asked the boys in class, what happened? Why’s the Director so annoyed with you? They said, “Oh, you know, we barricaded the door before the last lecture.” This is the class in which Dunu Roy was one of the students. “We barricaded the class,” they said, “and saw to it that the teacher could not get in. He probably went to the Director.”

‘When I asked why this had happened, Dunu Roy stood up and explained, “See if a teacher cannot teach, we keep him out of the class. We have a teacher who writes on the blackboard with his back to us and mutters things we can’t follow. So we keep him out of class. Because attendance is compulsory, we have to be here so we keep him out.”

‘They didn’t mention any other teacher who was banished thus, only this one. When I went to Brig. Bose and told him this, he was surprised, he said several teachers had complained about this notorious class. When I confronted Dunu with this he asked me to understand: “Your generation had issues to fight for, pre-independence days. My parent’s generation had something to fight for. We have nothing of the kind. We have to see what’s around, pick things we can fight for. Even an issue like a teacher not teaching properly becomes something we take up and do something about.”

‘I was impressed with his saying that they had to take up issues – and later, after he graduated, he started working in an NGO. Once when he came back, he met me and said, “I have found something to work for.” I asked him if he’d be satisfied doing what he was, and he said, “At present I am.” I am mentioning Dunu Roy because subsequently some of these IIT-
Bombay boys who went to the villages to work for tribals, have also made immense contributions to the nation.

Just as Wadhwani went from strength to strength in techno-entrepreneurship, so did Anuvrata (Dunu) Roy (B.Tech. 1967, M.Tech. 1969, Chemical Engineering) in his chosen field, that of social activism. His Distinguished Alumnus citation says he has ‘played the role of an engineer away from the beaten track. His work has been path breaking as it has shown how an engineer who works at grassroots level needs to combine understanding of social, cultural, environmental issues with technological issues.’ The ‘Vidushak Karkhana’ founded by Roy in the 1970s in Shahdol, MP, is legendary in circles knowledgeable about the creative work it has done.

Today, Roy divides his time between heading the Hazards Centre at Delhi and giving incendiary talks, such as at Techfest 2007, where he left the student audience stunned by insulting them to their faces, calling them ‘big fools’ with ‘swollen heads’ – all in the hope of provoking them into turning their minds to India’s teeming social and ground-level engineering problems, from which he feels they’re completely detached.

But Roy wasn’t all earnestness and no fun. After his talk, Dr S. Dixit of Metallurgical Engineering and Materials Science walked up to the stage and said, ‘This audience should know that all the great work Dunu has done in the social arena shows only one side of the man. He has many other achievements to his credit – including the organization of the strangest sports event any educational establishment has probably ever seen.’ But just as we waited for Swamidasan’s story about Roy to be completed, so we wait a few pages for the completion of Dixit’s; here, we return to running our gaze over a few other faces.

I WOULD HARDLY HAVE WRITTEN OUT THE PROBLEM AND...

‘He was the best student I have seen,’ says Electrical Engineering’s Dr H. Narayanan without a trace of hesitation, when asked to reflect on students who stand out in his memory, ‘the very best in all these years. Remarkable, in the sense that he could make connections between unrelated things very easily and see the essence of them. I remember he was continuously asking to be allowed to finish the B.Tech. programme faster. He had this
habit also of not attending classes and sitting at home. He’d study very seriously, though, he just felt that coming to class wasted his time. And he had to go faster. So I asked him, “Why are you in such a great hurry? These are subjects that have taken 200 years to develop, so why are you in such a great hurry?” He said, “I go deep.” He couldn’t speak English very well those days. “I go deep,” he said. “For me things repeat.” And that’s all. But I took him very seriously because I saw the way he answered questions. And I continuously kept track of him. And I used to predict that he’d go on to do well. Many years later, he cracked that big thing.

And here’s why Swamidasan, too, can’t forget him: ‘He took a course of mine, Philosophy of Science, and I didn’t know he was a gold medalist in the making. He was one of the boys I liked a lot, he used to come and talk to me. He was one of those very interesting boys when I used to give a problem in Symbolic Logic those days, they’d have to deduce something and I’d give them points for it. I’d hardly have written the problem, and the rest of the class would be working at it, and he’d have finished it. He was very good, he used to work it out so fast...not a single other student did it that way. Eventually I had to ask him to keep quiet because every time he’d be giving the answer, not giving anyone else a chance. So he was that kind of boy, and he was from a small place and not one with a great facility for the English language. But a very bright boy. Later I heard he contributed to some algorithm.’

What Narayanan refers to as the ‘big thing’ and Swamidasan as ‘some algorithm’ is in fact a world famous breakthrough in its domain. We turn here to the Distinguished Alumnus citation to know more: ‘Dr Narendra Karmarkar (B.Tech. Electrical Engineering, 1978) is well known for the Karmarkar algorithm for linear programming which was announced in 1984 and which made headlines not only in scientific publications but also the mass media.’ To have an algorithm named after you is a rare thing indeed, and Karmarkar had won this distinction when he was all of 27, in 1984 – just six years after he graduated from IIT-Bombay. The Association for Computing Machinery (ACM) awarded him the Paris Kanellakis Award for his work; the award citation remarked that Karmarkar’s contributions ‘inspired a renaissance in the theory and practice of linear programming, leading to orders of magnitude improvement in the effectiveness of widely-used commercial optimization codes.”
Postscript: The mathematical wizard’s impatience with the imposed pace of study at IIT-Bombay was so widely known as to attract this snide mention in *Technik* in 1975:1 And there was Karmarkar 730 [this an allusion to the fact that he was a 1973 entrant] … this bright young lad finished his third year courses in his holidays and wished to take on the Fourth year making a crash course of his B.Tech. programme. But the guardian of Academic Programmes, the Dean, sagely advised him to take to invigorating pursuits like football, athletics or even holding hands with the fair damsels. L.H. any takers? [L.H. here is the ‘Ladies’ Hostel.’]

‘AN EXTRAORDINARY PERSON’

A public letter carried in *Technik* in 1978 went:

To the numerous involved students and staff of the institute, the undersigned would like to express their thanks for making Mood Indigo a success. Thank you is as easily said as it is inadequate. Inadequate for the sleepless nights, for the many days of hard work, for the amount of running around and for the planning and execution of the festival. But we hope that all will understand.²

One of the two sleepless souls who signed this letter was a man who went on to become a household name in the realm of entrepreneurship and wealth generation in India: Nandan Nilekani (B.Tech. Electrical Engineering, 1978), Co-Chairman of the Board of Directors of Infosys Technologies Limited. Nilekani would seem to have displayed exceptional leadership skills in his formative years at the Institute. Busy with pre-event preparations, his friends saw him less and less in the classrooms; one compatriot recalls: ‘Nandan started slowly but gradually took control of the situations and before long he was telling them what to do and they all followed him without any protest’.³

Nilekani has attributed much of his leadership and management skills to his experience in organizing IIT-Bombay’s glittering student festival. ‘We were the guys who started Mood Indigo’, Nilekani reminisces with pride. ‘And I personally organized two of them. Once you have done that, I think you know all about management. At least, all that I know about management and leadership I learnt in Mood Indigo’ – an ultimate acco-
lade for the gains from organizing ‘M1’, and one of the most widely quoted soundbytes in IIT-Bombay folklore.

Nilekani made waves in 1998-99 by giving remarkably generous endowments to the Institute. By the time he had signed the final cheque, he had donated $5 million for a wide range of projects, translating into about Rs 23 crore, making him the Institute’s largest individual benefactor – and not one project did he wish to be named after him. Dr D.B. Phatak has been won over both by his modesty as well as by another facet of Nilekani’s generosity: ‘I consider Nandan’s contributions as greater than many others because,’ says Phatak, ‘he has created wealth legally and ethically in India at a time when wealth creation here was very difficult. He is an extraordinary person. All others will actually expect some recognition or other when they donate.’ (We’ll hear more of Phatak’s interactions with Nilekani in a few pages.) When asked about this trait, Nilekani, one of the most successful entrepreneurs and wealth creators modern times have known, said, simply, ‘I believe philanthropy should not be flaunted.’ And as for the official tribute (he was conferred the Distinguished Alumnus award in 1999), it went: ‘Mr. Nandan Mohan Nilekani has been one of the driving forces behind the emergence of the Indian software industry on the global map and holds the distinction of establishing, along with six others, a software company that is a role model for Indian industry. He is known to be an outstanding strategist, an excellent analytical thinker and an extraordinary communicator.’

‘PROUD TO BE A “NON-POSTER BOY” ALUMNUS’

‘One of the students who was absolutely memorable,’ Narayananurthy tells us, ‘was a person called Arun Nilakanth Dravid. He was a recipient of the President of India Gold Medal. He was a complete person, a good classical musician in his own right.’ Dr P.P. Kane remembers ‘Dravid from Chemical Engineering’ as ‘one of those very outstanding students with whom I had good interactions. He used to pester me in the staff room with questions.’ And Dr K.P. Madhavan adds: ‘If you read his answer papers, you’d know that he knew the subject extremely well, you could detect the talent. Immediately you’d know that he was a class apart.’
For a change, we hear more about this alumnus in his own words than in others. ‘Proud to be ‘Non-Poster Boy Alumnus’,’ writes Dravid, ‘I am one of those who spent most, if not all, of my career serving the Indian industry in India. Although I did complete a Master’s and Doctor’s degree from MIT, and had a stint of working in the US for about 7 years, I gave up my green card, and returned to Mumbai to pursue a long career with a consultancy company. During this long career I served the Indian chemical industry as Managing Director of this company, and I am still the Chairman of it, now known as Jacobs Engineering India. This was a rewarding phase of my long career, during which I received a number of professional awards including recognition by IIT-Bombay and UDCT as an Honorary Fellow, Distinguished Alumnus, and an external member of the IIT-Bombay Senate.

‘Thus, I fully agree that graduates that stayed behind, including those who excelled with President’s Medals or Institute Silver Medals can have equally or even more rewarding careers at home as compared with the money and glamour of a career outside India.’

Dravid’s gifts didn’t stop at chemical technology. He is a Hindustani classical vocalist, a recognized exponent of the Jaipur-Atrauli Gharana. Accepted by no less a singer than Kishori Amonkar as her first disciple, Dravid (B.Tech. Chemical Engineering 1966) undertook six years of rigorous training under both Amonkar and her mother, Mogubai Kurdikar, even as he pursued his B.Tech. at IIT-Bombay. Today, he is invited to perform the world over; simultaneously, he continues to pursue his ‘other’ callings, in chemical industry and consultancy.

‘I HAVEN’T TAUGHT A BRIGHTER STUDENT’

Dr Shiva Prasad of Physics, in the course of harking back to past students, had this to say: ‘I shall not be doing my duty if I do not name one very brilliant girl that we admitted in our two year M.Sc. Physics course. Her name is Seema Kumari Lathi. She was from Bhilwara, a small town in Rajasthan, but extremely brilliant. I have not taught any brighter student in the two year stream of M.Sc. Physics so far.’

A little way down IIT-Bombay’s long corridor, in Electrical Engineering, the same girl made just as lasting an impression. ‘One girl student
I remember,’ says Vasi, ‘is Seema Lathi. She came from Physics, M.Sc. Physics, but very...very memorable. She did a very good job. After her M.Sc. in Physics she was very keen on doing an M.Tech. in microelectronics, and she went to perform outstandingly in her courses and her project. Someone like that, with a strong interdisciplinary bent, was perfect for the kinds of projects we were running.’

Just a few words from Prasad and Vasi, but significant because it is unusual for a student who’s spent just two years at the Institute to have left such an enduring impression, that again on two members of the faculty in different departments.

Standing out as unique among the ranks of undergraduate girls at IIT-Bombay is one who so emphatically outperformed her contemporaries that she’s remembered to this day as ‘incomparably the best girl student we have had at IIT-Bombay’. This was Vijaya Korwar, of Electrical Engineering, gold medallist in 1976. She, it’s recounted, had a graduating CPI near 9.95, making the Institute’s next best that year (around 9.6) look decidedly middling. Such was her performance that her CPI reigned as the highest between 1974 (the first year a batch graduated with the index) and 1979. She was unusual in another way, having gained admission not through the JEE but as a direct entrant on the strength of her university rank (an avenue of entry that existed from IIT-Bombay’s earliest days and continued for several years).

Dr Vivek Borkar, now on the faculty at TIFR and a Distinguished Alumnus of the Institute, was in her class. He, too, was an academic high-flier coming into IIT-Bombay, having stood first country-wide in the JEE that year (and so holding the coveted title of ‘AIR-1’, or All-India Rank 1) – only to find himself left firmly behind, at the Institute, by Korwar. He recalls her as being very focused on doing well in exams, undistractable from her purpose, and systematic. ‘She gave equal attention to every subject,’ says Borkar, ‘not allowing her likes or dislikes to come in the way.’ Given that this was in the early 1970s, and star performances by girls in the realm of technical education still a rare phenomenon, did it come as a blow to some of the boys to be drubbed by a girl so comprehensively? Not really, says Borkar. Students in his batch were in awe of the exam performances Korwar used to turn in and, once they’d accepted there was no way they could better them, they simply ‘had to concede this territory to her’.
In the opinion of one of Korwar’s teachers, Dr H. Narayanan, ‘All of Vijaya’s attention seemed to be in “maxing” the exams including, I felt, a study of the peculiarities of the faculty from the point of view of exam questions and the type of answers expected. But there is no doubt at all in my mind that she was one of the all-time greats as far as exam technique was concerned. Over the first twenty minutes of the exam she’d solve the paper fully in the rough and then, as Prof Kamath used to say of her, she’d get along “like a house on fire.”’

Of the very many that were eminently possible, the handful of wax-works that appear here were chosen to illustrate certain points about IIT-Bombay’s former students. First, the wide range of endeavours in which alumni have excelled, despite being ‘engineers’ by training. Second, the fact that glimmers of their excellence to come were clearly visible during their time at IIT-Bombay. Third, that the atmosphere at the Institute gave them full rein to shape their talents. Finally, to take note of that exceedingly important phrase nestled in Dravid’s account, calling himself a ‘non-poster boy’ alumnus. There are hundreds of others like Dravid who have helped build up and strengthen Indian industry, academia, public sector, finance, and even politics – but are largely invisible to the public eye. Swamidasan, who has already touched upon this issue, expands now especially in relation to a certain profile: ‘What I feel is that some of the IIT-Bombay boys in their own way have tried to reach out to the really deprived and oppressed, and do something for them. How far they’ve succeeded I don’t know, but an awareness that we’ve had such students is necessary, because one doesn’t generally think of them as great alumni of the Institute.’ This last statement warrants particular attention, as many alumni feel that their alma mater hasn’t recognized or projected solid, valuable work done by the hundreds of the ‘non-poster boys’ the way it has projected their more famous, or richer, counterparts.

(One may also note that women students have not yet gained prominence in IIT-Bombay’s collective memory. In number there have been very few, of course, compared with the boys; and it has been more difficult for them to carve out a niche for themselves in traditional engineering.)

We move now from individuals to students at large, glimpsing slices of student life through the decades – and letting them, for the most part, speak for themselves.
GUM BOOTS, F-1 DONKEY RACES, AND ‘HUGE PILES OF TALENT’

With the Institute virtually an unknown quantity in the early 1960s, and armed with very little idea of what awaited them, IIT-Bombay’s early students were like prospectors venturing into unmapped terrain. And they looked the heroic part, too – if only because the Institute obliged them to. ‘When the time came to actually make your way to IIT,’ recalls Vasi, who arrived in 1964, ‘you were sent this letter saying that prospective students had to report on such and such date and bring the following. Now amongst ‘the following’ were all kinds of interesting things. For example they said you have to bring a hat because of the intense sun, especially in the summers – and I know at least two people who actually brought along not just hats but their Sola Topees. The other thing they insisted on bringing was gum boots, so you saw all these freshers coming in holding bags in one hand and in the other, holding a pair of gum boots. It was quite an odd sight but,’ Vasi concedes, ‘you did need those gum boots because right away when you came it was already monsoon, and Bombay has such fierce rains. It was muddy and squishy and I remember actually wearing my gum boots for a few days.’

But for all their practical utility, the gum boots could be a big liability, and not just in the matter of causing foot cramp. ‘Obviously gum boots were very alien to the IIT culture,’ Vasi explains, ‘and sooner or later nobody wore them, switching over to chappals – except at the start of the next year.’ Going into their second and third years, Vasi’s batchmates were able to spot freshers from a distance as ‘the guys wearing gum boots.’ And as for the latter, betrayed by this loud advertisement of their status, they became sitting ducks – serving up for their seniors yet another go at that most dubious of diversions, a bout of ragging.

And what, inconveniences and oddities apart, was life for students like in the 60s? One outfall of being in an area like Powai, cut off from Bombay was, in Dr K.P. Madhavan’s words, that ‘since there weren’t too many things you could do in the immediate vicinity, at least for five days a week you tended to be interned here – and naturally, you took fullest advantage of whatever facilities were available.’

‘Facilities’, of course, were being created one by one, and were necessarily limited – but students did take the fullest advantage. The 1960s
As they looked then (Top): IIT-Bombay’s students flash their creased trousers and ironed shirts, mid-1960s. No prizes for guessing what sorts of figures a similar group would cut today.

Turning lathes and turning heads (Bottom): IIT- Bombay’s early students looking rather vogueish, in their high gum boots, on the workshop floor.
seem to be high days for sport (all except organized swimming), theatre, writing, and hobbying of a great many kinds. Students acted in and directed a wide range of plays, both within the Institute and in theatres in the city. And student magazines of the time – such as Technik and the annual Pragati – carried a good amount of controlled, nuanced writing – if somewhat quaint in its Victorian flourishes. (Today, of course, it is Americanisms that hold sway, on paper and on the tongue.)

Added to which there was no little maverick activity of an undefined nature. Consider, for instance, the ‘Pagal Gymkhana’. In response to an appeal for memories and photographs from the 1960s, alumnus Dr Dinesh Mohan (now on the faculty of IIT-Delhi) sent in the pictures shown on these pages and the accompanying write-up. Supplemented by Dunu Roy, they resurrect something of the timbre of the times.

Pagal Gym 1: We organized the ‘Pagal Gymkhana’. I forget whether it was just once or twice. These pictures show Brig Bose in Arab head gear and the Coca Cola drinking contest (Anand Virmani in the foreground).

Which still doesn’t tell us what exactly the ‘Pagal Gymkhana’ was; and which is where Roy’s account helps us along:

‘This was an idea that Dinesh and I had stolen from our old school (Doon). How we got into the Student’s Gymkhana in 65-66 is one of those accidents of history. The previous year the Committee, headed by Virat Sahni, had got so disillusioned with the adamant attitude of the IIT administration, headed by the formidable Brig Bose, that nobody wanted to stand for elections. So we put in our papers, much to the displeasure of our seniors, and all of us got in unopposed! It was a truly fantastic team with Dinesh heading the social and cultural side and Ashok Modak steering the sports activities. We jelled so well that together we took on the Brigadier and the result is there to see in the picture – he came to the Pagal dressed as an Arab!’

Pagal Gym 2: ‘Top picture shows Professor T.R. Sarkari launching the festivities by running around the main field with the Pagal Gymkhana ‘torch’ and the bottom picture the winner of the donkey race (Tyzoon Tyabji?).’

And there we have it: pictorial evidence for what Dr S. Dixit had dubbed, some 40 years later, the ‘strangest sports event’. He had gone on to describe it further: ‘This was the first, and only, donkey race anyone
has perhaps ever seen – Formula 1 style, complete with flag-offs, betting stalls, a running commentary – and the donkeys ridden by carefully selected students of short stature (the jockeys). ‘Some competitors’, added Dixit, ‘did complete the race.’

When asked to cast his mind back to the exploit, Dunu Roy said, ‘From what I recall, the animals were turfed out from the local building contractor’s camp, where he was trying to construct Hostel 8.’ And instantly sank back into remembrances of times past, recalling the adolescent energy at the Institute waiting to be unleashed:

‘There was a huge pile of talent just waiting in IITB in all kinds of fields - theatre, debating, football, gymnastics, boxing, ham radio, electronic giz-
mos, aeromodelling, and so on – and I think (or like to think!) that our panel merely provided the opportunity for all that talent to let loose. And how both the seniors and juniors responded! They just whizzed off in all directions – including the iconoclastic Rejectra,\(^a\) the hugely creative inter-hostel dramatics, the fiercely competitive inter-college debates, and the building of an image of IITB slightly removed from the Intel type nerds. In fact, there was so much activity that both Dinesh and I had less than the required 40% attendance in classes. The Pagal was a kind of culmination of all that effort. And I think a lot of people of those years may remember it with quiet affection and ribald humour!

**A MESS WITH A CAPITAL M, A PAEAN TO THE POTATO**

As for living conditions in the hostels that backgrounded these varied pursuits, a promising, but foreshortened, account appeared in *Technik* in 1966. Titled *A guided tour of the institute: A Typical Hostel*\(^4\) (note the appearance of the ‘sola topee’ in the passage), it ran:

> Here we are at last, gentlemen, at a typical hostel. We go in through the front gates, and climb up the steps taking care not to step on the dogs, cats, watchmen, cows, cycles and other fauna. Here is the hostel lounge. See how the boys spend a relaxed evening. I hope you can hear me over all the noise. Now, there’s no reason to laugh at that boy just because he’s dressed in a pink lungi, yellow shirt and sola topee. He’s entitled to dress casually in the hostel. The boys dress quite well outside, and sometimes they even wear their trousers. What’s that, madame? You want to know who that quiet well dressed boy is? The one whom all the students are yelling at? Well I happen to know he’s no student,. He is the Mess manager. Which brings us directly to the Mess. Yes, I know ‘It sure is a mess’ but I did not say mess. I said Mess. That’s right it’s a Mess with a capital M.

> You might not enjoy the food we get here. One has to get conditioned to it. You might say it’s a kind of an acquired distaste. If those of you who are strong

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\(a\) Rejectra was a breakaway student magazine of the mid-1960s; in people’s memory, a hilarious – and merciless – spoof on the ‘official’ student magazine of the time, Spectra, which was ‘written’ more by the Institute’s functionaries than by students themselves. Unfortunately, no copies of Rejectra seem any more to exist within easy reach; all appeals to alumni to trace surviving issues failed.
and healthy will follow me into the kitchen, we can get a look at the strong silent men who day after day and week after week, turn out this tripe. There in the corner moodily rolling chapatties with an old beer bottle, is the head cook. On the floor there are a couple of his sidekicks, playing pat a cake with the evening’s bhajias. Those who want to retch will please go to the back. Well, that’s about all as far as the Mess goes (and I’m sure it’s quite enough). And now if the little boy will take his head out of the water jug, we can all move on. I think that’s enough of this typical hostel. I’d hate to take you up to the students rooms. No one is sure even now as to what unimaginable horrors dwell there.

Since we’ve been cautioned in our best interests to restrict our curiosity to the Mess and no further, we pay heed – and peer a little deeper into the cuisine of the times. Hostel food: can there be a butt of students’ jokes more universal than this? And at IIT-Bombay, students had particular reason to feel aggrieved – at the very diet that had stirred the entrepreneur latent in Wadhwani. ‘Some of us who joined in 1964 did have problems with the food,’ remembers Vasi, ‘because Brig. Bose had just started what he called a basic diet. He felt young engineers-to-be shouldn’t be pampered, they should have a good, healthy, Spartan diet – just roti and dal and sabji and rice. It started the year we came. But thankfully this basic diet only lasted about a couple of years. I don’t recall any formal pressure for change but I think people did definitely want a change and I guess Brig. Bose must have agreed to it.’

In vengeful rebound at the many months of deprivation, students made it a point to treat themselves to the best possible messing. ‘After that we went back to normal food and actually,’ says Vasi, ‘the later stuff was fantastic because in our hostels we subsequently had four messes, a Gujarati, a Maharashtrian, a South Indian and a North Indian Mess. You could choose exactly what you wanted, you could change your preferred cuisine month to month.’

No matter what the changes, one dietary giant weathered them all, standing its starchy ground. Alumnus Rajendra Gadgil (B.Tech. Chemical Engineering, 1974) was so moved as to pen a paean to the substance, set to the meter of that timeless S.D. Burman composition, Phoolon Ke Rang Se:
Patthar ka aata/aaloo batata/tu kyon hamein roj khilaye/
Jitna bhi khaoon/RK mein jaun/jaundice hamein tu dilaye /
Subah batata/shaam ko batata/din mein chaar baar batata/
Yaad tu aaye/bhook lagaye/yaad aaye aloo batata/
Haan..haan..Kaisa yeh mess bill/kaisa yeh khana/inka mel kaise jamana/
Khana hoga yahein hamein/kayee kayee baar.

Which, translated in the spirit of the writing, is to say:
Dough of stone/Potato and potato alone/Why foist on us everyday/
As much as I eat/Towards RK turn my feet/Jaundice, thus, you convey/
Potato for breakfast/Potato for tea/Potato four times a day/
In memory you dwell/My appetite you swell/On my mind you prey,
o mighty potato/
See here this mess bill/See here this food/How, tell me, do they jell/
Yet eat here we must/And here alone/Again and time again …

‘You should hear Gadgil singing this,’ says Dr U.N. Gaitonde. ‘There is something in the song also about cogging, about writing a journal, fluid mechanics, the hospital and many other things that give you the mood of the times.’

‘Audience participation’, and ‘a lousy function’

Come the 1970s, and performances of all kinds had begun to stipple IITB’s students’ calendar. But if you happened to be in the audience, you were likely to end up hearing more of those amidst whom you sat, and of yourself, than of the performers: that curious phenomenon that went by the name of ‘audience participation’. We have this heavy-hearted rumination on it in the wake of the programme Geetanjali held in September 1970:

Institute functions reached a new height of mediocrity with Geetanjali. One can picture future social secs. scratching their heads and wondering whether they’ll ever reach such murky depths. Audience participation reached a maximum but behaviour reached a new low and one feels that professional hooligans could have picked up a thing or two from our crowd.

b That fine art by which the IIT-Bombay student utterly uninterested in classroom proceedings still managed to achieve some parity with the ‘studs’ – involving the use of ‘unfair means’ and other such.
The programme began with a Hindi song by Patil followed by a song on the Bul-bul tara. This was one of the few good items of the evening and since the audience hadn’t really got down to it, it was heard. Then came a duet by Mr. Niranjan Mehta and Poornima Kikahi and the audience went wild. We heard a few words amidst the boooing, whistling and general rowdiness and we cannot really comment on the performance. (This was the trend throughout the evening. We heard more of the audience then the performers.) Then there was a game attempt by the ladies group to sing a funny song in some language but once again the audience was louder and so we reserve our comments.

Undeterred by reproach or revilement, ‘audience participation’ was only to flourish throughout the 1970s, attaining such heights that it threatened to bring to an untimely end IIT-Bombay’s flagship student festival: Mood Indigo (whose uneven early course will be traced in Chapter 17).

And this slice of IIT-Bombayana shouldn’t fail to bring a sweet-sour smile to the lips of anyone who has had to endure (which is perhaps the only word for it) but a single episode of that distinguished studently tradition, the ‘Hostel Function’, or ‘Farewell to Final Year-ites’. A mid-70s specimen was rendered with surgical precision, and a deft comic touch, in Technik:

Necessary ingredients of any HF are a variety entertainment programme, speech by the G.S., speech by the Warden, tea with a capital T, and movie as the grand finale.

The first item has infinite variety, and very little entertainment. Various people demonstrate their ignorance of music, and their ineptness at mimicry. A bunch of freshers are railroaded into putting up a hilarious skit, written by them, to which the audience (300 strong, but growing weak from hunger), listen in grim and tomb like silence. Finally two thirds of the hostel turns up for the group song, and accompanied by the bongos, and a tambourine, they sing a selection from ‘My Fair Lady’ in seven distinct keys.

The G.S. has prepared his speech five minutes in advance, on the back on an old tutorial sheet.

G.S.: Ladies … … ...and Gentlemen,

The joke is well received. As a matter of fact, the laughter does not die down for minutes.
(The G.S. attempts a humorous speech here, after which it’s the Warden’s turn):

Warden: My young friends…

This arouses derisive snorts, especially from the hardened back benchers, who are never friends with anybody from whom they haven’t bummed cigarettes. Besides, a couple of them happen to be somewhat older than the warden.

Warden: Being such a short man, I will restrict myself to a short speech. Heh, heh, (Groans, and hoarse yells of ‘P.J.! P.J.!’). I merely wish to say a few well chosen words before we all have tea.

The word ‘tea’ is so badly chosen as to be a fatal blunder. The herd arises in unison, and thunders en masse to the dining tables and jalebies. The rest of the Warden’s pithy hour long speech is heard out in appreciative silence by the Hall Manager, two tutors, and an open mouthed watchman who is lost…

At the next day’s post mortem, everyone agrees unanimously that it was a lousy function. The guests reserve comment.

THE WILDLIFERS AND THE MOUNTAINEERS

As the 1970s rolled on, IIT-Bombay’s green cover grew, and as students drank in more of their surrounds and spared them greater thought, they couldn’t but take note of the remarkable natural riches their campus possessed. Nor was the fact lost on them that if IIT-Bombay’s wooded areas weren’t preserved, the campus risked a swift depletion of its treasures. And there did appear to be threats of degradation from time to time. These were the stimuli that gave rise, in 1977, to IIT-Bombay’s Wildlife Club. For instance, recounts alumnus Shirish Waghulde, it was when the Institute set out to build a tar road cutting through the campus’s Sonari Baug woodland that Dr G.C. De of Electrical Engineering started the Club, partly to mobilize protest against the idea. (We recall that De was also one of the prime movers of the campus greening drive of the 1970s.) Amit Zaveri was the first wildlife secretary (there were just 7 or 8 members to start with), and the Club’s activities were supported by Drs De, A.S. Mahajan and B.S. Jagadish from the faculty.

Soon the Club established a vibrant presence on campus, its membership touching a healthy 150 at its peak, around the early eighties. Its activities, too, expanded. It screened a monthly wildlife film, sourced
with some effort from, among other sources, foreign consulates in the city. Every vacation it organized a wildlife camp in reserves and sanctuaries across the country (the Melghat Tiger Reserve was the first). And the Club joined hands with organizations such as the Bombay Natural History Society (BNHS) and the World Wildlife Fund (WWF), to whom it submitted detailed reports of members’ observations during their camps. Such was the blossoming of this relationship that the BNHS chose the Institute as the site for their centenary celebrations in 1983.

While the campus proper had been re-greened, and wooded parts of it salvaged through the efforts of the Club, the signature hills at its periphery had suffered setbacks, denuded by local woodcutters. In the late 80s, the Club undertook to rehabilitate the hills, in particular the Vihar hill – and for the thick fleece of green we see on it today, we have to thank the dogged efforts of the Clubs’ diehards of twenty years ago.

Even as its promise and possibilities grew, however, student interest in natural history began to taper off; and by the mid and late 1990s, IIT-Bombay’s Wildlife Club was struggling just as hard to survive as some of the species whose fortunes it fretted over. The reason, Waghulde is confident, can be traced to the introduction of the shortened, four-year B.Tech. in 1981. The more intensive curriculum left students (at least the undergraduates, who in any event were the Club’s soul) less time to stop, look and listen to the world around. And then came the era of untrammeled consumerism, the internet, and the fabulously lucrative corporate career (with all the grounding in ‘corporate ways’ that it entailed) – leaving students still less time for the wild and the wonderful. Today the Wildlife Club lies ominously dormant, if not defunct; and with its youthful sentinels no longer around, what this augurs for the safekeeping of the campus’s natural holdings is anyone’s guess.

‘Swots, nerds, geeks’ – these have been some of the offhand labels pinned by observers on the IITian ever since the breed entered the public consciousness. The range of pursuits recorded above, however, should convince the most hardened skeptic that the typical IIT-Bombay student was anything but a geek or a nerd. Some of his (and her) kind also courted death-defying danger: as evinced in the chilling account below, of a Himalayan mountaineering expedition undertaken by a group of students including the narrator, Ram Kelkar (B.Tech. Electrical Engineering 1980).
These expeditions went under the auspices of *Himankan*, the name given them by IIT-Bombay’s Mountaineering Club of the 80s.

“The highlight of the saga begins with the stormy weather which closed in beginning 21st of May 1979, and impacted the expedition through the next two weeks. At the end of it, several members of the expedition had severe frostbite. The notes from 28th May say it all and I was one of those in Camp III trying desperately to clear the snow off the tents…”

This was again a bad day, with snowfall and winds. At Camp III, no matter how much they tried to clear the snow, it would pile up again in no time. It was a formidable job even to get out of the sleeping bag, put on shoes and go out in the driving wind and falling snow.

The days that followed brought only more severity and misery. On the very next, 29th May, ‘It took five hours just to get the tents clear of snow and another two to remove them… The tent bottoms had stuck to the ground which had become ice and had to be hacked away from the ground.’ When they were walking again, that evening ‘by 7 pm, the snow was thigh to waist deep and movement through it was excruciatingly slow. Wadalkar had done most of the trail breaking, for he was the only person with the requisite strength left. This in spite of the fact that he did more work than all the other seven put together while winding up camp. A truly magnificent effort.’ With the storm weather not letting up, by the 4th of June ‘almost everyone was suffering from blisters on their feet. On top of this, we had
Three modes of transport historically deployed by IIT-Bombay students

Machine with engine (top left) patronized by males; machine without engine (top), preferred by females; biological machine (below), ridden by the flamboyant few.

Riding the motorbike are ‘Joglekar, Shirke, Unidentified, and Deo’, riding the bicycle are ‘Anjali and Vidya’, with Vidya supplying the leg power; and the horse has a story to it. ‘Kaul (Hostel 4 and Aero Engineering) found an abandoned sick horse on the campus. Taking pity, he took charge of the horse and arranged for its medicines and food. He soon started riding the horse to the Department and around the campus on a makeshift saddle, instead of a cycle.’

(Descriptions by alumnus Sunil Hattangadi, 1969-76, adapted from http://www.iitphotobook.com)
some of ours toes nipped. Thus this walk down to Gangotri ripped the already tender skin, resulting in open wounds to four members (Shelat, Kelkar, Bhawalkar and Raja). In fact, entire skin portions came away with their socks on removal. Thus we had five casualties who had to be carried from Gangotri, besides Bapat and six other frostnipped people.

Back in the plains, the aftermath was terrible, with time marked in one hospital after another: ‘Subodhan Gadgil and I spent the next many months completely bedridden and in hospital, first at AIIMS in New Delhi, then at the Bombay Port Trust Hospital for hyper-baric oxygen chamber treatment, and finally in the IIT Hospital. Our friends helped us get through the rigorous academics at IIT and ensured that we graduated on time.’ And the final outcome, physically disfiguring, was even worse: ‘Gadgil lost all five toes on one foot and I lost parts of five toes on both feet. Others suffered varying degrees of frost bite and frost nip. The miracle is that all of us survived, and returned to civilization, and have lived productive and normal lives since then. We are spread across the globe from Hawaii (N.S. Raja) to Chicago (Ram Kelkar) to Boston (Subodhan Gadgil) to Pune (Ajit Shelat) amongst others.’

When one has stared death in the face at a young age, one’s outlook on life can’t but radically and forever change. ‘I look at every day as a gift,’ says Kelkar, ‘having survived the Jogin Expedition, when for a few bleak days it looked unlikely that we would ever make it back alive.’ As for Gadgil, who lost all toes on one foot, a tribute to him flowed 28 years later from another member of the team, N.S. Raja: ‘Gadgil took the lead in breaking the way through thigh-deep snow when retreating down the mountain. I believe that he saved some of our lives. He stayed in front and went on ploughing through the snow for us like a bulldozer. Gadgil, you lost your toes but you are famous in my family for saving our lives.’

The near miss of 1979 foreshadowed an expedition in the mid 80s, which tragedy did strike. The death of a student on it, attributed to deficient preparation and unwarranted risk-taking, prompted the Institute to clamp down on the excursions, and Himankan too became a footnote in IIT-Bombay’s history, awaiting resurrection. Mountaineering in milder forms, however, continued to thrive on campus, students undertaking dozens of treks every year, some of them treacherous, in the rugged, enchanting ranges of the Sahyadris and the Western Ghats.
...and its torchbearers

Ambassadors of sport (above) and culture (below). IIT-Bombay’s contingents to the Inter-University Sports Meet, 1965, and to the Delhi inter-collegiate cultural festival, mid-1970s. Writing about the picture at bottom, alumnus Kirat Patel recalls that this was the first time ever that IIT-Bombay won the best contingent cultural trophy. Seated (L to R) are Amar Bhide, Utsav Kapadia, Jairam Ramesh, Sushila Mhatre, Dr A.K. De, Dr H.H. Mathur, Dr K.K. Mani, Kirat Patel, Pradeep Anand, and Nandan Nilekani. Standing (L to R): Rajan Sastry, Aditya Srinivasan, Madhav Patwardhan.

When students were not in the classroom or on the theatrical stage or on snowstormed expeditions – when, that is, they were back in their roosts in the hostels, other issues loomed large in their minds, and could create deep schisms between them. One such was that perennial fount of divisiveness, the question of who fitted best into the IIT-Bombay mould – and
who didn’t. Alumnus Arvind Sanger (B.Tech. Chemical Engineering 1984) sketches this evocatively in what he calls the Hum Log Tum Log episode...

‘One of my batchmates,’ recounts Sanger, ‘went along to one of our ‘topper types’ to seek help in understanding some particularly difficult concept. The topper’s response, not entirely in jest, was, Yeh Hum Log ko samajh me nahin aya to Tum Log ko kaise samajh me ayega. To a lot of us who were not as academically focused (or proficient) this became a classic phrase that captured the divide between the academic haves and have nots. I felt people who recognized early on that they were not destined to be amongst the Hum Log and pursued other fulfilling extra curricular activities were probably able to deal with IIT easier than some of the in-betweens who were not in the Hum Log but wanted to be there all through IIT. Also the Tum Logs compensated for their outsider academic status by visibly having more fun than the muggoo Hum Log. Of course the most impressive people for us Tum Log were the Hum Logs who could study quickly but not kill themselves to be toppers, but knew how to have fun like the Tum Log.’

SPEAKING IN TONGUES, IIT-BOMBAY TYPES

Conversations in received English, for all their other merits, can have nothing of the tang and bite of a dash of home-brewed slang. And IIT-Bombay’s students are able to boast their very own brand of pidgin. When they’re going on about work, girls, life, and everything else under the sun, so sharp is the tang that the listener can end up feeling linguistically challenged. Here’s how it can go between two students, boys both, and both a little down in the dumps (expletives have been blanked out; the uninitiated reader is advised to turn to the end of the book for a glossary, adapted from a dictionary hosted on the web by alumnus Uday Mahajan): 8

Just can’t crack this assy, boss. Can you give me some fundaes here? / Scope kyaaa. I’m in the same nbd. Why not ask Bong? / Him! Hadaaaa! Total rg-giri god, what to expect from him! / Yeah, punter’s a total commie. But proffie seems to think he’s a stud. / That’s because he’s sucking all the time. / Such a low hawaa he had, but look now... / Leave him. Damn tense assy, this. / Hajaar tense man. It’ll have to be a night-out. / With Chinko’s for Manchurian. / Serve us right for all that lukkhagiri the whole sem. / But how did yesterday’s jam go? / Ok-types. Nabdoo did major
The spaces where it all happened: A hostel’s tunneling corridors caught in a somnolent mood (this is mid-1960s Hostel 2).

keeda in the riff. Ghoched it. / That nabdoo’s an absolute dnot. / Amazing how that saaaxx sophie babe latches to him. / Maybe he’s a total god under that sidey skin / Dayaaa!

**EACH SIDE IGNORING THE PRESENCE OF THE OTHER**

Speaking of sophie babes latching to dnots, one could be right in wondering just how many of these sorts of alliances could really have been forged at the Institute. You can have ‘gender relations’ only if both genders exist; and amongst IIT-Bombay’s students, over the 60s, there were far too few of one of the sexes for such theoretical constructs to mean much. Alumnus A.N. Dravid (1961-66) recalls ‘one solitary girl in my batch of 300 undergraduates. In the next batch there were two.’ And T.R. Dalvi (1964-69) speaks of ‘not a great feeling when you have two engineering females and six M.Sc. female students in Physics and Chemistry.’

Over the 70s and 80s girls on campus grew in number, more rapidly in the Institute’s postgraduate programmes and the sciences than amongst the engineering undergraduates: for the latter, they never rose to more than 5 to 10 per cent of the total. And as girls started to trickle into the Institute, and the genders got to glimpse each other, both found the air between them riddled with mystification and awkwardness. (This needs to be seen also in the context of the India of the times, where unease between the sexes could take on colossal, socially paralyzing proportions.)
Among the first recorded intimations that not all was well in the way boys reacted to the presence of girls came in 1970, when one amongst the boys’ own number observed after a musical nite:

Bad as the programme was, the audience even worse. Budding sociologists could perhaps make an in depth study of the ‘Behaviour of IIT students at Functions’. Like Pavlov’s dogs they seem to have automatic reflexes as far as females are concerned. The lips purse up and as K. Rao would say a wolf whistle occurs, and irrespective of the standard of performance clapping occurs throughout. We have only this to say, Institute functions are not compulsory. You don’t have to come. If you do come and find that the thing is not to your liking, you are at perfect liberty to leave the place.

Jumping ahead a decade and a half, things hadn’t changed much; the highly skewed gender ratio distorted all engagement. We hear it from a girl student of the time who, by virtue of being friends with one of the opposite camp, was privy to their ways. Alumnus Kaveri Mukherjee (M.Sc. Physics, 1988) recollects: ‘Boys in IIT would talk non-stop about the girls in their batch but very few would muster enough courage to go up and say a word to any of them. Boys who had grown up in the metros would finally manage to speak to the girl they were very interested in.’

With what results? It all depended on the quality of performance. ‘Well, if the first conversation was passed by the girl, visits would start to H-10; being allowed into this hallowed building was always a big coup. A few visits, then some dinner invites to H-10, and the whole campus would term them attached! Under this pressure they quickly imagined that this was true love, but sustaining a relationship then became very difficult. Many guys on campus just did not know,’ she sums it up, ‘how to interact with a person of the opposite sex.’ Mukherjee also recalls how, being a state level table tennis player, ‘It used to be terrible for anyone from the boys hostel if it was known that he was beaten by a Hostel 10 player – an ultimate shame in their peer circle.’

Leap ahead another decade and a half – to 2001 – and you find that time, instead of smoothening the rough edges between the sexes, had driven a worryingly deep wedge between them. The mutual unease rose to such a pitch that both sides decided to vent their feelings on a common platform. An issue of student magazine InsighT carried an article with a
The girls’ point of view, advanced by Kavitha Subramanian, painted a dismal picture. ‘Interaction between members of the two sexes is minimal in IIT,’ she began. ‘There is almost an undercurrent of hostility with each side trying its best to ignore the presence of the other…’

Subramanian next pointed out the very real academic handicaps of being a loner in the crowd: ‘Believe us, being a minority community is no picnic...having a classful of guys when you are the lone girl is no girl’s dream come true. Picture this scenario: hajaar assignments to be submitted, projects to be done and quizzes to be written - surely these cannot be managed alone and as every IITian knows, require, well, team work. In such a situation it becomes very difficult for the girls to survive as isolated entities.’

And social discomfiture, rooted in many places at once, was rife. ‘A very interesting phenomenon peculiar to IIT alone is how after having broken the ice one day and spoken freely to a guy, you discover the next day to your consternation that things are back to square one with the very same guy gliding straight past you as if the conversation never took place!’ (She did concede that ‘there do exist some guys here who are pleasant to interact with, with no hang-ups whatsoever.’)

Other girls lamented the trait that boys ‘would like to interact as equals but are heavily set back by the prevalent mentality – the attitude of their own friends towards them, lest they be treated as “aliens”, or outsiders to the gang. One said, ‘They don’t respect us or give us any credit for our brains.’
Subramanian’s end-note made for disturbing reading: ‘This, then, is IIT today as seen from a girl’s eyes. And it is not a pleasant view. It is very frustrating, irritating and depressing, even a minute’s piece of interaction takes on the form of a Herculean task.’

The ‘guys’ (a trio of Prateek Singh, Siddhartha Srivastava and Dheeraj Prasad) had their say as well, and it uncannily mirrored the girls. ‘Though a few girls actually give you a cold shoulder,’ it began, ‘the majority are actually pleasant to talk to. However, the problem lies in the second encounter. I got to know this girl through a Mood Indigo job we did together yesterday. But then, she doesn’t respond to my ‘hi’ today. In fact, she pretends as if she has never seen me…Believe me, the most embarrassing situation is to wave to a girl in utmost enthusiasm and not get even a glance in return.’ Both boys and girls, then, had become rather adept at a warm first encounter, followed by an icy refusal to acknowledge the presence of the other.

Other boys groused that ‘interaction usually centers around Labs and Practicals … only where the girls need help.’ And the ‘guys’ did confess that they were probably ‘as guilty in building the wall as our counterparts’, attributing their part in the impasse to the very trait decried by the girls, their ‘so-called mob-mentality’.

It’s perhaps safe to say that so long as the gender ratio remains as acutely tilted as it is, the air between the sexes at IIT-Bombay will continue to be streaked with gawkiness, discomfort, and mutual suspicion. Yet, lest this account have conveyed too dim a picture, it must be said that for many girls (and surely some boys), the IIT-Bombay experience hasn’t been all misery. The unease has been seen by many, more as an amusing curiosity, a youthful coming of age, and less as a malaise.

THE COMPENSATORY PRINCIPLE, IN THEORY AND IN PRACTICE

We’ve talked of students thus far as an undifferentiated socioeconomic group. But the student body at IIT-Bombay has been far from homogeneous, comprising a number of socially and financially distinct sets. Before the mid-1970s, it was less varied than it was subsequently to become. Most students came from the middle classes; many of them had
schooled in English-medium public schools; and there was a preponderance of Bombayites. Student composition gradually turned more cosmopolitan of its own accord over the 1970s, driven by the gathering countrywide demand for the IIT education. In the early 1970s, it also underwent an externally promulgated change. Soon after independence, India, land of stark social inequalities grounded in deep historical roots, made moves to redress some of the disparities by introducing, in the early fifties, reservations in employment and education for those who had been most severely discriminated against: the country’s constitutionally recognized scheduled castes and scheduled tribes.

Reservations for the educational programmes of the IITs were implemented twenty years later, in 1973, following the recommendations made by a central government committee. All SC/ST students (as they came to be termed for short) who had cleared their Higher Secondary examination, and had appeared in all prescribed subjects of the JEE, were admitted against the quota of 22.5 percent reserved for them. This was irrespective of their performance in the entrance exam. In 1973 and 1974, the number of SC/ST students admitted to the Institute was 15 and 37 respectively. Between 1975 and 1977, their entry operated on slightly different criteria. As before, all those who had appeared for all JEE papers were entitled automatically to enroll at the IITs; but also, those who had aggregated 50% or more in their Higher Secondary examinations were granted direct admission, even if they hadn’t appeared for the JEE (this latter channel was created to fill the significant numbers of reserved seats that had been going begging).

While centrally effected allocations of this kind were both necessary and timely, in themselves they constituted only the first step in the proclaimed goal of enabling disadvantaged students to become, eventually, an ‘indistinguishable part of the mainstream’. From their very first days in the IITs, many of them found themselves academically ill-prepared compared with entrants through the open competitive route. The IITs were yet to devise supplementary measures to bring them on par with the others; in the absence of these, the ‘compensatory principle’ had little chance of working as well as had been hoped.

Over the years, integration of SC/ST students with the general category students has been imperfect, to say the least. Thrust suddenly into the...
keenly competitive environment at the IITs, a good many of them slipped in academic performance (in the initial years, several failed to earn their degrees) and were left all at sea socially as well, with predictable blows to their confidence and self-regard. Not surprisingly, the outcomes of the reservations over the first few years have been said to be ‘disastrous’.11 Voices of concern started to be raised at the Institute, too; the matter was frequently discussed in meetings of the Senate. In 1976 it was recorded that the performance of SC/ST students admitted in the years 1973 to 1975 had been ‘very poor’.12 In 1978, the following picture emerged (this was at an all-IIT level13): ‘While those students admitted directly through JEE (with two-thirds marks criterion) were able to improve their performance… the students admitted directly constituted a drag on the system’ and ‘were unable to compete and found themselves in great difficulty to cope with the subjects and content of the courses and therefore could not clear the subjects… In a number of cases their length of stay had to be extended from 8 to 10 years’, something that ‘created a number of psychological problems.’

The indifferent performance turned in by SC/ST students, clubbed with the ever growing numbers aspiring to an IIT education, prompted a re-look on admission policies. A committee appointed by the Institute to examine the matter recommended in 197714 the revised norms that currently govern the intake of SC/ST students across all IITs. These operate on the candidates’ JEE ranks, but with some academic requirements relaxed. In essence, reserved category students can now secure a place in the IITs through any of three channels, once they’ve demonstrated a certain level of performance in their school leaving examinations and in the JEE (direct admissions are no longer offered). They may compete directly with all other aspirants, unaided by concessions of any kind. They can also secure a place if they notch up two-thirds the marks of the last ranked general category student in the JEE. Finally, if all the reserved seats haven’t been accounted for through the first two streams, a further relaxation in the JEE-based entry threshold is made, and the residual seats are offered for admission on the condition that these entrants first clear a year-long Preparatory Course meant to bring them on a level with their higher ranked peers. For this last stream of SC/ST students, clearing the Preparatory Course is a precondition to embarking on the Institute’s degree programmes.
Once admitted to the full-fledged course, SC/ST students are granted a couple of relaxations in the rules that govern academic progression, such as an extra year in which to complete the B.Tech. programme. Other than these, however, and regardless of their channel of entry, they are judged for their performance on the same scales as all others. A recent study conducted in 2005 by the Institute’s current coordinator for SC/ST students, Dr P. Trivedi of Humanities and Social Sciences, examined the question of how SC/ST students had fared in recent years. The numeral most widely used as a litmus of academic performance at the Institute is the cumulative point index, or CPI; a CPI lower than 5.5 is taken generally to denote poor performance. Some 22 per cent of SC/ST students surveyed were found to have CPIs shy of this mark. Though sizeable in itself, the figure nonetheless spoke of a distinct improvement on their performance in previous decades; thus, it seemed no longer true that most SC/ST students were unable to square up to the degree curriculum at the Institute. It did remain true that SC/ST students were performing consistently less well than their general category counterparts: only about 3 per cent of the latter (as against 22 per cent of the former) fell short of the 5.5 threshold.

It’s the students who enroll for the Preparatory Course (their numbers varying across the years from as low as a dozen to as high as 50 annually) that have historically been the greatest cause for concern. Their socio-economic profile, and their access to educational and material resources, are in general, considerably poorer than those of direct SC/ST entrants. One consequence is that the ‘Prep’ students will have had effective teaching at school in Hindi or other Indian languages, but not in English. Many come in with a sketchy command of the language and have trouble grasping lectures and expressing themselves in exams. Unsurprisingly, their motivation can plummet and needs to be propped up by supportive friends, faculty and instructors.

Trivedi’s study did find, however, that the Institute’s Preparatory Course appeared to have served its professed purpose. Despite the fact that the JEE ranks of ‘Prep’ students were lower than those of direct entrants, the difference between them in subsequent academic performance was marginal. The Institute was able to savour a rather more concrete vindication of its efforts on Convocation Day 2002, when for the first time a Preparatory Course student received the Institute’s Silver Medal.
Another heartening finding of the survey was that inasmuch as access to resources went, a good proportion of SC/ST students no longer came from backgrounds that could be termed underprivileged. The fathers of about 70 per cent of the students were judged ‘well educated’; 75 per cent of these in turn were employed as professionals or executives. For such students, financial resources would appear not to be a binding constraint. There do remain, however, the small but significant numbers that come from very needy families. Breaching the bastions of the IITs through sheer grit and against the most daunting odds, these are students who may never have had the luxury of a room to themselves to study in, a PC to use, or the (rather dubious) advantages of the drilling purveyed by coaching institutions, all of which have rendered their adjustment to the Institute’s demands and expectations that much harder.

Although the Prep Course segment of SC/ST students poses its own problems, Trivedi feels that in the long run it’s some of their direct entrant counterparts who may end up facing, somewhat paradoxically, the taller hurdles. Prep students get the indirect benefit of an extra year in which to acclimatize to the demands of IIT-Bombay’s curricula (social adaptation is an added edge). Direct entrants, by comparison, forgo these incidental advantages, being thrown into the deep end from the start. For them it takes at least a semester or two to adjust, during which time their academic performance can falter, often triggering a cascade of backlogs that become less tractable with each passing semester.

Seeking yet better prospects for themselves, many SC/ST students have declared that they’d prefer the Institute to bring in a tougher Preparatory Course than exists at present. This, it’s hoped, will enable future batches to embark upon their degree programme on a footing comparable not just to their directly admitted SC/ST counterparts, but also to students in the general category. Strengthening the Prep Course may enable the Institute also to bring down the exit rate from the regular curriculum.

Opining further on ways in which the tenor of their stay at the Institute might be improved, SC/ST students proposed that their academic records be closely monitored, and a process of regular dialogue be set up with them. The continual tracking of poor performers and supporting them through their programmes are important provisions the Institute needs to ring in. Just as acute a need has been felt to strengthen their English
language and communication skills. One student’s remarks encapsulate cogently the sentiments of the group: ‘I feel that all those who fail to complete their curriculum, fail not because they aren’t capable, it is just that they don’t put in enough effort. It may be so because may be they don’t believe in themselves. Once you start comparing yourself with others it is really easy to [develop] an inferiority complex.’

ADDRESSING SOCIETAL ISSUES – AGAIN

The experience gained over three decades in trying to put in place an improved milieu for SC/ST students should prove valuable in tackling situations connected with reservations for another State-recognized social category, many more of whom will be making their way into IIT-Bombay not long from now. These are students that belong to the Other Backward Classes (OBCs), reservations for whom are slated to be implemented July 2008 onwards, to the tune of 27% of the total number of seats. Accompanying this earmarked rise will be a steep jump in student numbers on the whole. In order not to cut into the places for general category students, the 27% reservations for OBC students will be teamed with an equal expansion in places available for the general stream. The net gain of 54%, although slated to be spread out over a few years, represents the steepest surge in student numbers the IITs will have experienced since their earliest years, and will call for rapid and marked expansion in academic infrastructure, campus amenities and – without doubt most critically – in staff strength.

Stiff though the demands will surely be, current Deputy Director Vasi views the prospect no less as an opportunity, on two counts. ‘This is a difficult and challenging time,’ he accepts, ‘but there is built into it a great opportunity as well. If we can take hold of this opportunity, we can emerge out of it very strong. My point essentially is that as a 5000 student and 400 faculty university we will never make an impact anywhere. If I take Electrical Engineering, for instance, which has 35 faculty today, we can never compare with a department in any major university which has a hundred plus. The only university I can think of which is small yet makes an impact is Caltech, but there are very few like that.’

Giving it another slant, he adds, ‘The implementation of these reservations gives us the stimulus to grow to the desired strength. It gives us an
opportunity funded by the government. I know there are constraints, but I’d say let’s grab this opportunity, expand to 7500 or 8000 students and to 750 faculty, that’s the point at which you start to have some critical mass.’

But when the Institute is struggling to attract even modest numbers of quality faculty to offset the attritions of retirement and movement, what hope for this massive scale-up? Vasi is the first to own that the going won’t be easy. He also concedes he’s concerned about what the centrally ordained decision means for the Institute’s autonomy. Here too, however, he’s quick to pick out the good in it. ‘It does impinge on our autonomy, I guess, but these are things which somehow need to be done, they don’t happen naturally in an IIT. For example the SC/ST decision of the early 70s was taken by government and I might add that places like the IITs I think are societally conservative. They wouldn’t themselves have taken decisions that run along the lines, “The SC/ST are a cadre of people whom we must as a society support so we must have reservations for them.” I frankly cannot see an IIT having taken this decision. So I don’t deem it inappropriate that the government should take such a decision and that we should be asked to implement it. We are very good at many other things but not at addressing societal issues.’

But while the IITs do need to wake up to their larger societal obligations, there’s no dispute that it would be disastrous to do so at the cost of academic standards. Competent new faculty are ever harder to come by, partly because of the yawning differential between salaries in academia and in industry. If this continues, another of the most vital hallmarks of the IIT education, so emphatically pronounced by the Sarkar Committee as being a precondition to the Institutes’ success – the low ratio of students to teachers – will come under threat, with foreseeably unwelcome consequences.

‘WE SHALL NOT SIT BY’

‘Alumni’: it was as if the word hadn’t existed with any real force in the general consciousness of the IITs before the mid 1990s. This was as true within the Institute as it was outside. But IIT-Bombay’s graduates had in fact been keeping in touch with their Institute from the earliest days. The first ‘Annual’ of the IIT-Bombay Alumni Association dates back to December 1962, when the Institute’s first Convocation was held. The Association os-
cillated between spurts of activity and relative dormancy over the 1960s and 70s, a direct function of the enthusiasm of its office bearers. In the 1980s, it was given a fillip by alumnus Sharad Saraf who, even as he established himself as an entrepreneur industrialist, breathed new life into the Association through membership drives, a regular calendar of events, and keeping in close touch with the Institute (see also Chapter 9).

Then by the turn of the millennium, the word ‘alumni’ had emerged from the attic to become a household term. The IITs began to be identified with the achievements of their former students. IIT-Bombay, for its part, received the largest endowments from its alumni, and moved the most aggressively to strengthen ties with them.

What really set the whole goodwill avalanche off was the doldrums in which the Institute found itself in the 1980s and early 90s, partly chronicled in Chapter 9. Mid-90s onwards, alumni joined their voices to the Institute’s in raising the alarm. Some of these voices were raised in places as far away from Mumbai as you could get on the globe: in California, a full 12 hours apart. There, as alumnus Sandeep Pandya (B.Tech. 1986, Mechanical Engineering) reveals, a band of enthusiastic alumni had started getting together in the early nineties purely socially, reliving their times at IIT-Bombay, recounting to each other their diverse routes to success, and networking to further their own interests. The first key event Pandya remembers is a bhel puri picnic organized in 1993 for alumni in San Francisco’s bay area by Raj Mashruwala (Mechanical Engineering, 1975), where the latter broached the idea of raising funds for the Institute.

Presently the thought crystallized that they should give their conclaves a formal shape. By around 1995 serious thought was being given to the possibility of forming a legal entity – in time it was to be called the IIT-Bombay Heritage Fund – that could help channel money from the US to IIT-Bombay. Mashruwala again took the lead – Pandya considers him the ‘father of the Heritage Fund’ – and, once the fairly extensive paperwork had been done, the Fund was born. In some time – by Diwali 1997 – they

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c The Directors of the Heritage Fund were Anil Kshirsagar, Paritosh Choksi, Ram Kelkar, Raj Mashruwala, Sandeep Pandya, Deepak Sabnis and Subhas Tantry. In the meantime, a band of five alumni had pitched in with personal money – $10,000 each – towards forming a professional office to smoothen the operations of the Fund. The five contributors, Pandya remembers, were Raj Mashruwala, Kanwal Rekhi, Tushar Gheewala, Girish Gaitonde and Yogen Dalal.
had launched their own website, iitbombay.org, and within it, a webzine. They called this ‘Y-point’, after one of the main entrances to IIT-Bombay where the intersection of roads is shaped into the eponymous Y.

To glance through the webzine over the next couple of years offers a ringside view of the developments from the alumni’s vantage, and the headlong pace at which they unfolded. And the story of how their concern snowballed into a movement illumines the affection in which they held their Institute, and their willingness to expend large chunks of time, effort and money to see if they could do something to help.

There was first the sense of horror at the hard times IIT-Bombay had fallen upon. The inaugural issue of Y-Point – datelined Diwali 1997 – set the ball rolling with a troubled observation collectively authored by the ‘Directors of the IIT-Bombay Heritage Fund’. It was based on data to which they were privy by virtue of having kept in regular touch with the Institute’s functionaries.

‘Since 1991, government funding to IIT-Bombay has been cut by over 50% in real terms,’ Y-Point informed its readers, ‘and the Institute has been forced to raise funds through non-traditional sources. At the same time, operational costs have skyrocketed, and the Institute has been forced to postpone non-essential expenses. As a result, many visiting alumni have been shocked by and have commented on the shabby state of the physical infrastructure.17

A few months later, in the Spring 1998 issue, Y-Point’s Chief Editor, Ram V. Kelkar (B.Tech. Electrical Engineering, 1980, and one of the survivors of the near-calamitous 1979 Jogin expedition), sounded a more distraught note. Citing an India Today article which had appeared in April 1998, and which spoke of ‘a persistent resource crunch, like an army of termites...eating away into the edifice of the IITs’,18 Kelkar went on to say:

‘As a proud alumnus of IIT-Bombay, it came as a shock to read about the extent of the decline in the infrastructure...Hostels in disrepair, laboratories with obsolete equipment, libraries cutting back on journals, students being asked to live off-campus or double up in tiny rooms...why are these elite institutions of engineering education being allowed to deteriorate so rapidly?’19

And the Winter 1999 issue carried an alarming article titled The Campus Infrastructure Crisis by alumnus Deepak Sabnis, batch of 1973.
‘The words that follow,’ warned Sabnis, ‘can only capture a fraction of the shock that I received on a recent visit. The campus is greener than it used to be in my time. This greenery, while soothing to the eyes, also hides a sad fact… the hostels are in bad shape. The same is true of Department buildings, staff quarters and the Convo Hall.

‘The pictures you see were taken by me in October 1998. These pictures barely show the condition the hostel is in. The interior of the rooms is even worse. The glass window panes are broken. The doors need to be replaced. I can go on and on. However, words cannot even begin to describe the extent of the deterioration. The best I can do,’ he concluded, ‘is to urge you to go visit your hostel next time you are in Mumbai.’

The pictures Sabnis displayed were harrowing indeed; and, since they tell their own story, are reproduced here. Sabnis also related how, while he was scanning the photographs, a colleague who happened to see them asked: ‘It looks all boarded up. Does anyone still live there?’

Little might Sabnis have known it, but back at the Institute, none other than its Director was having to tackle the same embarrassing question. Sukhatme recalls, during this very period, when escorting a visitor past the student hostels, the guest asking him: ‘What are these buildings here?’ Sukhatme told him, at which the startled visitor asked, ‘You mean to say students actually live in them?’
The same, as we’ve seen, could have been asked of the Institute’s housing for its staff, or of its departments. Nothing had escaped the all-enshrouding pall of dishevelment and disrepair – not even the Director’s office. Sukhatme also recalls, bemused, how when he took charge he found a bucket gracing the floor of his office. When he wondered aloud about the provenance of this curious piece of office equipment, he was informed by his staff it was placed there to catch the water that leaked from the ceiling when it rained heavily.

Even as they came to terms with the physical mauling their beloved Institute was receiving – and which would surely, sooner or later, jeopardize academic vitality – alumni started asking themselves if there wasn’t something they could do to help matters along. A partial answer came in Y-Point’s inaugural issue, where the Editors announced the birth of the organization that another alumnus, Anil Kshirsagar, had called to tell Sukhatme about (see Chapter 10). The Directors of the Heritage Fund appealed to fellow alumni to come forward and contribute to IIT-Bombay’s cause through the Fund, declaring: ‘The gap between available funding and what is required to build and sustain a world-class institution is large and growing. Clearly, alumni need to help fill the gap. We are working with IIT to develop a program of targeted donations.’

This quite naturally begged the question: could alumni really ‘fill the gap’? How much material difference could they really make?

Quite a bit, it seemed to the movers of the Heritage Fund when they cast a fleeting look about. The sense of possibility was in no small measure fuelled by a growing discovery, almost an incredulous one, of the extraordinary waves many of their number had created in their chosen fields. If you turned to the infotech world you saw Nandan Nilekani at Infosys; Romesh Wadhwani at Aspect; Kanwal Rekhi at The IndUS Entrepreneurs (TiE); Raj Mashruwala at TIBCO Inc.; Bharat Desai at Syntel; Ashank Desai at Mastek; Girish Gaitonde at TekEdge; and they were all either the CEOs or the founders of these companies.

If you looked in the upper league of academia you came across the likes of Narendra Karmarkar and Arun Netravali, both at Bell Labs; Rohini Godbole, at the IISC; Vivek Borkar at the TIFR; Shankar Sastry at Berkeley; Kota Harinarayana, heading the Aeronautical Development Agency; Dr S Ramani, Director of the National Centre for Software Technology.
In the sphere of social activism and jurisprudence you had the tall presences of Colin Gonzalves, Dunu Roy, Shailesh Gandhi and Shripad Dharmadhikari. In manufacturing industry and finance you had Sharad Saraf at TechnoKraft; Shailesh Gandhi at Clear Plastics; Victor Menezes at Citicorp; Parag Rele at Aplab; Dr-Ing Bharat Balasubramanian at Daimler-Benz; Arun Dravid at Jacobs Engineering; Shailesh Mehta at Providian Financial; Parag Saxena at Invesco. In politics, too, IIT-Bombay had a presence through the likes of Manohar Parrikar and Jairam Ramesh; and in film, through Jagmohan Mundra.

And this was just a partial list. The only fields left untouched appeared to be the two that go amorously hand in hand these days: sport and glamour.

Given a gallery as formidable as this, you couldn’t have faulted alumni for being thrilled with themselves; unsurprisingly, a sense of self-assurance started to assert itself.

Tied to alumni’s sense of shock was a deep and abiding affection for the Institute, for the years they had spent here. Ram Kelkar again, in the Diwali 1997 issue of Y-Point: ‘The Powai days were certainly one of the most important life experiences for me, as they were for most of the fellow alumni I am in touch with. Only after many years and decades in industry and academia does one truly get a perspective on what really matters, and one appreciates which part of our IIT educations made a difference to our lives and careers.’

This sentiment swelled in proportion to the shock, and presently became a rallying cry. Clarion calls to conscience came from Kelkar himself and Pradeep Anand, B.Tech. in Metallurgical Engineering, 1980. Kelkar wrote, ‘As alumni who have gained so much from IIT-Bombay, we should not sit by and see “the magic sheen of the IITs... slowly fading”. Pradeep Anand spoke of gratitude and reciprocation: “The rank and file IITian, at various stages of their career, must be made aware of the “social contract” or an unwritten obligation that we all have for our alma mater. Yes, education at IIT was cheap, and we are basking in the phenomenal returns of miniscule investments made in India. At this time, we must accept reciprocity as a fundamental social value, and do our part for IIT-Bombay.”

One alumnus, for his part, had already felt the stirrings of this ‘fundamental social value’, and was to go on to set an example that proved inspiring for many others. When Kanwal Rekhi visited the Institute in...and its torchbearers
1994, it was his first visit in 27 years – he hadn’t returned since the year, 1967, he’d graduated. And what he saw appalled him as it would appall many after him. His old hostel, H7, was in a shambles, the Institute wore its infamous dilapidated look of the 1990s. ‘I felt very depressed’, he says; ‘it really touched my heart that a place I had such fond memories of was falling apart. I was asking myself: how could I be doing so well while my alma mater was doing so badly?’ He returned the following year, 1995, which is when he heard from Director Sukhatme about the Institute’s financial travails. Rekhi wrote out a cheque for $50,000 on the spot; three years later, as we’ll see presently, he was to pour in a much larger sum.

Meanwhile the Institute, sensing the growing mood, busied itself smoothening processes to receive the donations through the Heritage Fund. Once alumni had grasped the gravity of the situation, and their fierce loyalty roused, they rose in solidarity. Here on IIT-Bombay’s lawns, alumni reunions, sparked off a few years previously, gathered force. Silver Jubilee batches, in a spirit of friendly competition, vied with one another to lend the Institute a hand. The slew of events led to the barrage of ‘giveback’ documented in Chapter 10, for a variety of ends, including the setting up of a new School, refurbishing hostels, strengthening internet access, sponsoring awards and scholarships, and bolstering the library. They made 1998-99 truly an *annus mirabilis* for IIT-Bombay.

The influx of endowments for KRESIT is an outstanding example of the spontaneity and generosity with which alumni requited their debts of nurture to the Institute. The negotiations with Nilekani, described in Chapter 10, constituted only the tail end of events on this front. They started in fact before Dr S.L. Narayanamurthy took office as Dean of Resource Mobilization, during his predecessor Dr D.B. Phatak’s term – events that left Phatak stunned and gratified.

‘We wanted a business incubation centre built round information technology at the time the IT boom was starting,’ reminisces Phatak. ‘Prof Sukhatme too was very excited about the idea, but what could be done? For a new initiative you need money and we had none. That was when Kanwal Rekhi stepped in. He has a great penchant for entrepreneurship,
his dream was to convert every Indian into an entrepreneur. When I met him he said, “I’ll give IIT-Bombay a million dollars provided you get a matching grant. And you can set up a School of IT provided you run a business incubator in it”.

A galloping start; but this was only half the battle won. ‘Our estimate,’ says Phatak, ‘was that we’d require something like Rs 16 crore, but Kanwal’s million and a matching million would give us only Rs 8 crore. It was at around this time that, having finished my term as Dean and handed over to Prof Narayanamurthy, I went to the US. There I told Kanwal that since we didn’t have Rs 16 crore we’d start with a small building and a limited School and so on. A couple of minutes later he suddenly asked Anil Kshirsagar (who was also present), “How much is 16 crore?” Four million dollars, said Kshirsagar. Kanwal said, “Prof Phatak, are you saying that you’ll start with a small building because one plus one will only make two?” I sheepishly said yes. Now look at the spontaneity of the person; “No, Prof Phatak,” he said, “IIT-Bombay is trying to do something world class, we can’t compromise. Tell you what, I’ll give you 2 million – but don’t compromise.”

‘Now this,’ Phatak says, patently moved by the memory, ‘is typical of the golden heart our alumni have had. Giving instinctively, without a second thought. This happened in August 1998 and when I met him in September he had deposited two million dollars with the Heritage Fund. But he insisted that this was a matching grant, and we couldn’t spend it unless we had its counterpart in place – he wanted us to keep trying. So I said fine – and guess what, in the first week of December I got a call from my friend Narayana Murthy, then CEO of Infosys (this namesake of IIT-Bombay’s own Narayanamurthy is distinguished from the latter by the cleft in the name) saying, “Deepak, you know I’ve done something for IIT-Kanpur, now Nandan wants to do something similar for IIT-Bombay. He has just heard that Kanwal Rekhi has done something, and he’d like to talk to you.”

Then on the 2nd or 3rd January 1999 Nandan and I spoke. Frankly, I had no imagination of the wealth these people had and their willingness to give. I thought he’d sponsor a lab, a Chair or the like; but Nandan said, “I want to give a million dollars.” I was most pleasantly shocked. “One million, Nandan?” “Yes, I want to match what Kanwal has done.” Utterly
inadvertently I said, “Oh, but Kanwal is giving us 2 million.” “Oh!” he said, “is that so?” Of course I did say, “That’s okay Nandan, a million is a lot, our building can start.” But he said, “No Prof Phatak, wait, I’ll get back to you tomorrow.” Most likely he discussed it with his wife – after all, these people were giving their own personal money. Next morning he called me and said, “I have decided that we will match Kanwal dollar for dollar. So I’ll be giving 2 million”.

‘Of course,’ Phatak turns musive, ‘I was spoilt by people like Rekhi and Nilekani. It hasn’t been so all along. Other donors, subsequently, have been laying down several requirements and conditions.’

Given these outpourings of generosity, it’s no wonder that the air surrounding Institute-alumni relations became positively festive. Not to be left behind the likes of MTV in wielding the promotional wand, US-based alumni organized in autumn 1999 a ‘Roadshow’ for Sukhatme and Narayanamurthy, who together and separately visited a number of alumni hot-spots across the length and breadth of the US. Here they addressed alumni chapters, setting out the Institute’s vision, while alumni responded with statements of intent. And it was during this trip, at Chicago in 1999, that Nilekani made the pledge that his endowments to IIT-Bombay would one day total $5 million (and he kept his word to the last cent). Today, Nilekani applauds the hard work put in by the Heritage Fund, crediting it with being one of the stimuli that moved him to make the pledge.

On the home front, alumni were collectively no less active than their America-settled counterparts in doing what they could. Mid-1990s onwards, with Sukhatme (and after him, his successor Misra) taking an active interest in extending the spectrum of the Institute’s engagements with its alumni, the IIT-Bombay Alumni Association grew steadily more vigorous. Until 2001, it had been registered as a Society; that year, it was formally incorporated as a Section 25 company under the Indian Companies Act. (Unlike normal business companies, a Section 25 company’s goals are mutual aid and social good, and it functions as a non-profit organisation.) In 2004, the Association got its own CEO, alumnus Milind Gokhale; and

Neither Rekhi nor Nilekani asked for any of the Institute’s physical assets built up with their donations to be named after them. To this day, no structure is named after Nilekani; and the School of Information Technology bears Rekhi’s name because the Institute went through with the decision as a mark of gratitude without involving him in it. He himself, Rekhi says, would rather have had it named after one of the faculty he remembers most fondly – amongst them Dr J.S. Murthy of Physics and Dr M.D. Parmar of Electrical Engineering.
soon, it had a separate office within the Institute to operate from. Today, the IIT-Bombay AA is seen to play a key role in shaping Institute’s prospects and growth. It has linked up with the Heritage Fund; there is cross-representation on the Boards of the two. Together they try to locate more and more ‘missing souls’ amongst alumni, and to garner ever larger participation from them. On another front, more and more alumni are today aiding the Institute in steering its course for the future, through their involvement in the Institute’s Advisory Council, its Board of Governors, and in other less formal but equally effective ways.

‘DEEPLY PRIVILEGED TO HAVE RECEIVED THE FINEST EDUCATION ANYWHERE’

Alumni’s loyalty to the Institute had been quickened by the feeling, as we’ve heard Kelkar put it, that for most of them their ‘Powai days were certainly one of the most important life experiences’, and that with the passage of the years, the difference their IIT educations had made to their lives and careers had begun to sink in.

Given that many of these careers turned out to be successful beyond their own dreams, what were the elements of their IIT-Bombay education that ‘made the difference’? To succeed as they had done, alumni would have needed a set of core values and skills that equipped them in rising to the challenges that awaited them at every turn. What part of these values and skills did their years at IIT-Bombay equip them with? Talk to one of them – Victor Menezes – and he identifies three critical ingredients he believes no place other than the Institute could have given him. First, a ‘meritocracy of entry into the Institute’; second, ‘intellectual rigour and meritocracy of performance while at the Institute’; third, what he calls ‘cultural bandwidth acquired in the hostels’ – in that order.

Meritocracy of entry was enshrined in the JEE, which let through only the brightest young talent from a very large national pool (a factor which several others have also recognized, and which we’ll address further in Chapter 17).

On the ways in which intellectual rigour was instilled, Menezes, when addressing the graduating batch at the Institute’s Convocation in 2001, had this to say:
You’re fortunate to be graduating from what’s now globally recognized as one of the great institutions. It may be difficult to believe, but the pain and torture inflicted by your professors over the years will shape your intellectual process and decision making for years to come. The combination of rigorous thinking, hard work and fundamentals is what you have got from this great institution, and they will be the building blocks in whatever career you may choose.

Dunu Roy’s view on this is no different. ‘Courses in my time,’ he says, ‘proved to be very valuable later. They taught us to learn to think.’ Acknowledging the part played by liberal curriculum, Roy says, ‘Courses like History of Technology, Logic, and Ethics helped us see things beyond plain engineering. The 5-year B.Tech. also helped, with all the time it gave us for thought. The 4-year B.Tech. in comparison,’ he regrets, ‘may just be hastening the throughput of technical products, not rounded humans.’

And then there are those who have been students at the Institute, but for long weren’t counted amongst its alumni: those who, for one reason or another, didn’t stay the distance. Some of them chose not to do so, at times dropping out tantalizingly close to the finishing tape – in their final or penultimate year – and forgoing the IIT-Bombay degree. IIT-Bombay’s ‘near-alumni’, too, have had reason to look back on their days at the Institute with a sense of beholdenness. One such is Tarun Hukku, who opted out in 1984, just a semester before he’d have completed his B.Tech. Today, he successfully heads operations in an infotech firm; at the workplace, he says, appreciation of his IIT-Bombay antecedents has by and large overshadowed the absence of a degree from the Institute. And adds: ‘I gained so much from IIT-Bombay that the one or two incidents that led to my dropping out pale into insignificance. What was gained was the ability to think through a problem. And the confidence that one could analyze and think a problem through’ – Hukku, too, sounds that recurring refrain – ‘better than almost anyone else.’

The third component Menezes listed, ‘cultural bandwidth’, also finds definition in his Convocation address:

Dealing in this new world of globalization needs new skills. It’s not enough to know India, or the United States – you have to be able to deal with Brazilians, Mexicans, Thais, Chinese, Kenyans and Russians ... you must be able to understand and master complexity. In a strange way, the IITs help here. Due to
the miracle of their impartial entrance exams, the IIT class is (a) extraordinarily bright, (b) extraordinarily eclectic. When I look back at my IIT group, among them were a Chitpavan Brahmin, a Parsi, a Christian, a Kashmiri, a Tamilian, a Nepali and a Sikh. Very different backgrounds, religions and languages. Yet, we all had to pull together. I submit to you that this is a unique part of your education. Developing a broad cultural bandwidth is one of the key requirements of the modern global workplace.

Menezes’s tribute to the intellectual crucibles and cultural melting pots that IIT-Bombay’s hostels have been finds itself repeated in other alumni’s assessment. Many among them have assigned credit to the ‘preparation for life’ they received in the Institute’s hostels – to the point where some have said that the ‘education’ gained there emulated, if not surpassed, that gained in its classrooms. This claim has expectedly received much attention, both in media and in inner circles.

Can this be true, however; can the classroom experience really have been merely incidental to the chiseling that took place in the hostels? Most alumni take a balanced view, exemplified by Nilekani’s response when I posed the question to him. ‘I’d be the first to admit,’ he said, ‘that what was learnt outside the classroom was in its own way invaluable. My hostel experience equipped me with street smartness, and my experiences in organizing Mood Indigo brought me project implementation and management skills. But the classroom experience at IIT-Bombay gave me an equally crucial toolkit in tackling problems. More than the specific contents of the courses, it was the training in rigorous thinking and analytical ability. It helped me to abstract information, and to devise solutions to problems inventively. And our professors were central to the development of these skills.’ (Amongst the faculty he chooses for special mention, the first name to crop up is that of – and who else could it be? – the ubiquitous M.S. Kamath.) And alumnus Jyoti Gulia (M.Tech. Biomedical Engineering, 2005) makes a discerning point when she says, ‘While hostel life may be as important as the classroom experience for IIT-Bombay’s undergraduates, for its postgraduate students it’s definitely the classrooms and labs that make all the difference.’ She herself speaks of having gained academically in leaps and bounds while at the Institute; in other arenas however things ran, she says, pretty much a standard course.
Time and again in the course of these pages we have come across the view that IIT-Bombay’s early faculty gave their all to their teaching, putting monumental energy and creativity into the shaping of minds. As Hukku says, ‘Some of our teachers put so much effort into their teaching, they made you feel like working for their courses just to “justify” the effort they were making.’ And Rekhi feels ‘very blessed’ to have gained from the ‘sincerity and intensity’ of faculty here. He commends them also for having been ‘very demanding’, driving students to higher than ordinary levels of achievement, equipping them with lasting skills and perseverance.

Their dedication, then, was proved not in vain; it helped author the very many success stories of IIT-Bombay’s alumni. We round off this section with another few lines from Menezes (and find Prof M.S. Kamath haunting them yet again):

I took Professor Kamath’s EE course. For 31 years after, I never met an electrical circuit that I really liked; but, the rigor of analysis, the discipline of process thinking and the drive for the right answer remains in everything I do. I rarely take an important decision without thinking of Professor Kamath, Bedford, C. Balakrishnan and Jimmy Isaac looking over my shoulder. It’s enough to keep you awake at nights… I think we must all understand that we are deeply privileged to have received the finest education anywhere, here at IIT.

Would Kamath, Bedford, Isaac and their like ever have imagined, while applying chalk to blackboard or while framing their intricate exams, that in years to come they’d be robbing their pupils of their sleep at night, or fashioning their corporate decisions during the day?

**LET’S SEE WHAT THEY BRING US, BOUQUETS OR BRICKBATS**

Alumni who today pepper the upper echelons of the public service, corporate and entrepreneurial worlds are comprised largely of those who graduated from the Institute in the 1960s and 70s, iced over with a sprinkling from the early 80s. On average, the lead time they’ve taken to make the waves they have been on the order of 20-30 years. Will subsequent generations of students – those that have graduated mid-80s onwards – sparkle over the next couple of decades just as brightly as their predecessors have done? Although the Institute would quite naturally like to think so, this cannot by any means be taken for granted. And if you were
...and its torchbearers

Over the last several years, undergraduates seem to have become visibly uninterested in their cardinal purpose of being at the Institute: academia. Their attentional shift away from their books and classrooms into a maze of diversions was evinced in surveys conducted recently by a committee charged with revising the undergraduate curriculum. The revision itself was prompted by the dramatic changes that have set in of late in student aspirations and attitudes. Among the causes are a handful that find frequent mention. There is first the burn-out syndrome students have to overcome, of feeling academically jaded at exactly the time they should be at their most charged-up: over the very first months of their undergraduate studies. The culprit here is the arduous effort they need to put in while they’re still at school, often stretching over years, preparing for the JEE. There is next the swelling perception that their courses of study at the Institute are of increasingly little relevance to their future prospects. The decades-old disconnect between industry’s needs and academic training refuses to go away. A third ingredient put forth by many is ‘disillusionment with the quality of the academic programmes, the more so when it comes to laboratory work and hands-on learning.’ It’s clear that students, in such a scenario, aren’t entirely to blame for their low attention spans. (Indeed it’s claimed that in select fields of study, whose graduates are in high demand in industry, such as microelectronics or information technology, students do display a marked involvement with their courses, an eagerness to learn and to make the most of their time at the Institute.)

These desiderata, some subtle and some not, have marred the academic climate of the Institute in tangible ways. In the wake of climbing skepticism about the relevance of the curriculum to their eventual employment, students now look to the IIT degree chiefly for the easy ticket it offers to well-paid employment, much less for the education that is its flesh and fibre. And they have resorted to assembling their CVs on the pillars of avocational – and sometimes purely recreational – interests instead of academic attainment, a tendency that corporate employers over the years seem to have only encouraged. It’s no wonder that gradually, insidiously, students’ extracurricular calendar has become cluttered to the point where even those who might otherwise be academically inclined
find themselves spending ever more time in these pastures. In the view of
the curriculum revision committee, one has the unfortunate situation to-
day of ‘a small number of academically oriented students being swamped
by the majority of the disinterested.’

All of this has left its expected dents on the morale of the Institute’s
faculty. They evince widespread disenchantment with the undergradu-
ate programme. It’s easy, after all, to lose heart when lecturing to a class
consistently at one-third its strength, then again made up of faces whose
minds are frankly elsewhere. Equally dispiriting can be the open disdain
for the scholastic way of life students often express, both in their de-
meanour and in so many words.

Another phenomenon that has grown over the years, until now it has
reached alarming proportions – and this is one for which faculty have on-
ly themselves to blame – is that of grade inflation: the continual rise in the
generosity of awarding grades, such that large percentages of students now
walk away with grades in the upper reaches of the scale. The most troubling
upshot of the munificence is the tacit acceptance and abetment of medio-
cre work. Year by year, there has been a lowering of students’ expectations
from themselves, as also of the demands placed on them by faculty, trends
that can’t bode well for the academic standards of the Institute. Dr P.G.
Awate, of Mechanical Engineering, in writing of the threats the Institute
faces in years to come, sees ‘mediocrity in teaching as well as research, in
whatever areas it exists’ as one of the biggest. The Institute would need to
devise ways and means, he reckons, of identifying the weak links that ‘pass
by’ in today’s systems of monitoring. ‘The control over teaching activities
in a few areas appears to be too weak,’ Awate worries, ‘resulting in ‘soft-op-
tions’ type of teaching that adds very little value and yet passes through
our official monitoring mechanisms. In the long run this results in multi-
plication of mediocrity in some areas, which is very dangerous.’

In words less restrained, Dr D. Manjunath of Electrical Engineering
makes a plea for self-examination and corrective action: ‘I think the ques-
tion is, are we as faculty doing enough to extract the best out of students?
Those who don’t care can get away without studying because passing is
easy. Those that are academically oriented are not challenged. See the sta-
tistics of the number of AAs and ABs given out in our courses – anywhere
around 25% in many of the “important” courses.’ He recounts how stu-
...and its torchbearers

dents who have marks as low as ten or twenty per cent in a course, when confronted with failing it, think nothing of approaching him to say they were expecting a passing grade anyway, or suggesting that they be passed to ‘save their face.’ ‘I can only surmise that his expectation stemmed from his experience in other courses,’ says Manjunath, alluding to the general run-down in the rigidity of awarding grades. ‘Half the students don’t even bring a notebook or pen to the class.’

Perhaps the most alarming offshoot of these developments is the complacency they can engender. We have here a kind of throwback to just before Kelkar’s time at the dawn of the 1970s, during which phase Bedford felt the Institute’s faculty had grown self-satisfied, thinking they were getting along ‘marvelously’ when there were in fact significant deficits to address. ‘Even today,’ concludes Manjunath, ‘we don’t seem to have the desire to measure ourselves and take corrective action. We just seem to want to live in the belief that we are the best and all is fine with the world around us.’

The mood of laxity has set in also among postgraduates. We hear Awate again, bemoaning the contagion, ‘Today there are many more students who are keen mostly for the IITB stamp, and don’t care to leave behind so much as a proper account of their work in M.Tech. projects that could be useful to their successors in the following years. Eventually, a kind of degradation in project works could result and affect the value placed on IIT-Bombay students by their recruiters.’

Dr A.Q. Contractor’s reflections offer a pithy round-up of these concerns: ‘The biggest change that has occurred in recent years is in the students. There is a qualitative change in the kind of students that are coming. On the positive side,’ says the Chemistry professor, ‘we are getting more students from smaller cities and fewer with public school backgrounds. On the other hand, very few are coming for the love of science and technology or scholarship.’ Training an eye on the future, he adds on an ambivalent note: ‘Because of the brand name IITs will continue to attract go-getters but all of them may not be cut out for science and technology…let us wait and see what these students will bring us, bouquets or brickbats.’

For observers of these trends, the years ahead will be absorbing at the very least. For those who are swirled about in the flux, they’ll be anxious times, with outcomes hanging in the balance.
CHAPTER 16

LIFE ON THE CAMPUS

‘THE FIRST TIME I came into the IIT-Bombay campus after the JEE results were declared, I remember saying to myself, oh my God, this can’t be in India.’

This is how Shailesh Gandhi, batch of 1969, recalls his maiden encounter with the Institute. ‘Back in 1964,’ he explains his sense of dislocation, ‘we felt that only universities abroad could be as grand as this, in India we hadn’t imagined anything of this nature.’

Once it had been settled, IIT-Bombay’s campus could be a truly winning sight for the fresh entrant. We’ve seen in Chapter 6 the highlights of the campus’s topography that have made it extraordinary in many ways. By 1964, all department buildings had been erected, as had many residential blocks. A sprawling, freshly appointed, splendidly sited campus couldn’t have failed to inspire. But at the very outset of IIT-Bombay’s existence, things were really very different: the Institute had a campus only in name. With the Powai estate still under construction, its campus consisted of no more than one wing of Sasmira plus an assemblage of rented flats in Worli that functioned as its students’ hostel. Dr B.G. Bhat of Chemistry remembers the timbre of life in that metropolitan setting: ‘While in Sasmira, we hired a building at Worli circle where students were put up. Prof G.D. Shah from Chemical Engineering (and later of Chemistry) was given charge of arrangements for beds, dishes, cooks, and so on. We had students from all over India, quite a mixed population with various tastes. Without prior experience in these things, it was very difficult to employ cooks for them. Prof Arvind Mehta, also of Chemistry, was asked to do this; and his solution was to hire a cook who’d worked in
a maternity home. Why?’ Bhat gives out a laugh at the nugget. ‘Because someone who could satisfy all those Gujarati ladies would satisfy anybody, he said. And it was really successful. It was necessary in the formative stages to keep the students happy, and these kinds of things helped.’

The Institute’s staff, meanwhile, lived dispersed about the city, leading a split working life. They went some days to Worli, some to Powai, watching the campus’s buildings materialize before their eyes, before the big move happened between June 1959 and April 1960. During and on the heels of which, over the first few years, ‘life on the Powai campus was far from comfortable,’ runs one account.1 ‘The area was infested with snakes and a variety of insects. There were no roads, nor foot tracks to move from one building to another; no street lights. The first monsoon arrived within weeks of shifting to the campus. People recall they had to walk through the lush and wild growth, sometimes three to four feet high, always in danger of snake-bites or insect-bites. Snakes, scorpions, crabs, and frogs entered the houses and students’ hostel rooms, class rooms and offices.’

And former Director De says, ‘I remember we used to come to the classrooms with gum boots on. The roads were slushy and muddy, even the students used to come all the way from the hostels clad in gum boots between June and October.’ And he recalls snakes being plentiful, and ‘wild cattle coming from the hillside area in big groups of 20 to 25. They were very scared of humans, they’d bolt at the slightest sound. Now they aren’t at all afraid, I see them lying about casually, not caring for anybody.’

And if you entertained thoughts of putting a good distance between yourself and the slush and mud, you had another thought coming. Getting away from the campus was an undertaking in itself. The nearest gateway to the vast world beyond was the suburban railway station of Vikhroli, on Bombay’s Central Line, some 2.5 km from IIT-Bombay’s exits. ‘There was hardly any communication between Powai and Bombay,’ recalls Katti. ‘Bombay for all practical purposes extended only up to Sion. Beyond, a rickety bus plied between Sion and Thane in an unscheduled way. We used to walk from the Institute to Vikhroli station to catch a train to Sion.’

Respite from the long walks first came in the form of an Institute bus, ‘the only transport available to go to Vikhroli, which charged Rs 3 for a monthly pass for the employee and ten paise per adult passenger for family members. The bus plied at fixed hours.’ A lot more hinged on the ‘fixed
hours’ than might at first appear: the service was infrequent, and if you missed it, you had no alternative but to walk the distance. Hardly anyone had their own car, taxis this side of town were a rare sight, and the autorickshaw was still to come to skittery life. ‘Workers who stayed off campus and had shift duties’ that didn’t coincide with bus timings ‘also had to walk from Vikhroli or Ghatkopar to the campus’ (Ghatkopar lies a good 6 km from IIT-Bombay’s gates).

In a bid to tackle these irritants, Brig. Bose took it upon himself to persuade the BEST – the Bombay Electric Supply & Transport Undertaking – to start a bus service between Vikhroli to Powai; and succeeded. ‘This was a major achievement,’ feels Katti; and so in 1965 a bright red BEST bus, route 392, started shuttling between the IIT-Bombay campus and Vikhroli station. Route 392, over the years, was to burn itself into early campus residents’ minds as their ‘life line’.

The dearth of wheels was just one enemy of escape from the campus. A significant other was darkness. Residents, it’s said, didn’t dare venture outside the gates after dusk for fear of ‘unsocial elements and illicit liquor distillers.’ ‘It was desolate,’ recalls Dr D. Deshpande of Chemistry. ‘No taxi man would agree to come to Powai after 6 o’clock, as they were terrified of the area.’ With good reason, too: the roads leading to the campus were prone to hold-ups and robberies and, recalls Mr V.K. Tandon, Laboratory Superintendent, until 1964 there was a sign at the bottom of the hills to the east of the campus that read: Yahan Shikar Karna Mana Hai, no doubt conjuring visions of brushes with predators other than the human, too.

In any event, there was little point in setting forth if it was the zap and zing of the city lights you were after. Outside IIT-Bombay’s walls, you were offered the services only of a grocer, a jeweler, an aata chakki and others of an equally domestic stripe – hardly the kind of thing to set your pulse racing. Good distances had to be travelled before you chanced upon anything like organized entertainment. On the IIT-Bombay campus, then, you were truly islanded, treated to a hermetic existence shorn of the frills of city life – and in return shielded from its excesses.

For students, as we’ve heard from Gandhi, the campus could be an overwhelming place. It was also a welcoming place, affording comfortable living. The hostels were new, the students few, and each got a room to themselves from the word go. (Certainly the boys did; girls, only flecking
the campus in single or small double digits through much of the 60s, were put up in houses converted to hostellries; their first hostel, H-10, came up in 1968.) And what greater creature comforts might a student of the 60s have expected than a room of his own, in a brand new hostel, amidst charmed surrounds?

Alumnus Lalit Kanodia, of only the second undergraduate batch (1959-63), moved to MIT after his B.Tech. at IIT-Bombay. From Cambridge, Mass., in November 1963, he wrote to Brig. Bose (testimony to the close ties that existed between students and faculty – including the Director – in those less complicated days) about his experiences at MIT. He told Bose first about how he found education and research at MIT to be superior to that at IIT-Bombay. He spoke of the pervasive emphasis on advanced mathematics there, and how ‘a student puts in twice if not thrice as much work at MIT that he does at IIT.’ After which he went on to say:

But MIT has its drawbacks. It has none of the scenic grandeur of IIT, and is located right in the heart of the city with busy streets surrounding it. Our laboratories [Kanodia's possessive points to the fondly recalled IIT-Bombay] are much more spacious and better lighted. Our classrooms and hostels are better. MIT’s hostels are crowded, and most are double or triple seated. As far as conditions of living are concerned I think the student at IIT is far better off than his counterpart at MIT... [here] the fresh air is lacking and the splendours of nature do not exist. As far as student life as such is concerned, I often think of IIT, and its charms. IIT’s students have a lot to be thankful for.

But for faculty throwing in their lot with the Institute in the 1960s the ‘accommodation’ they were given could be a great leveler of the ego. In the early 60s, you could find yourself living in the same rooms as students did. ‘In the early years,’ Narayanamurthy relates, ‘faculty accommodation was a problem. During my first few months I stayed in the city and I used to commute, then when I did get a place on campus it was in a students’ hostel. I was one of the first ‘official but unofficial’ occupants of hostel room in Hostel 8. The room had not been taken over by the Institute, and Deputy Director Prof Mhatre said, “If you are willing to stay in a room out there, then they can hang a wire and put a bulb for you.” I stayed in that room for about a month – rent free of course. And then onto the Staff Hostel. It had taken me three years to get a room in the Staff Hostel, after signing on
as faculty. So there were constraints on infrastructure, and faculty accommodation was one of the major ones. Yet it wasn’t such a serious crunch situation,’ he reflects, fast-forwarding to the 1970s and 80s, ‘as developed in later years. We were growing, but certain things were keeping pace and I think the real hard crunches came a little later.’

With avenues for recreation outside the campus nowhere in sight, residents did what they could to amuse themselves within its bounds. As early as 1961 – just a year into the life of the campus – was formed a Film Society, screening its offerings weekly. Its venue took time to settle. Debuiting in the Civil Engineering department, it hopped first to the terrace of the Main Building and then to the Lecture Theatre, before nestling into the ceremonial spaces of the Convocation Hall once the latter was ready in 1964. In the early 60s you paid 50 paise per show; soon, films were screened twice weekly, on Friday and Saturday evenings. And they soon became the high point of the week for campus dwellers – as attested by faculty, alumni and staff alike. ‘Weekend movies were perhaps the only major entertainment of any kind available to students,’ recalls Dr U.N. Gaitonde. ‘There used to be a Friday evening show, essentially for students, and they projected it again Saturday evening, essentially for faculty and staff. That was not a de jure separation but a de facto separation. The students would pack up their bags and go to the Convocation Hall and from there rush home in the evening.’ Here in ‘Convo’ the screenings continued until the time, more than 40 years later – to flash forward again – that the tradition took its last bow, vanquished by the many-flanked assaults of TV, video, cable, and the Internet.

‘A WONDER EXPERIENCE’

The Swinging Sixties around the world may have been a tumultuous decade, witnessing flower power, transcendental meditation, bra burning, and flights to the moon, but on the IIT-Bombay campus, they were shrouded in long silences, fleshed out with the simplest of pleasures. ‘Since the number of students was very low,’ Gaitonde rolls on, ‘you had hardly any vehicles on campus. The campus was much quieter than it is today. The road outside had hardly any traffic; it was possible to ride bicycles on it without trouble’ (something unthinkable today: anyone who has visited
IIT-Bombay lately will only have shuddered at the hideous mess ‘traffic’ outside the gates has become). So quiet, indeed, was it, that no oncoming bus could take you by surprise round the bend in the road: ‘One could hear the bus conductor’s bell from the Main gate,’ remembers Gaitonde, with his yen for detail, ‘standing in front of the Y point gate’ (the gates are separated by a good half a kilometre).

Enlarging the stillness on the campus was the outrush of students after the Friday film. Quiet as a rule, the campus would become eerily silent over weekends. Most students were Bombay boys (or girls) and, says Gaitonde, ‘Many of the students used to go away, either to their homes in Mumbai or to their local guardian’s place. Friday evening one used to see a huge exodus of students from campus, returning either on Sunday evening or Monday morning. If you stayed back over a weekend in the campus, the place was essentially dead.’

Where the Friday movie was a weekly high point, there was another that came along daily – but, depending on your stars for the day, could as easily turn out to be a low. This was the era of, exclusively, snail mail; real paper envelopes bearing your name were what you awaited anxiously to pop into your Inbox; and the Inbox itself was the letters shelf or table at the entrance to your hostel. The postman’s arrival was a daily apogee: in alumnus Dr A.L. Ravimohan’s mind, it etched itself enduringly. He recounts ‘vivid memories of the vociferous postman, Kashinath, who would come with our letters to the hostel and shout out our names individually. And in the bargain he had become quite knowledgeable about all the US universities making those offers!’

So keenly awaited was the event that alumnus Dr A.N. Dravid, too, recalls it as a zenith, his account taking the postal saga further: ‘There were no PCs, no Internet or e-mail, and the table in the common room displaying daily mail was almost everyone’s connection to the outside world. Love-letters, letters from family, friends, even job offers, application materials for higher education in India and abroad, GRE application packets, you name them... they were all there. There is no count of how many connections were made, hearts broken, and future careers shaped from this mail table!’

The simplest of times indeed. But when it came to daily supplies and provisions, things weren’t quite as simple. ‘There were difficulties in
day-to-day living,’ Naraynamurthy relates. ‘The mid 60s was an era of shortages in the country. Sugar was rationed at 200 grams per head per month, and foodgrain supplies relied partly on PL 480 assistance from the USA – we were often living a ship-to-mouth existence.’ Which is where the Institute’s non-academic staff stepped in, he says, to keep the campus going. The IIT Consumers’ Co-operative Society was started around this time, initially to supply stationery to students at concessional rates. A milk distribution unit was created in 1963; readied the same year was a small shopping bay near the Y-point gate. You didn’t have to step out of the campus for your banking needs either. The State Bank of India opened transactions in the TCS building as early as 1961, moving to its present location at the Main Gate in 1972. The campus’s post office came a bit later, in 1966; its first abode was the Staff Hostel.3

For those in need of the healing touch, health care services over the first few years were basic as basic could be. You had just a doctor and a dispensary tucked away in Hostel One, catering mainly to students. Alumnus D. Dahanukar, of the Institute’s second undergraduate batch (1959-63), recreates the charm of being an early settler, recalling the doctor with apothecary ways all his own: ‘We were the first batch at Powai. The roads
were not asphalted, we wore gum boots in the rain [Those gum boots again!]. There were only three buildings: Hostel 1, and two others pretty far away. The Main Building was being built. The dispensary had a doctor who colour-coded his mixtures, different colours for different years! It was a wonder experience. The campus’s hospital proper was commissioned in 1964, replacing the dispensary -- but, as we’ll soon see, the translation in space didn’t spell an end to its clinical quirks.

A proud asset of the campus have been its schools. They’ve played a large part in making campus life self-contained, freeing up parents and children alike from the worries of admissions and commuting. Their origins go back to 1963, when the Institute started an ‘IIT School’ consisting of one section each of nursery and kindergarten, and two of primary. The intention was to add a class each year until the Higher Secondary was reached. In April 1964 the school was handed over to the Kendriya Vidyalaya Sangathan, forming the Central School, now reputed throughout the city. It didn’t take long, however, for the campus population to outgrow the Central School, and the Institute started what came to be called a Campus School in 1976.

The social weave of campus life in this cut-off world, accounts from the period seem to say, had all the flavour of an experiment in institution building of which all participants -- faculty, staff and students -- were determined to make a success, each doing their bit to groom the infant campus even as it groomed them. This snapshot by Dr V. Punekar of Humanities and Social Sciences fills us in on its broad contours.

The community was small, people were young and willing to face hardship; they co-operated and willingly undertook whatever tasks they had to carry out. They were concerned about the prestige of the Institute... everybody contributed his mite to make it a success, and were proud of it, once the task was accomplished.

The whole enterprise is said to have been infused by that state of mind which, still buoyant in the 60s, was to fall prey not long from then to a decades-long torpor: the nation-building spirit of the time.

\textsuperscript{a} While the ‘colour-coding for different years’ may be apocryphal, the colour-code itself wasn’t – others also remember the absence of foils, and the nameless, gaily coloured ‘mixtures’ they were dealt out.
‘One cannot ignore at this point the temporal context, to use the physicist’s jargon,’ Punekar pens the scene, ‘of these achievements: late fifties and early sixties was a period when the nation was on forward march, full of hope and aspirations, and people committed to their professions. The students, faculty, and staff of IIT could not be an exception to this national ethos.’

We hear alumnus Shailesh Gandhi again, shifting gears into contemplative mode (and his thoughts find an uncanny echo, almost word for word, in those of another alumnus a year his junior, Victor Menezes (Electrical Engineering 1970)): ‘One had not even dreamed that such an institution could exist and this is important because I think the amount of money India spent on this Institute was phenomenal by the standards of the time. It was really an investment in the future; Jawaharlal Nehru and the nation consciously decided to invest in the future far in excess of what the nation, impoverished as it was, could afford.’

THE FRUITS OF STOICISM

The 1970s saw no dramatic improvement in the Institute’s links to the rapidly transforming world. Bus Route 392 remained the only cord, plying every half an hour, looping within the campus, lumbering in one gate and out the other. But ‘after 9 o’clock there was no communication at all,’ recalls Dr Dipan Ghosh of Physics. And the campus still wore a decidedly bucolic look: ‘When I joined,’ says Ghosh, ‘it was monsoon, the roads were water logged, it was as if I had moved very seamlessly from Shanti Niketan [from where he’d come] to IIT-Bombay because this was as much of a village as was Shanti Niketan at that time.’

For people like Ghosh, faculty enemy number one in the ‘village’ continued to be the same as it had been for Narayanamurthy and others in the 1960s. ‘If you ask me if I faced any difficulties,’ says Ghosh, ‘I think the biggest was accommodation. Even today you find young faculty complaining about housing, but in 1974 when I came in, things were on a different order altogether.’ He goes on to relate a grim tale of multiple moves and down-and-out living stretching over several years before he came into accommodation to which he, as an Assistant Professor, had been entitled

b Gandhi and Menezes not only voiced the same notion, they used practically the same words too – in separate interviews.
from day one. This included camping in the spare room of a colleague’s apartment, eating out so as not to bother their hosts (‘My wife was shell-shocked at the whole situation’, he says – we’d just returned from the US’); moving next to a one-room ‘apartment’, then to another, this one in the Staff Hostel – during which period their elder daughter was born. ‘And there we were, in a single room, cooking in that place – there just wasn’t enough space in the Institute to give anyone two rooms.’ And this wasn’t all: there was yet another move to a flat designated for support staff before Ghosh at last got his due in faculty accommodation.

Did it not bother him that he, faculty in an ‘Institute of National Importance’, was being meted out such shabby treatment? No, says Ghosh; if there was one trait faculty at large, cultivated in the 60s and 70s, it was an unflinching stoicism; and circumstances were such as to leave you little choice in the matter. ‘If you were here in the India of the 70s, nothing like this ever bothered you because there were so many much tougher problems to deal with. There was no rice available in the market – it was a controlled item – and we are primarily rice eaters. I remember we had to go to other side of Govandi for our rice.6 There was no kerosene available either (this was rationed), nor cooking gas, in fact the first time I got a cylinder was after four and a half years at IIT-Bombay. And we had to wait ten years for a telephone connection. Those were difficult days for the whole country, and I think anybody who decided to come back then knew exactly what they were getting into. It was a tough situation, but that’s the way it was. So the accommodation problem was nothing compared to all this.’

**TWO SWIMMERS, EACH AS SURPRISED AS THE OTHER**

Over a good three decades, IIT-Bombay’s watery surrounds played a very special part in setting the tenor of its citizens’ lives. The Institute’s two enveloping lakes, their waters shimmering to the north, south and west of the campus, have served to insulate it not just from the press of civilization but also from thermal assault. The lakes form an aquatic cladding, which, aided by the abundant green cover around, helps keep the campus measurably cooler than the city at large.

Aside from the purely climatic edge, the lakes have afforded for campus dwellers over the decades a rich fund of diversion and leisure. Powai
Lake has been the campus’s proud frontispiece, Vihar its secret treasure. Powai has been enjoyed by residents and visitors alike, for the Institute’s guest house commands a panoramic view of its waterspread. And until the early 80s it could be a glorious sight: ‘not a single weed’, old residents remember, marred its margins. For many years through the 70s its banks played host to a thriving boat club whose patrons honed their paddling skills in its waters, sometimes in the dead of night – until the time the lake’s bed was caked over with silt, its shoreline overrun by weeds.

To students who have lived on its fringe, such as in Hostels 7, 8 and 11, Powai Lake will have been both friend and foe. Friend for the calming backdrop it has provided to their anxiety attacks before submissions and exams, foe for the unhealthy miasma it can exude on monsoon evenings and winter mornings, triggering bronchial distress. Foe also for the numerous life-forms, not all of them welcome, that it sends crawling and fluttering into their corridors, messes and rooms. Some of these are vectors of disease: the lake’s marshy perimeter is a perfect nursery for mosquitoes, and malaria and filariasis have been constant hazards of campus life.

Vihar Lake must surely loom just as large as Powai, if not larger, in the memories of those who have passed through the Institute. Evenings, for years together, residents would stroll up the access road under the pipeline, and take in the air and the scenery from Vihar’s southern embankment. You had here the silken rippling expanse of the lake’s waters, twilight-grey, a small island or two inlaid into them. You had also the languidly foraging cormorants, and the silent, swarthy hills of the National Park rising suddenly from its northern shores. In all, a panorama so flawlessly tranquil that it was easy to lose oneself in its contemplation, watching its pieces dim and dissolve in the gathering dusk.

After dark, some would stroll back to their rooms and homes; but for others, darkness didn’t spell an end to their communion with the waters. They stayed back, or returned after dinner. Vihar Lake was open access, 24 × 7, and you could pretty much do what you pleased in and around it. There were those who – intrepid souls like Dr S.S. Talwar of Chemistry, or alumnus Dr S. Waghulde – trekked around its margins into the heart of the National Park’s forests. They camped nights there, undeterred by thoughts of being chanced upon by the odd prowling panther or meandering snake. There were others who slipped into its waters for a swim – with sometimes
unexpected results. Dr A. Chatterjee, who spent his undergraduate and doctoral days here in the 1980s, was such an avid swimmer that he’d sometimes go ‘two or three times a day’ to Vihar for a splash. ‘It was like having your own private swimming pool,’ he smiles at the recalled privilege, ‘in your backyard. Often I went on night swims – as late as one or two a.m.’

On one of these nocturnal swims, Chatterjee swam across to the island in the lake. (It was customary for him to circle the island a few times before returning to IIT-Bombay soil, sometimes alighting on the island for a breather.) Climbing ashore, he was confronted with a numbing sight: there on the island sat a crocodile, gazing at him thoughtfully. Both human and reptile were too stunned to react – ‘The croc was as surprised as I was,’ says Chatterjee – but in a moment, the scaly one decided to do the polite thing. Recognizing Chatterjee’s equal claim on the island, it slipped into the waters of the lake, and was lost to sight. Its courtesy only amplified Chatterjee’s quandary, of course: he was now marooned between the devil and the deep lake. It was beautiful all around – the moon was reflect- ed enchantingly in the lake – but he could scarcely feast on the scenery all night long. He’d like to swim ashore in some reasonable time – but what of this other, long-jawed swimmer in the lake? Yet there was nothing for him but to brave it: he decided finally to make a dash for the Vihar Park, closer to the island than the Institute’s embankment. A torrid and merci- fully uneventful swim later, he was ashore. There he ran into one of the Lake guards, to whom he related his misadventure.

‘A crocodile?’ the guard laughed away his shivers. ‘Who worries about them? They never say anything!’ – much as Chatterjee might himself re- assure a panicking Japanese or Australian delegation visiting the Institute about a hystERICALLY SNARLING pack of pie dogs or a colossal bull charging straight at them, snorting, kicking dust...Which brings us to that other zoological facet of campus life, the less glamorous of its wild inhabitants: its herds of cattle, its packs of strays, its insolent monkeys.

While the monkeys are truant visitors from the Borivli National Park, the cattle and dogs are domiciled citizens. And while the panther has been a stealthy intruder into the campus, skulking in the shadows, the cattle here have the air of sovereigns, masters of all they behold. They are treated every bit like royalty, too: they roam the campus free and unchallenged; sacred as they’re generally held to be, they are saluted and fed wherev-
er they go. Watchmen deferentially raise the Institute’s gates mornings and evenings for them to saunter out and saunter back in. Spoilt by the affection and respect showered on them, they also become willful and maverick, often making pests of themselves.

In a letter to the Director written in July 1974, the ‘Occupants of Staff Hostel No. 2’ pleaded: ‘We have already submitted a couple of applications for the construction of parapet wall to the ground floor verandah but no action has been taken so far. The construction of wall is highly essential as we are facing following inconveniences.’ Inconvenience No. 1 centred on the ‘hygienically unfair’ behaviour of campus cattle in ‘spoiling’ their habitation every night: ‘The untamed cattles are sitting in the verandah during night time and spoiling the whole verandah which is highly unfair from hygienic point of view.’

Or picture this: on a rainy day, late for a class, you and your friend are one instant rushing into your department’s landing; the next instant, you stand there frozen in horror, while your friend doubles up in mirth. You’ve collided full-speed with a freshly deposited, steaming cake of dung, splottering it over your legs; in the corner of the landing sit the authors of your misery, mother and calf, serene as saints. And then when you’re in one of those ground-level classrooms, wrestling an equation, there’s no saying when the wobbly calf might wander in for the lecture on network theory or fluid mechanics.

In these ways have IIT-Bombay’s cattle stitched themselves into the tapestry of campus and academic life, their own lives an open book for all who care to see. They whelp in the small hours on our roads; long columns of them are found trotting down our academic corridors with all the solemnness of Zulu warriors, single-file; the bulls when in heat will think nothing of putting their sexual capers on public display. But while some of the vignettes our bovine herds stage can be thought-provoking, even endearing, there can also be occasions when the cattle, particularly bulls in the throes of passion, are a full-frontal danger. Time and again have residents had the closest of shaves, escaping by a whisker being rammed by half a tonne of rock-hard muscle moving at blustery speed, with possibly horrific consequences.

No less legion are the stories of annoyance, mishaps, and injuries involving the campus’s coalitions of stray dogs. It’s no surprise, then, that
the Institute’s human populace has been divided on the space they’re willing to spare their bovine and canine co-residents. The debate at times has boiled down to one of modernity – and no less of what can or cannot be accommodated within the ambit of IIT-Bombay’s desire to be a ‘world-class’ Institute. Dr B. Krishna Mohan of CSRE sounded a protest on behalf of those troubled by the apparent incongruity:7

It is amazing how we, the ‘elite’ at least in the field of education, put up with these kind of things for so long: large numbers of stray cattle dirtying the roads and forming potential threat to motorists and pedestrians, wailing and barking dogs through the night ... the list goes on.

Perhaps the most trenchant riposte was offered by Dr K. Trivedi, of IDC, who related this twist-in-the-tail conversation:8

I continue to be baffled by the logic which connects being ‘world-class’ and ‘elite’ with the presence of other living beings ... When I was in Staff Hostel long ago, I told a new faculty member over dinner that there were crocodiles in the Powai lake. I was shocked by his immediate response: ‘Why, can’t they kill them?’

Trivedi went on to make this poignant pitch in support of preserving IIT-Bombay’s ‘wild’ legacy:

The cows were there when I joined IIT as a student in 1970. I was told they had been there before the campus. Actually IIT appropriated their land; and now wants to get rid of them. For me animals on the campus are not a problem; they enrich my life. I welcome the presence not just of cows, but also of snakes, crabs, frogs, fish and all the various life forms we are lucky to be surrounded with ... Do ‘world-class’ minds in this ‘world-class’ institution solve only ‘world-class’ problems, and not of their immediate surroundings and life?

Here on campus, then, there has been high adventure laced into recreation laced into annoyance and delight – all as if on tap in IIT-Bombay’s ‘wild’ precincts and surrounds. Add to this the range of civic amenities contained within, and it comes as no surprise that residents across generations have described campus life as ‘picture-postcard’ (Dr M.V. Hariharan’s words), attesting that whatever irritants existed were clean overshadowed by the charms of IIT-Bombay’s rolling hectares, the conveniences built in-
to it. Others have spoken of how it afforded a ‘priceless environment’ for children to grow up in. And several non-academic staff, visibly emotional at the thought, have counted the chance to lead ‘such a serene life’ in a city as notoriously dyspeptic as Bombay as ‘God’s greatest gift’ to them. They have also paid tribute to the vigorously academic setting that has enabled their children to rise professionally further, often much further, than they’d ever done. Several such campus children are now on the faculty of universities, or corporate executives, or infotech hotshots, both in India and overseas; the campus, then, has ‘made lives’ in ways that have earned it its residents’ warm and everlasting gratitude.

Amenities on campus, over the 1970s, had improved, but on their own whimsical terms. IIT-Bombay’s full-fledged primary and secondary care hospital of the 1970s was certainly an improvement over the one-room dispensary of the early 60s in size and scale – but inside, you could be ambushed by surprises. ‘The hospital,’ says Ghosh, ‘was the most hilarious place IIT-Bombay has had.’ A hospital – cold dungeon of needles, bandages, blood and drips – surely the last place to set off peals of hilarity in one’s mind? Well, Ghosh explains. ‘When I went there on my very first day, the Senior Medical Officer – one Dr N.W. Billiangady – conducted my medical examination. No blood test, just a stethoscope check-up. Suddenly he
lowered his voice and asked me, “What is your name?” I told him, and he said, “That was the hearing test”.

No less rudimentary, and effective, was the ‘test’ for pregnancy. ‘But the most hilarious story of the hospital I have,’ Ghosh cannot stop himself when harking back to the hospital, ‘is about when we were expecting our first daughter. We went to the doctor – this was a male doctor – and said we suspected my wife was expecting, so we’d come for a confirmation. He was absolutely taken aback – he couldn’t believe somebody could talk to a male doctor about such things. Recovering from the shock, he said to me, “My friend, you should know this is a very, very difficult diagnosis to make. But why worry at all? It’s the kind of thing that…you know…will manifest itself anyway, no?”’

All of which goes to show that although IIT-Bombay was, as an institute of technology, supposed to be at the vanguard of all things scientific and technological, life on its campus could cloak you in an other-worldly air all its own.

‘SOMETHING IIT-BOMBAY HAS NEVER DONE WELL’

The 1980s, too, came and went, and IIT-Bombay found itself just as cut off from the rapidly burgeoning city as before (though gradually, almost imperceptibly, the city’s tentacles were creeping in on it along the decade); and on campus, the question of housing continued to set a dismal cap on faculty contentment.

Ask virtually any faculty about their early days at IIT-Bombay, and one particular building on campus occupies dubious centre stage in their thoughts: one of the first residential blocks to be erected in 1959-60, the Staff Hostel. And for everyone, evokes a trail of bittersweet memories. Bitter for the unlovely introduction to campus life it represented, sweet for the rich and easy companionship it offered. Dr J. Vasi, of Electrical Engineering, who took the plunge in 1981 of moving from IIT-Delhi to IIT-Bombay, reflects on the double-edged sword the Staff Hostel was. ‘I had not bargained really,’ his face clouds over with the revisited disappointment, ‘for the housing here. There in IIT-Delhi I was living in a row house, two storeys, with a garden around, and here I was confronted with a single room in the Staff Hostel – itself a terrible place. I tell you, if I
hadn’t actually resigned from IIT-Delhi, I would have gone back within a month. Again I think this is something IIT-Bombay has never done well – housing for its faculty. This was certainly true in 1981 and it is even more true today’ – recalling, here, Narayananmurthy’s foretelling of the ‘real hard crunches yet to come.’

Vasi’s ‘even more true today’ is significant beyond the purposes of this chapter. Although the Institute has taken measures to improve housing in recent years, there is still much to be done; and its efforts in this direction will be a key element in deciding the professional talent the Institute succeeds in attracting in years to come. But to revert to how it once was, ‘My solution to the situation,’ says Vasi, ‘was that the Staff Hostel was merely the place you slept – so I used to end up being in the department from about 8.30 am till about 11 pm everyday. Sometimes of course you wonder,’ Vasi muses snidely, ‘if they didn’t plan it that way, to get us to work harder. Of course I must add that although the Staff Hostel itself wasn’t good, the people there were really fantastic. One got to know a lot of people, so many of my contacts within IIT-Bombay originate from those days.’

Many others have spoken just as fondly of the conviviality that lightened the air in this otherwise grubby, poky apartment block, right into the late 1970s. ‘The Staff Club, too,’ Ghosh recounts, ‘was located initially in the Staff Hostel’ – adding to its vibrancy. The Club moved in the 80s to the oldest building on campus, the only ‘pucca structure’ of 1959, the Chintan Bungalow. Here, too, the good times rolled on. ‘At the Staff Club in the evenings you would find a minimum of 30 or 40 people,’ says Ghosh, ‘while today you won’t find three or four. Billiards, table tennis, cards, carrom – all these tables were continuously occupied. The Staff Club was an amazing place for socializing, primarily because there was no television.’

Mid- to late 1980s, the city was busy donning the avatar that defines it today: choked with people, traffic and concrete. Life on campus grew to be increasingly a contrast to this messiness. Alumnus B. Ahuja, B.Tech. Mechanical Engineering 1993, recapitulates the late 80s: ‘Being in IITB felt like being in a small world of our own with very little connection or regular contact with a bustling metropolis just a few kilometres away. To go anywhere south of Ghatkopar involved special effort and planning… Pooling resources was pretty much the IIT way of life, so these expedi-
tions always involved everyone putting in whatever little they had so that the whole group could have a good time.’

‘Outings’ therefore remained dominantly local, and some of them were imbued with their own subtle highlights. ‘Another popular outing was trekking down to Huma theatre in Kanjur Marg for movies. If one went for a night show there would be an added favour thrown in by the cinema authorities, whether we wanted it or not. Immediately after intermission, there would be a few minutes of adult content, after which it would be back to the regular feature. Usually after the post-intermission bonus, a section of the audience (often auto and taxi drivers) would leave.’

The campus’s motif of silence enjoyed its last few years into the early 1990s: ‘Until my third year,’ Ahuja remembers, ‘there were hardly any motor-bikes on campus. People mostly walked or cycled around campus. It was probably in my second and third year that the first motor-bikes appeared on campus.’ And once motorbikes did appear, of course, all auditory hell was let loose.

Campus life for employees was developing a few new irritants as well. Not just was there an acute shortage of housing, what little was available was in a shambles. The Institute’s buildings were falling apart, and maintenance was at an all-time low. The Institute’s Estate Office, moreover, wasn’t exactly doing its best to keep the campus in good trim. Residents were having a rough time of it and losing faith in institutional mechanisms to afford them a trouble-free existence, jeopardizing mutual goodwill on campus, as implied in this snip from the Administrative Reform Committee’s report: ‘Procedural matters consume more efforts and time,’ it said, ‘than the actual action. The important fall out of this is the prevailing and ever growing loss of faith and confidence on the part of residents and employees - leading to dissatisfaction, mistrust and general resentment.’

**SOME GAINS, SOME LOSSES**

Today things are very different whichever way you look – the social or the material. Even as the campus has grown discernibly more populous in recent years, social engagement has given way to the inexhaustible potpourri of pre-fabricated entertainment on the one hand and increased work pressures on the other. And a gradual social distancing from one an-
other appears to be as true for students as for faculty. In the rooms of their hostels, a worrying proportion of students have started to lead a chrysalis existence, losing themselves in a maze of websites, e-games, e-books, e-films, e-everything.

The losses on the social plane have been offset by gains on other fronts. Life on campus has become less old-worldly, less laid-back; coupled to this is the increasingly spruced-up, manicured look the campus has acquired. Inlaid into its revamped visage are a host of new amenities that residents had keenly awaited for decades together, such as an on-campus restaurant, a banquet hall, a crèche, a new guest-house – all adding up to make life on campus more self-contained (if more crowded) than it has ever been.

Possibly the most unfortunate privation of recent times is to do with the lakes: the decline of one, and the going off-limits of the other. The lakes, from the very start, have enjoyed contrasting fortunes. Today, while Vihar is still youthful and pristine, Powai, though born much later, has aged, and is barely limping along. Vihar was meant to supply potable water, and was zealously protected. Since Powai’s water quality was never as good as its northern neighbour’s, this graceful, picturesque, many-lobed water body was orphaned. Over the 1980s, it was to suffer a series of insults. Its bed was heavily silted owing to massive construction around its eastern periphery. Organic pollution, in large part due to the discharge of untreated sewage into the lake, led to its eutrophication, and the rampant proliferation of weeds. On this score, IIT-Bombay wasn’t free of blame. For a number of years, the Institute discharged raw or partially treated sewage into the lake, adding to its woes. Then in September 2000, the Institute’s sewage was redirected to the municipal lines; however, external sources of effluent continued unchecked. Run-offs from automobile repair shops and exhausts from increasingly heavy traffic added heavy-metal pollution.

Today the lake, and all that it stands for, is threatened with morbidity and possibly extinction. It has already declined to a haggard shadow of its former self, and unless swift measures are taken to reverse the trend, one may well lose this precious gem forever. Waking up to the peril, alumni from the class of ‘80 targeted fund raising for a ‘legacy project’, directed at saving the lake, as their ‘give back’ to IIT-Bombay.

Also in the 1990’s, to the deep disappointment of all, the campus’s crowning fount of leisure and repose was gradually withdrawn, then bloc-
ked off entirely. On the banks of Vihar lake, as it grew dark, the Institute’s watchman began to do a beat, marshalling stragglers back into the campus. The reason most often given was that drug peddlers had started conducting their furtive operations along and beyond the pipeline. Where there are drugs there will follow petty and not-so-petty crime... and once a few knife-point robberies had taken place, the campus’s northern strip became unsafe to potter about in. This culminated, in the early 2000s, in a complete closure of the gates at the underpass, robbing the campus of one its most beloved, and profoundly cherished, recreational nooks – one already described as being ‘like nowhere else on earth.’

‘A GRADUAL DECAY, ULTIMATELY RESULTING IN NON-EXISTENCE.’

Having travelled into the 1990s and 2000s, it’s a good time to take an overview of a selection of extra-academic realms in which the IIT-Bombay campus (along with others of its ilk) has stood out as unusual among academic institutions. These are: interaction between students and faculty on a completely residential campus; the special problems women in a predominantly male environment have had to tackle; and political sensibility (or the paucity of it) in an institute of technology.

‘A residential campus should provide unlimited opportunities,’ it has been said, ‘for interaction and for exchange of ideas between faculty and students.’ Did the IIT-Bombay campus succeed in this provision? The evidence, from my conversations with several long timers, is that while such interaction has not been absent, it has by no means been ‘unlimited: It seems always to have been a businesslike interaction at IIT-Bombay, students meeting faculty by appointment or dropping into their offices during working hours, when faculty may spend time addressing their difficulties. But student-faculty interaction in the sense of ‘sitting over a cup of tea to discuss everything bothering the world’ as it’s been put by some, has never been too common except with a few amongst the Institute’s staff. These latter have enjoyed having students over at their homes, or themselves going over to the hostels, offering their services as their wardens, or in other ways becoming firm fixtures in students’ lives.
Confirming this impression, a good number of students, past and present, have said they wished that the give and take between faculty and students had been more extensive. Speaking of faculty that did make it a point to reach out, the first name that comes to mind is that of Prof J.R. Isaac. His contemporaries have recounted how, no matter what time of day you dropped in at his house, you were sure to find students there – he enjoyed having them around, and they liked to be around him. Also mentioned frequently is Dr T.R.R. Mohan, of Metallurgical Engineering; students who graduated in the 1970s are still said to drop in to see him.

Who better than Isaac, then, to run his seasoned eye over a three decade span and give us this short but sweeping capsule on the subject? ‘In the early years there were only a few senior professors around,’ Isaac reminisces, ‘and most of us were around 30. There was a keen desire to get on with knowing students and teaching them. The concept of research was a backdrop. But then, this was forced to be changed, partly due to the emphasis given by the faculty Selection Committees [for recruitment and promotion] to journal and conference papers and presentations. Thus the faculty concern turned from teaching to research – not research as a support to teaching, but research for ‘market value’. All this played a role in the slow transformation of staff-student relationships. Essentially, these relationships may be said to have changed from ‘excellent’ to a gradual decay, ultimately resulting in non-existence.’

Things weren’t static on the students’ side either, and Isaac takes note of the fact. ‘But as they say,’ he continues, ‘it takes two to tango! In the early years students used to take their studies seriously – and showed some interest in specialization, career paths, and such. But their areas of concern slowly drifted to “self interests” - not really connected with academics, but rather with “social pressures”. In particular there was the “GRE thrust”, with the insatiable urge to higher studies (outside India! – in reality of course this was the urge towards an easy dollar). The GRE driven approach resulted in a loss of interest in academics. Specializations, areas of interest, planning towards careers – all took second place, if any place at all – and GRE focus was it! Coaching classes and student “Study Groups” towards this end were the order of the day. IIT courses and studies became incidental towards this end. No real involvement remained. Which of course life on the campus
ultimately resulted in there being no academic motivation. And then came computers and Information Technology – the other distraction!’

Most current faculty would take it up from where Isaac has left off, and say that computers and the Web have driven the final nail in the coffin for academic earnestness in students. And all sides are at a loss on how to tackle the ever widening estrangement. The Institute in 2007 took the drastic step of curtailing net access to limited hours during the day – leading to a tidal wave of debate, discussion, and protest. Given the mixed bag of factors involved, whether or not the measure will succeed in its aim isn’t easy to say; but the next many months will surely tell.

A CONTINUOUS ANXIETY

At IIT-Bombay’s workplace, the saree and the salwar-kameez have always been tiny islands of print and colour in a huge grey-scaled sea of shirts and trousers. For the small minority of women employees, the Institute’s chambers and offices have offered an uneven experience, situated as they’ve been within India’s overwhelmingly patriarchal landscape. Dr N. Talwar of Humanities and Social Sciences, who has been convener of the Institute’s Women’s Cell, delineates the kinds of unwelcome attitudes, both overt and subtle, women at various levels have had to tackle. In the work spaces of the lowest rungs of support staff, for instance, there has invariably been a male figure pushing them to work; and here, women have had almost no voice. Nor, if they’ve encountered slurs or insinuations, have there been mechanisms of redressal on hand. At the level of office staff, Talwar observes that women there have often been polarized themselves, becoming part of existing workplace dynamics. This has compromised their ability to fight harassment – something that has unquestionably existed.

For women faculty and officers of the Institute, the stresses have been more subtle. They include the patronizing attitudes of male colleagues – at times unintended – towards the women. In group situations, for instance, they’re often not taken as seriously as are the men, and have found themselves sidelined in decision making processes. This has had two unfortunate fallouts: their talents have often gone unused, and they’ve had to square up to a continuous anxiety in group situations: to be heard, and to prove themselves. The classroom, too, has been a potential zone of anxi-
ety. Girl students have had to tackle insensitivity towards their needs – and even their very presence – by faculty. Older male faculty in particular, habituated to and very set in their ‘boys-only’ ways, have been difficult to approach or speak with. And there have been instances of sexist remarks being passed in large classes containing just one or two girls, leaving them feeling confused, isolated and helpless.

Since the issuance in 1997, of the Supreme Court guidelines on sexual harrassment, which Talwar lauds as ‘very enlightened’, and the formation of the Women’s Cell at the Institute in 2002, there has been a change for the better. ‘The Institute is growing,’ she says, ‘in this respect. Women are coming forth with their problems, and attempts are increasingly made to address these. Perhaps, however, IIT-Bombay isn’t doing enough: it’s doing what’s demanded of it by legislation, but not enough to pro-actively build sensitivity to issues, and rationales for redressal.’ The implementation of Supreme Court guidelines in their true spirit poses the real challenge, Talwar feels. Equally important is for the guidelines to be read, their spirit understood – if partly as a mark of education. Failing this, the suffering of victims may fail to be properly understood, and the lack of empathy at every level may persist. In the end, support for women should be a matter of ideological pride for institutions like IIT-Bombay, Talwar reasons; they should feel exultant about the space they’ve created for women, and not stop at setting up mechanisms that merely react to situations.

By far the best counter to these concerns would be to hit at their very root: which is for the Institute to find ways to increase the proportion of women in every sector – students, faculty, staff – through supportive and enabling mechanisms. These are measures to which the Institute has paid scant attention in the past, and won’t do well to neglect in future.

**NO POLITICS, PLEASE, WE’RE …**

To be riddled with student politics; to be degraded into breeding grounds for political parties; to have their student unions and hostels infiltrated by political operators, blighting their academic atmosphere; to have their admissions subverted by political interference: such has been the sorry lot of any number of Indian colleges, universities and their campuses. These include some of yesterday’s best, now fallen into decay from these insults.
The IITs, in contrast, have been largely spared these ignominies. IIT-Bombay’s campus, other than during isolated incidents such as the 1980 closure of the Institute, has been strikingly free of politically coloured turbulence. We follow the texture of ‘political’ life on campus through the eyes of Dr R.R. Puniyani, who joined the Institute in 1977, working first as a doctor and Senior Medical Officer at its hospital and later fashioning himself into a political commentator widely respected on the national scene. ‘In the late 70s, levels of political and social awareness on campus were very high,’ says Puniyani, ‘and this included students. In the 80s one saw a number of active social and political forums, with student groups regularly organizing lectures by faculty, by students themselves, or by visitors. But the late 80s saw a decline, with residents becoming passive – and the trend has continued since.’ Speaking of the Institute’s official stance, ‘It has always been conservative at IIT-Bombay,’ says Puniyani, ‘the overall policy of the Institute being to curtail politicization. This applies to all sides, giving the Institute a relatively apolitical tone.’

Post 1980, the one major upheaval that affected life on campus was the Babri Masjid demolition of 1992, and its sequela. In the Convocation Hall, after the weekend film shows, chants of Jai Shri Ram were heard; hand in hand, the early 90s saw a rising Shiv Sena presence on campus. ‘The national mood of religious chauvinism,’ recalls Dr A.Q. Contractor, of Chemistry, ‘did creep into the campus in 90s.’ But illiberal persuasions of any hue were unlikely to gain much ground. With all constituents of the campus – its faculty, students and staff – intent on preserving its intellectual life, such views failed to find fertile soil in which to take root.

Of late, if there is but one characteristic of the political climate at the Institute, it’s disengagement. The intense focus on careers and on upward economic mobility (and this is a focus that today starts for undergraduates from pre-IIT days, while they’re still at school or at their coaching classes) have meant an aloofness from socio-political concerns. Dr A. Mehra of Chemical Engineering, observing these trends, says of the present: ‘In terms of political atmosphere, I think there is a very strong degree of depoliticizing now, especially in terms of social awareness and values. Social sensitivity has been eroded. For instance, nobody will say poverty is good, but nobody really worries too much about its prevalence anymore. And this applies probably to every part of the campus community.’
But for depoliticization to set in among students, in times past fiery agents of change, is a special concern. ‘Large numbers of students these days,’ continues Mehra, ‘don’t really bother about anything that doesn’t affect them directly. The influence of the city of Mumbai, too, is significant. Every second person now wants to be an entrepreneur, or to incubate technology and so on. Where is the space in all this for developing one’s political sensibility? But,’ he concludes, ‘this is consistent with changes taking place in society at large, with stock markets and the quick buck dominating the scene.’

GOLDEN MOMENTS, FANGS AND CLAWS

Slipping into the new millennium, one lake may have been degraded and the other sealed off; students and faculty may have been distanced from old, time-honoured ways; the campus may have become a lot less retiring; but one feature in which it had only gained was its wild side. So extravagant did IIT-Bombay campus’s natural riches – dwelt upon in Chapter 6 – come to be that one could be excused for thinking it as much a wildlife preserve as it was an academic township.

An outstanding feature of life on campus has been the intimacy its residents have been able to enjoy with nature’s myriad moods and forms. The ways in which this has affected them has often been subtle. One needn’t be blessed with the faculty of perfect pitch, nor trained in the Hindustani classical tradition, to be moved by the transcendence of a Kishori Amonkar or a Kumar Gandharva; likewise, one need possess no great fund of zoological or botanical knowledge to marvel upon the wealth of plant and animal life the IIT-Bombay campus showcases everyday. Just to be surrounded by its implausible bounty of trees, shrubs, birds, butterflies – not to mention snakes, spiders, and crocs – is enough to fill even the most biologically uninclined technologist with a sense of wonder. Here’s entranced testimony from alumnus Neeraja Balachander, M.Tech. Biomedical Engineering, 2003:

The first time I came to IIT-Bombay to explore the application process was in January 2001. I remember just wanting to return to the campus as a student. When I did return, it was July 2001 during the monsoons. Then, it was as if the campus had undergone some magical transformation, from just an academic
institution with departments and laboratories, to a forest, alive with wild flowers, old, huge trees, birds and what’s more, snakes. On the first day itself, I saw a large cobra coiled against the H1 fence and people walking nonchalantly by it – I fell in love with the place.

And when asked if she could identify a ‘high point’ during her sojourn on campus, she proferred:

Once when a few of us were walking near OAT [Open Air Theatre] by H1, we spotted a beautiful, milk-white Paradise Flycatcher in the mango tree there. It was flitting among the branches with the most acrobatic, delightful twists of its long, frail streamers. That was a truly golden moment.

Nor has the campus’s scenic grandeur, the misfortune of its lakes notwithstanding, been lost. Alumnus Dr A.N. Dravid, here in the mid-1960s, recalled his fondness for the campus thus: ‘The two lakes were almost a signature of the campus. After the monsoon, they filled to the rim, and with the greenery surrounding them, looked breathtakingly beautiful.’ 40 years and more on, current student Aishwarya Ramakrishnan (Metallurgical Engineering) used the very same superlative when speaking of the thoughts stirred by the campus: ‘Breathtaking beauty.. the lakeside, the hills, the greenery all around. It’s still breathtakingly beautiful.’
Nature’s embrace has also played its part in invigorating academic exertion, as attested by several faculty, alumni and students. One after another has declared how, for instance, the campus afforded a ‘perfect setting’ for intellectual absorption, ‘cooling them down’ or ‘giving them that extra stimulus’ to dive single-mindedly into their pursuits.

As for those who have the eyes to look, and in whom scientific interest in things biological runs even moderately deep, the arena around them has offered daily delight and amazement. In an article published in the Indian Forestry College Journal in 1975, it was described thus: ‘The campus of IIT-Bombay, flanked by two large lakes, ribbed by several hilly spurs, blessed with 250 cm of annual rainfall and still retaining remnants of vegetation of the shrunken Borivli National Park, contains many nooks and corners of idyllic natural beauty and would set on fire the imagination of any conservationist.’ More recently, in 2006, the campus was identified as one of ten hot-spots for tree diversity in Mumbai. And it has to be said – if one may take the liberty of authorial intrusion here – that if I have loved the IIT-Bombay campus as I have loved few other self-enclosed places I’ve seen, it’s because of its matchless setting, and because of the superabundance of life, both wild and not-so-wild, that it shelters.
But the quality of being ‘wild’ can cut, as we’ve noted, two ways. Wherever there are humans and animals sharing the same spaces, there will be a tussle, a fact that surfaces graphically when the apex predator of these parts, the panther, wanders in for a visit. The campus goes on high alert; the Institute’s Security Section puts out notices advising residents to watch out. Here are snips from one, typical of its era, that will ring familiar bells in many minds: a circular issued on 12 July 2001, titled ‘SIGHTING OF PANTHER IN THE CAMPUS’. I have not meddled with its occasional ambiguous, and touchingly expressive, turns of phrase.

Panthers were seen recently at various places in the campus during the last few days … For the purpose of precautionary measures, the campus residents are requested to observe the following:

To shout loudly for help on sighting panther.

Not to provoke the animal by stone throwing or attempting to hit it with anything.

Not to take photograph, nor should the animal be followed or make provocative gestures.

If the cubs are sighted, do not indulge in any provocation whatsoever, as the panther accompanying the cubs can be highly dangerous.

Not to sleep outside, and doors & windows should be secured.

Do not rear livestock such as cows, goat and fowls, as they attract panther.

And so on.

Beautiful yet terrifying, majestic yet cunning (and with no taste for provocative gestures), the panther, embodiment of Jekyll-and-Hyde opposites, is a perfect example of a creature that can drive a deep emotional wedge between campus residents – and has. No different from the debate on cattle and dogs, it’s a question of how one situates oneself in an era: of what sort of lifestyle we expect to lead in modern times. A key factor in the equation is the psychological. To some, living conditions that oblige them to share space with feral animals, exposing them intermittently to the threats they pose, are ‘primitive’, and irreconcilable with the Institute’s self-image as a leading centre of science and technology. To others, an amalgam of this kind is not just workable, but a pointer to an alternative modernism, one that sees no conflict between the calls of technology and those of a peaceable co-habitation with the natural world.
FUTURE IMPOUNDERABLE?

If an academic institution is to continue to flourish, it must relentlessly innovate and expand: into novel academic structures and programmes, new areas of research and development, ever newer modes of administrative functioning. There is no soft option here, no cosy middle way.

At IIT-Bombay, too, there has been continual growth, expansion, and diversification over the past five decades, be it in academic programmes, infrastructure and facilities for R&D, or campus development. And the mood of the times is such that much more of the same, and at an accelerated pace, looms large. None of this can happen, of course, without creating more of every kind of infrastructure. Inevitably, there will have to be ever more buildings – departments, labs, classrooms, hostels, residences – and ever more roads and amenities...and, in direct consequence, ever less space given over to nature.

With such pressures, both psychological and physical, exerted on the campus, it’s anybody’s guess where it will find itself in years to come. The time frame here may be fleetingly short: going by the pace of change today, all it may take is a few years to radically alter the languid persona the campus has possessed for decades.

Already there are signs of the change to come, and of alarm at this change. New buildings are being put up all around; scores of grand old trees have already been felled, or are marked for felling, to make way for yet another new project – housing or infrastructural or academic. Speaking of a ‘beautiful campus being ruined’, Neetu Choudhary, currently a doctoral student in Humanities and Social Sciences, voices a widespread sentiment when she despairs: ‘With large scale chopping of trees, IIT-Bombay will gradually become a semi-arid zone. Is there any initiative to resolve the conflict between the indispensable environment and our ever rising requirements?’

And it’s certainly a point worth pondering for an institute of engineering and technology that daily occupies itself with the business of optimization on a number of technical fronts: will it be able to strike the fine balance between development and preservation? The eyes of the world will be trained on it, for IIT-Bombay is certainly just as famed in the public mind for its leafy campus as it is for its technical accomplishments.
Yet one cannot presume to sit in judgement here, or prescribe. Often, this is a process of evolution under constraints, and the campus may be compelled to evolve towards a vastly more built-up, congested edition of itself in years to come. And though its streets may remain pleasingly tree-lined, it may be left with ever fewer of its pockets of woodland that support its rich biodiversity. Undoubtedly the greatest impact of this churning will be felt by its ecology. IIT-Bombay’s campus is something of an ecological hot spot; and the problem with hot spots is their fragility. Pristine pockets of woodland and undisturbed lake margins are crucial to the existence of several species adapted to narrowly defined habitats. As human encroachment and intrusions escalate, these micro-environments on campus run the danger of being irreversibly damaged. Take these away, and the years to come may well see the ousting of species of flora and fauna that cannot adapt to a fundamentally different habitat. With this possibility in mind, and in the interests of recording the natural wonder that the IIT-Bombay campus has been over its first 50 years, partial checklists of flora and fauna, as they were to be found on campus at the turn of the century, have been presented in Appendix 3.
For ‘fun-loving’ college students around the country, the words ‘IIT-Bombay’ probably conjure up no particular picture of students bent over classrooms desks, laboratory benches or library tomes; nothing of the kind. They may kindle, instead, the kind of image the words ‘Goa on New Year’s eve’ might in the minds of the restless party-hopper. For these students, ‘IIT-Bombay’ translates into four days of unrestrained revelry at the Institute’s annual student festival, a spectacle few others can rival nationwide. Take another kind of student, though – the school-leaver who aspires to bend over those very lab benches or library desks at IIT-Bombay – and a pitifully unfestive image swirls before their eyes. It’s the examination which looms implacably between them and their dreams: the JEE, compared to which few exams are more respected or feared. In this chapter we take a look at the genesis and growth of these creations that have assumed the stature of institutions by themselves, at times surpassing in visibility the very organizations that have engendered them.

‘UNIQUE CULTURAL HAPPENINGS’

Even as one year flickers out to give way to the next, IIT-Bombay’s campus springs to riotous life. Thoroughfares are festooned with banners, posters, and awnings that get bigger and glossier every year – and you can scarcely walk about without brushing against someone in their late teens or early 20s, flushed with excitement and dressed – by IIT-Bombay’s usually staid standards – quite outlandishly. Thronging the Institute are the youth of the land from all corners of it, drawn irresistibly to the campus like so
many flies to a honey pot. And while they're here, the lush green arena, bathed in Mumbai’s mild late-December sun, takes on an uncommon hue: indigo. For this is the week of Mood Indigo, IIT-Bombay’s mammoth student festival that draws (at last count) some 60,000 pilgrims from more than 450 colleges countrywide.

Over four packed days these visitors (and with them the Institute’s residents) savour the charms of forging new acquaintances and friendships, the adrenaline rush of competitions – debating, painting, dance, theatre, many others – and the thrill of witnessing a starburst of top-drawer professional performances: feasting, in short, on ‘culture’ in its myriad forms. And then, as the year dies, they haul themselves moodily back to home base, none more so than IIT-Bombay’s own students, for many of whom this signals an end to several months of feverish organizational activity and a sobering return to books, seminars, and the unsettlingly earnest faces of professors.

When Mood Indigo started, however, it was timed not to bid farewell to the year that had been, but to greet the one just begun. The festival took place in early January, after the institute opened for the second semester. And, as seen in Chapter 8, the very first ‘Mood-I’ (or ‘MI’ for shorter still), held over January 3-7, 1973, was proclaimed to ‘herald the start of unique cultural happenings out here at Powai,’ and to give ‘a chance to young Indians to break new ground on the cultural scene.’

According to Harshvardhan Gupta, batch of 1976, the idea of IIT-Bombay’s own student festival germinated in the minds of, amongst others, V.V. Ramesh and Colin Gonsalves (the latter was then the General Secretary of the Students’ Gymkhana, and is now a senior advocate in the Supreme Court; Gupta himself was the Fine-Arts secretary). As for the festival’s name, in equal parts evocative and seemingly imitative (shared as it is with a classic jazz composition arranged by Duke Ellington in the 1930s): Gupta seems to recall it was compatriot Ramesh Advani’s handiwork. Thoughtfully enough, the 1973 souvenir ran an elucidation on the origin of the name in its local setting: ‘And so the colour chosen to be representative of the Mood was Indigo – a fusion of Red and Blue. Red for the warmth and passion of an artistic adventure; Blue for the originality of the rational mind, giving Indigo – the symbol of creativity and intellectualism.’
The first organizers operated on a frugal budget, said to be no more than Rs 5000. ‘And most of the money in the mid-70s came from the Students’ Gymkhana funds, some from ads, none from corporate sponsorships,’ writes Gupta. The brochure itself was demurely featherweight, just 16 tissue-thin pages carrying messages and ads from some 25 well-wishers. These included the giant Mafatlal Group rubbing shoulders with the very local Maharashtra Grain Stores, and with a certain firm ‘Figurette’, intrepidly targeting a virtually all-male Institute with, ‘for the first time’, three essential beauty aids: Facial Sauna, Vibra-Massage, and Hair-Dryer.

Having announced the temptations on its menu (debates, dance, experimental film classics et. al) the booklet concluded on a courteously anticipatory note: ‘All this amidst the natural breathtaking hills of Powai, we hope will make your visit to Mood Indigo ’73 an unforgettable experience.’ Unforgettable or not, the first ever Mood-I wasn’t so resoundingly successful as to render its successor a foregone conclusion. For there came a hiatus the very next year. The announcement in August 1973 was curt and peremptory, seeing no need to assign reasons: ‘Plans for another Mood Indigo, or whatever you prefer to call the week where you are clobbered with a surfeit of culture,’ it declared, ‘have been shelved.’

Seemingly the neonatal tradition was put on ice in deference to a higher purpose: to breathe new life into another tradition that had gone moribund. As Gupta remembers it: ‘In ’74, we gave MI a go-by and revived the then defunct students’ magazine Pragati.’ Once the Samaritan deed had been done (and we have issues of Pragati of striking artistry from the early 1980s to suggest that the resuscitation was done with care and élan), IIT-Bombay’s culture brigade swiveled their gaze back onto Mood Indigo.

In 1974-75 it was Harsh Koppula, the Gymkhana’s General Secretary that year, who got it going again. And MI ’75, held between 9 and 13 January, ‘was a huge affair,’ says Gupta. ‘Jairam “Jerry” Ramesh handled debate.’ Other Mood Indigo stalwarts in its first few chapters were Kirat Patel, Pradeep Anand (now recognizable as the author of An Indian in Cowboy Country), Utsav Kapadia, and Madhav Patwardhan.

The 1975 Mood-I brochure, visibly healthier than the first, leant heavily on free verse to advertise its subject, as in the opening greeting that went out from IIT-Bombay’s extended family:
Two thousand students
Faculty members
Heads of stray cattle (plus droppings)
Wing mascots and other dogs (plus droppings)
And various other animals
Living on this campus

Welcome you to MOOD INDIGO 75.

It also abetted unabashedly that heady mantra of the 70s, ‘self-realization’: Permission is granted to all and sundry to behave like either/buffoon or/rhinoceros or/Khushwant Singh or/elephant or/Pablo Neruda or/ faculty member or/John Lennon or /yourself... Sunsets by the lake side (both Powai and Vihar)/are free.

Undoubtedly the biggest question in everyone’s mind after MI ’75 must have been: would the festival continue uninterrupted, or would there be another recess? As if to allay fears, Technik announced well ahead of time, in October 1975: ² ‘Mood Indigo ’76 is on: and it’s scheduled from Jan. 15th to 19th. MI earned a tremendous reputation last year and this year, with your help, we should be able to keep up and surpass that reputation.’ A certain anxiety – but a healthy anxiety, pinned to MI’s ambitions for growth – was also broadcast: ‘The top priority at this stage is advertisements. We must get at least 25,000 bucks in ads this year to have a decent working capital. That’s where you can help put in an effort to get as many ads as you can by Dec. 1st.’

The ‘25,000 bucks’ was probably quite easily raised: MI-76’s souvenir was plumper still than MI-75’s. And who was the biggest advertiser of them all, splashed on its back cover? A firm that had begun to play an increasingly large, and invidious, part in determining the course of that other trademark IIT creation, the JEE: ‘Agrawal Classes,’ boomed the ad in throbbing thick black font, ‘Well Known For IIT Ent. Exam. (JEE) Coaching.’

MI ’76 must have succeeded in at least some measure; Technik published a ‘letter of genuine appreciation’ which congratulated Mood-I on being ‘really great’ and affording them a ‘fantastic time.’ And it went on:

We think people who didn’t enjoy MI are weird and need a thorough check up. One hint, publicize this event a bit more next year, specially at Sophia College from where you’ll get a hell of a lot of good looking girls.
The rumblings within

Appreciation and thoughtful tips on targeted publicity from admirers were all very well; but the Institute’s own student body was by no means united in their enthusiasm for the festival. Before it was two episodes old, Mood-I had provoked simmering disaffection in the ranks. ‘So you’ve seen the pretty posters that have proliferated all over the campus,’ went one glum letter carried by Technik on the eve of MI 1975, ‘and you’ve heard the words ‘Mood Indigo’ (a rather meaningless title, probably borrowed from a jazz composition) being bandied around for untold months … but now that you’re into it you’re still probably asking "What the hell is it", "What’s it about?"’

And the unconverted were making their displeasure known by distancing themselves from the festival in the most emphatic way possible: physically. Technik in 1976 carried this tirade against the deserters: ‘The festival is set for Jan 12th and doubtless in countless hostel rooms the junta is planning how to spend these four free days outside IIT. Doubtless, I say... for are these things not widely known, approved of and applauded? Isn’t the man who quits IIT for the duration of the festival looked upon as an embodiment of sly cunning and wisdom?’ (following which the article went on to make an impassioned plea for the ‘men’ with boycott on their minds to change their minds and stay on.)

But why this discontent; why were students keeping Mood-I at a good arm’s length? Before it was a few editions old, qualms were being voiced that Mood Indigo was losing its lustre. Consider this anxious appraisal written in 1980: ‘76 onwards MI, many allege, has become preoccupied with publicity, glamour, efficiency and scale. Quite a few contend that the festival has become stereotyped and perpetual, and therefore predictable and boring. There is no apprehension, excitement, curiosity, or plain looking forward to it anymore’.

There are claims that polarization among students also took on a sociological hue. One alumnus feels that the so-called ‘pseuds’ (IIT lingo for ‘pretentious, Westernized crowd’) ‘ruled at Mood Indigo’, and that ‘except for a few performances, MI seemed designed mainly for Western tastes.’ No surprise, then, that Mood Indigo was in store for chequered times. 1978 in particular was said to be a ‘turbulent year in the history of Mood Indigo’. Its fate hung in the balance. Student meetings were held to see if
the festival should continue or not; ‘the topic was hotly discussed and ultimately...the move to discard MI was routed.’ The festival had survived by the skin of its teeth. Just as well, else it wouldn’t have thrown up someone we’ve met in Chapter 15 who went on to become a lodestar on the infotech firmament and who, one day, would attribute his renowned management skills to his experience in organizing two MIs.

To all appearances Mood-I was growing from strength to strength, and without a stutter, into the 1980s. The festival kept ballooning in scale, leaving its own organizers pleasantly startled. This thrilled salute to MI’s scale appeared in January 1980:

The festival has become a truly colossal affair. This year we have well over 40 Colleges participating. Five thousand visitors, including nearly a thousand participants pour into our picturesque campus during these five hectic days. Accommodating and feeding this vast multitude and organizing the numerous items is a truly stupendous task but, Mood Indigo has a long tradition of excellent management.

Which also goes to show that what’s considered to be a ‘vast multitude’ is an inconstant notion, and prey to the whims of time: MI 2007 reckoned it would host ‘around 60,000 students from over more than 450 colleges’. But scale was one thing, and vitality another. Others kept wondering if the seven year old ward in their care was being nurtured wisely. Exactly a year later, in January 1981, emanated the following Introspective View:

One more Mood Indigo has just flashed by... But most of us come away with nagging thoughts at the back of our minds; ‘What a waste of money and efforts’; ‘it gets more stereotyped and boring with each passing year - the same programmes and often the same performers too’. The fallout from every Mood Indigo is a sea of apathetic frustration or so it seems.
As troubling as MI’s alleged predictability were the increasingly belligerent attitudes of its hosts, who seemed intent on inviting upon themselves the charge of incivility. The first trait to come under fire was that familiar bane of IIT-Bombay events chronicled in Chapter 15, ‘audience participation’.

One thing that really betrays our wrong attitude to a cultural festival is the phenomenon of booing (the average IITian’s only ‘active’ participation in MI) … MI ’81 had considerably fewer participants from city and outstation colleges than previous MI’s … we have to admit that the behavior of IIT audiences at previous MI’s has certainly not encouraged guest participation.

And then there was that special behavioural quirk, born of the sheer monochromaticity of IIT-Bombay’s student body, that simply couldn’t be camouflaged:

We do try to make certain female contingents ‘very welcome’, but no one, including the females, is fooled by the motives behind that … To many of us, the height of ‘interaction’ and ‘achievement’ at MI is to be seen escorting females from participating colleges, around the campus.

The escorts must, of course, have merely found themselves helpless against the urgings of their chromosomes; but that wasn’t enough to ex-
tenuate their acts, and they were bound to fuel disenchantment amongst their kind. The impassioned litany continued:

For obvious reasons the number of IITians who get these ego-boosting opportunities is bound to be limited... We have to change our attitudes drastically. Hospitality has to be extended for its own sake, not with ulterior motives. At Mood-I we have, instead, the more fortunate IITian playing a game of egoistic one upmanship, while his frustrated brethren crib about the programmes, organization and the festival in general.

Just how deep these internal rifts must have run, and how they were thought to have jeopardized the festival itself, is suggested by this excerpt from ‘Elegy to the Death of a Festival’, which a disconsolate V. Prabhu was moved to pen (calling it also, in acknowledgment and apology to its inspiration, ‘I’m Sorry, Ogden Nash’):

It has an enviable reputation, they say,
It is the best in all Bombay,
For five years it held sway,
But this time the crowds stayed away.
Come 1980 and there was Malhar,
IITians crowed ‘We’re better by far
But where are IP, Stephens and LSR?’
Did I hear someone chuckle ‘Har! Har!’
Though rockets did whizz,
The festival definitely lacked fizz,
Fashion show, beauty contest, Vijay Arora, G.S. Quiz,
Is this a cultfest or was it ‘show biz’?

The elegy proved to be premature at the very least. ‘MI’ steamed unstoppably on, and in less than a decade from then resembled more an extravaganza of show-stoppers and cultural odds and ends than a student festival (living up handsomely to Prabhu’s ‘show biz’ label), with budgets to match. In ‘A Sneak Preview’ of 1993’s Mood-I, reporters Bindu Priya and Shubha gushed:

The expenses have been figured at half a million of the best – no kidding. Asked where the 500,000 will go, [we were told] that the bulk will constitute the bread and butter of the pro artistes who will grace the four nights
at M.I. With 30-35 out station colleges to be invited and more than twice as many city colleges expected, M.I.’s success ... is predicated on the efficiency of its organization.

A reliable indicator of Mood Indigo’s success over the years was the stature of the professional artistes it was able to attract for its ‘Pro Nites’
(keeping in mind that, as implied above, performers would have been lured in later years also by the handsome fees on offer.) Ustad Zakir Hussain electrified audiences for five years running between 1980 and 1984; other well known names who performed at MI between the 70s and 90s are Pt Hariprasad Chaurasia, Pt Bhimsen Joshi, Pt Jasraj, Asha Bhonsle, R.D. Burman, Hema Malini, Hariharan, Lucky Ali, Remo Fernandes, the Colonial Cousins, Trilok Gurtu and Sivamani. And amongst the present-day lot can be counted Taufiq Qureshi, Shaan, KK, Kailash Kher, Indian Ocean, and Euphoria – truly a galaxy of the popular and celebrated. A second indicator has been corporate sponsorship for the festival, which along the 90s has leapt to giddying levels.

As for the students who make it all possible – those who plunge themselves into active organization – MI has lately been offering sizeable perks with the job. Prime among these are CV building, so critical for career placements, one’s first lessons in networking, and getting to meet and know corporate managers – opportunities that are also the sweeteners offered for signing up on the organizing team. Contrast this with the age of innocence, about which Gupta assures us: ‘We didn’t even think of how Mood Indigo would look on our résumés. Though we went around and sold ads in a nice peppy souvenir, the concept of sponsorship was not even invented then. Money came from the ads and from Institute’s Gymkhana Funds.’

And as the new millennium rolls on, there’s just no containing Mood Indigo’s volume and magnetism. a ‘The most popular college festival in town has grown to become one of the highest sponsored college festivals across the nation,’ said one news item of MI. b IIT-Bombay’s students’ ‘symbol of creativity and intellectualism’, having risen from truly humble beginnings, lives on in style.

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a See D. Unny, ‘Mood Indigo generates almost Rs 50 lakh with corporate sponsorship’, DNA, 22 Dec. 2005. Mood Indigo’s operating budget was Rs 34 lakh in 2002, and it boasted some 50,000 footfalls that year. The budget ran up to nearly Rs 50 lakh in 2005, with participation from around 300 colleges from across the country. Meanwhile, the financial gap between Mood-I and other college festivals had grown. Most other college festivals in the city managed with a maximum of Rs 8 lakh while MI 2007 expects around 60,000 students from over 450 colleges to participate.

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Dreaming Big … Again

A ‘festival’ was ‘fun’; ‘technology’ was ‘work’ – but then these were rather straight-jacketed associations, and it didn’t take too long for IIT-Bombay’s staff and students to wonder if work and fun couldn’t be blended into a palatable whole. The thought gave rise to IIT-Bombay’s first technology festival, christened “Technofair”, in the mid 1980s. Described as ‘a triangular interaction between students, faculty and industry - through the media of panel discussions, invited talks, audio-visual presentations, exhibitions and workshops,”14 it was driven in large part by Prof J.R. Isaac of Computer Science and Engineering. Technofair proved to have a foreshortened existence. ‘While the first few attempts were fairly successful,’ recalls Isaac, ‘I understand the effort gradually died off.”15 No clear reason was identified, but conceivably it’s because the concept was a decade ahead of its time. There were simply too many speedbumps in the way of vibrant IIT-industry partnership in the 80s, and ‘fairs’ that pinned their hopes on this alliance for their success wouldn’t have stood much chance.

The idea was reborn about a decade later in the shape of IIT-Bombay’s now-renowned Techfest, visited briefly in Chapter 10. S.P. Arun, a team member of Techfest 1998, recreates the making of the first chapter – and is candid in acknowledging the inspiration to have come in this instance from another IIT: ‘Techfest began as an idea in the minds of Vivek Singhal and Mayank Goel (batch of 1999, Electrical Engineering), when they attended IIT-Kanpur’s technology festival in 1997. At the time, the only festival of note on campus was Mood Indigo, and a festival celebrating technology was glaringly missing. Vivek and Mayank inspired others to join and we all deliberated on the details.16

The team submitted its proposal for the event to the Dean of Students’ Affairs. Arun recounts that ‘the Institute liked it and gave us seed money, but they were understandably skeptical. But we were also encouraged by professors such as Dr A.N. Chandorkar and Dr D.B. Phatak. The real turning point was when AMD (Advanced Micro Devices) gave $20,000 to become our chief sponsor.17 After that, support kept pouring in - and we kept working harder and harder.’

The support and hard work paid dividends; Techfest ’98 was a gratifying success. In its format it was a close (if unwitting) echo of its forebear,
Technofair, and it set the tone for successive editions, offering to its patrons a rich mix of competitions, lectures, workshops and exhibitions. Over the next three years Techfest saw rapid growth and soon made a mark for itself as the premier technical festival in the country. New, imaginative competitions were introduced, as were a wider spectrum of events. Much of this was possible, however, only because of the sinewy foundations laid by Techfest ‘98. And the opener notched up the success it did because, to Arun’s mind, ‘We had always been dreaming big. We wanted to get the best people for our lectures. No one had attempted a video conference before (BSNL would setup a broadband line exclusively for that day) … The Sam Pitroda video conference in a packed Lecture Theatre was a truly memorable ending.’

Succeeding years saw themes on entrepreneurship make an appearance, and the introduction of ‘Technoholix’, which showcased technological entertainment, including phantasmal laser-light displays, at the end of each day. And so bright did Techfest’s flares burn that they threatened to dim those of the Institute’s departmental events, popular in their own right, like Yantriki, Chemsplash and Last Straw. In a strategic move, these were brought into Techfest’s fold in 2002, themselves benefiting from the extended reach of their foster festival.

The number of partakers grew and grew; held in January each year barely a month after its famed elder, the last few editions of Techfest have begun to rival Mood Indigo in verve and scale. Thousands from colleges across India stream in every year; teams have also flown in from Singapore, Nepal, Iran, Bangladesh, Sri Lanka, Pakistan and the USA. Concomitantly, Techfest’s growing cachet succeeded in attracting some of the biggest names in science and technology as invited speakers, either live or via video-conference. They came from across the country and the globe, and included (to list a few) astrophysicist Jayant Narlikar (in 1998), telecom wonder worker Sam Pitroda (in 1998 and 2006), entrepreneur nonpareil N.R. Narayana Murthy (1999), and mathematical physicist Roger Penrose (1999). In 2002 the Indian President A.P.J. Abdul Kalam spoke; and between 2005 and 2007 were featured engineering and maths heavyweights Stephen Wolfram (creator of Mathematica), Amar Bose of Bose speakers fame, John Forbes Nash, inspiration for ‘A Beautiful Mind’, and Arun Netravali, former President of Bell Labs. With luminaries of such standing
to be heard and hi-tech to be experienced just a short walk away, IIT- Bombay’s students have been in a position, thanks to their festival, to gain enviably near-range insights into some of the best minds and leading technological breakthroughs of their generation.

Having taken a look at IIT-Bombay’s feisty traditions (while keeping an eye trained on the foals among IIT-Bombay’s student events, such as Eureka!, Avenues and sundry others seeking to write their own names into the history books), we wind now into more solemn orbits.

THE SOVEREIGNTY OF MERIT

Over only the first couple of years of its existence did IIT-Bombay depend on the results of school or junior college exams to select entrants for its undergraduate programmes. Subsequently, in order to establish parity between students who came from higher secondary boards that varied widely in examination formats and standards, the IITs attempted to create a level playing field through the institution of a nationwide examination. Its unassuming beginnings (as unassuming as Mood Indigo’s), in the avatar of the ‘Common Entrance Examination’ conducted just by two IITs, Kharagpur and Bombay (see Chapter 7), belied its eventual blossoming into perhaps the most demanding undergraduate entrance exam anywhere.

Demanding; yet no less keenly contested for that. It’s a commonplace now that the acceptance rate among IIT entrants through JEE is one of the lowest the world over, around 1 in 60. It was the unrelenting operation of merit, coupled with the clockwork precision of its operations and
its near-infallible calendar, that made it, over the 1960s and 1970s, rapidly ‘very popular among candidates taking it’ and inspired confidence in its dispensations. ‘No student is admitted who cannot meet the general academic standards set for all students,’ ran one appraisal. ‘Academic merit is the sole criterion for undergraduate admission.’ That, of course, is merely as it ought to be; but sovereignty of merit wasn’t something you could take for granted in the deeply scarred world of Indian higher education where merit was – and sadly remains – the first casualty at the hands of rampant nepotism, patronage, and graft.

And for years together, the JEE had an unvarying time table which was scrupulously honoured. It took place always on the 2nd and 3rd of May, no matter if these dates fell on public holidays; and the results were declared unfailingly on the 1st of June. Those who appeared in the ‘merit list’ made their way to the IITs between the second and fourth weeks of June to be counseled on their choice of discipline. And admissions and academic sessions followed without a stutter, never delayed unless by an ‘Act of Nature’. This again in contrast to the countrywide norm where students routinely lost months, at times years, because of delays and cancellations in exams, results, admissions, re-exams... Thus, along the decades where the sanctity of examinations was being violated at every turn and in every possible way, the JEE stood tall as a byword for fairness, integrity and dependability.

When paired with the growing repute of the education offered by the IITs, these features of the JEE raised the stakes steeply for securing a place in the coveted ‘merit list’. From its earliest days, students appearing for the JEE outnumbered the places available by a long multiple. While ratios and absolute numbers have changed over time, the stiffness of selectivity has endured. In 1962, on the order of 22,000 students vied for 1,000 seats; in the mid-1980s, 70,000 for around 2,800; today’s figures hover on 300,000 for 5,500. In the JEE’s early years contenders were examined in four subjects, Chemistry, Physics, Mathematics and English. Later English, though compulsory, wasn’t factored into the rankings. Still later, in 1988, the paper in English was discontinued. Questions in Hindi and an option for answering in Hindi and regional languages were introduced during the eighties.

b This holds for 2007; 2008 onwards there will be a sharp rise in the number of seats, with eight new IITs coming into existence over the next couple of years.
Its mode of operation and patent fairness may have earned it a good part of its reputation, but no smaller part was played by the intellectual challenge it posed for its contenders. Dr K.D. Joshi of IIT-Bombay’s Mathematics department, who has been closely involved with setting and evaluating JEE papers ever since the 1970s, traces with insight the weft of the JEE over the decades. An important reason for the exam’s prestige, he believes, ‘could be the question papers of the past, when many a question posed a challenge of its own. I distinctly remember that some of the pure geometry problems in the golden days of the JEE were so challenging that if I had the power, I would admit a candidate solely on the basis of doing a couple of them on his own. Sometimes the number of solvers would be in single digits. The mere presence of such gems in the question paper enhanced the prestige of the IITs.’

Dr Dipan Ghosh of Physics concurs: ‘If you look at the JEE exams before the multiple choice questions started, the questions asked were just a reduced version of the way we set questions in regular courses in IIT, viz., problem solving. Take for example, Physics. In the old days Halliday and Resnick’s Physics was the text book in the IITs. You’d find the JEE questions to be similar to those we asked students to solve here, only the difficulty level changed.’

The rigours of clearing the JEE guaranteed, in general, that only those with the best developed quantitative, scientific and analytical skills came into the IITs, placing at the Institutes’ disposal the prize intellect of the nation, to hone and mould them as they saw fit. In 1978 came the first of many changes to the JEE, both in the pattern of the examination and the nature of the questions. ‘In 1978, the JEE syllabus (at least in mathematics) was changed drastically,’ remembers Joshi. ‘Pure geometry was gone. Calculus was in. Also from 1978, objective type questions were started.’ Today there will be very few old timers like us who have taught the last of the Romans. But those who did can tell that they felt a qualitative difference’ – pointing here to his suspicion that degradation in the selectivity of the filter may have chipped the quality of the input stream.

The JEE’s ‘golden days’ lasted, to Joshi’s mind, until the time – 1978 – it didn’t contain objective type questions. ‘I was not happy with the

c The fraction of these questions grew steadily, from around 10% in 1978 to some 25-30% in the early 1980s, and about 40% towards the 1990s. Dr K.D. Joshi, personal communication.
JEE after 1978 and so in 1980 had prepared a write-up pleading for a two stage JEE. The proposal was considered but rejected at that time. The idea, though turned down then, does appear to have gained ground over the years. The 1986 IIT Review announced:

The IITs are considering modification of the JEE on a two-tier basis, the first tier being a preliminary examination of the type of multiple choice objective test out of which about 5,000 candidates are to be selected for a second tier test.

But the national penchant for dilatoriness saw to it that the two-tier exam wouldn’t see the light of day until year 2000.

Meanwhile, a certain kind of establishment had started looming large on the scene and was to irreversibly alter the face of the JEE and all it stood for. ‘Coaching classes’ for the test had insinuated themselves insep-arably into the school-leaver’s landscape. If the claims of Agrawal Classes in Bombay are to be believed, they were almost as old as the JEE itself, claiming to have produced JEE top-rankers as early as 1962. And they, and others of their ilk, had kept well abreast of the times, scaling their operations in step with the vaulting demand for IIT seats.

So pernicious and pervasive were the effects of the coaching classes that they started to determine the very character of the JEE and its questions. Around the mid-1970s onwards, JEE coaching turned into an astonishingly lucrative, full time profession, with large numbers of teachers in coaching centres earning salaries that put the average IIT professor’s package firmly in the shade. And huge collections of solved problems, put out by the centres, were systematically available to students on which to practice, practice, practice, until perfection had been achieved – of a certain kind.

‘These questions were quite different from the textbooks,’ feels Joshi, ‘where the thrust was on developing the theory and not so much on problems. In fact, students soon began to study only these problem sets and not the textbooks. This changed the whole equation. I distinctly remember

d The idea was to be turned down in 1985 again. Minutes of the 90th meeting of the Senate, IIT-Bombay, 16 Feb. 1985, Item No. 10.
e Scaling up for the JEE wasn’t confined to the coaching centres. IIT-Bombay, too, was feeling the strain. Until 1983, the Institute’s Academic Office had been conducting the exam; that year, a separate JEE (and GATE) Office was created to relieve ‘the great strain on existing staff of the Academic Office’. Minutes of the 84th meeting of the Senate, IIT-Bombay, 11 Feb. 1983, Item No. 4.
proposing some good problem and its being knocked out on the ground that it already appeared as Problem 47 in Set No. 11 of the manual of some reputed coaching class.’

It wasn’t just the types of questions that were compelled to change; it was also the level at which they were pitched. ‘Earlier, there was no obsession with defeating the tutorial classes as other than Agrawal Classes of Bombay,’ feels Ghosh, ‘whose problem sets were anyway very similar, there were few others.’ Joshi agrees that IIT faculty became ‘obsessed with outdoing the coaching centres.’ More and more, the legitimate concern started to be raised that the JEE ‘did not really test aptitude in engineering and encouraged students to cram information;’ the exam’s discriminative ability was dwindling.

A FLAWED FILTER?

The increasingly stiff standards of examination and the feverish scramble to penetrate the JEE firewall gave rise, over time, to more than a few societal warps of its own. Students, for example, started concentrating with such single-minded intensity on the JEE that other facets of their existence took a beating, including play and lateral academic growth on the one hand, and their preparation for school leaving examinations on the other. The time students spent on preparing for the JEE grew inexorably: from a week or two in its benign days it became months together, and from that it became, late 90s onwards, literally years together.

As the impression gained ground that certain coaching classes were near-essential to success in the JEE, and as their reputation soared, so did their charges – to the point where the JEE started to act as an economic sieve as much as an academic one. Only students from more or less affluent backgrounds could now afford the quantity and ‘quality’ of coaching without which it wasn’t easy to get through. India, at the same time, had become a country where the State took such little care of your needs, and left you so vulnerable to a myriad vagaries, that the reigning ambition grew to be either escape through migration or the single-minded pursuit of wealth, if mainly in order to insulate oneself from the often abject conditions of civic life. And the IIT degree offered a ticket to either. With parental ambitions for their children reaching a tinny pitch, even the
choice of profession came generally to be made by parents rather than by students themselves on the strength of their innate gifts and inclinations. Thus, one important dimension of the fitness of the candidate for an engineering education went missing from the JEE. Such students often struggled to complete the IITs’ programmes as they had little aptitude for an engineering education.

A parallel concern was to do with the massive pool of school leaving talent that aspired for the IITs, and the arbitrary dividing line forced to be drawn by the limited number of places at the Institutes. It was generally believed that there would be little to tell apart the 3000 odd students beyond the dividing line – the ‘next best set’ – from those that got through. Given these attributes, the JEE had started to serve less as a process of selection and more as one of elimination. Ghosh contends: ‘I don’t believe that IIT JEE, even in the old system, selected ‘good students’. JEE has always been an elimination examination and has always stood for the survival of the fittest.’

All of which goes to show that entire sociological treatises could easily be written, and probably are, on the havoc unleashed by the existence of small islands of excellence like the IITs, and of excessively exacting filters for them like the JEE, in a populous country where despair can run as high as opportunities are low.

The vicious cycle continued unattenuated. By the mid-1990s, so frantic had the scramble for IIT berths become, and so high were the monetary stakes involved for the coaching centres, that in 1997 something unprecedented happened that shook the JEE to its very foundations. The question paper was leaked. Said to have been traced eventually to a coaching centre, the event sent shock waves rippling throughout the land: was the venerable JEE’s credibility, too, about to be shattered? It wasn’t. As one commentator puts it, the episode ‘surprisingly added to the reputation of the Examination. This is so because the public appreciated the decisive administrative handling whereby a prompt decision was taken to cancel the examination already conducted, and that there was no attempt to hedge or delay matters as is the common experience with other large examinations.’

Instantly, the IITs decided to hand over the probe into the event to the CBI. Marshalling all the resources at their disposal, the Institutes
conducted the JEE in July again that year without a hitch, only the admissions being slightly delayed; and public faith in this symbol of probity was quickly restored.

Prompted by the ever climbing number of candidates appearing for the exam, which made evaluation an increasingly unwieldy and time consuming process, the turn of the millennium saw a sweeping departure in the JEE’s template. In year 2000 it started to be conducted in two stages: the ‘Screening’ and the ‘Main’. The screening test, a combined paper in Mathematics, Chemistry and Physics, confined itself to objective (multiple-choice) questions. Only those who cleared it – this number was restricted to around 20,000 – moved on to the main examination. The latter consisted of questions entirely of the traditional, subjective type. In this manner, a large fraction of candidates were first screened off and a smaller number evaluated more exactly in the second stage. IIT-Bombay’s thoughts on the transition, submitted to the 2004 IIT Review Committee, make for compelling reading.

‘This procedure,’ said the Institute, ‘is in line with top level institutions all over the world. As you go down the level of institutions, the objective type of questions become more and more prominent and subjective type questions recede into the background. Since All India Ranks and allotment of courses in various IITs are based solely on the performance of the candidates in the Main Examination, the IITs are in tune with the institutions of the highest level in the world. At the same time, the first stage, consisting of the Screening Test is equally important because it allows for a detailed evaluation of only a smaller number of candidates.’

These remarks are of special note because just two years later, in 2006, that element which lent parity with ‘institutions of the highest level’ in the axioms of sound examination practice – the subjective questions – was undermined. In 2006, the IIT-JEE was reduced (in more ways than one, some would say) to a single, purely objective type paper. Ostensibly it was to spare students the stress caused by a two-stage examination; and it was based on the recommendations of a special task force constituted in February 2004 to recommend reforms to the JEE. Another major change introduced was the factoring of the results of school board exams into the
admission criteria, restricting eligibility to those who secured a minimum of 60% in the boards – a device intended to restore seriousness in school-leaving exams, which were now suffering rank neglect in the face of the inordinate attention lavished on the JEE.

While the second of the changes was welcomed by all, the first, as noted in Chapter 13, triggered an outbreak of concern at the Institute. Not only were they seen to be academically ill-advised, they had also been pushed through against the wishes of the IIT community (at least those of the IIT-Bombay faculty), provoking the feeling that the IITs’ academic autonomy had once again been stepped upon. Apologists for the new pattern, for their part, contended that an objective type examination could in theory be designed to test both aptitude and analytical ability; not many were convinced.26

‘Sometimes I feel tempted to compare the JEE,’ Joshi draws a graphic parallel, ‘with a swimming competition where we assemble all the contenders on one bank of a river and ask them to get to the other. In the past, we could actually see them swim. But now we have no way of knowing whether they crossed the river by actually swimming or by taking a ferry, or, if they can afford it, whether they hired a helicopter! All we care is who made it to the other bank, and among those who did, who were the fastest.’

THE BRAWNY-BRAIN TRADEOFF

For as long as the nation fails to provide a sufficiently broad spread of opportunities for engineering education to all those who are fit for and desire it, the visceral questions about the JEE will continue to haunt the IITs. These are questions of the kind posed by Dr C. Amarnath of Mechanical Engineering: ‘When will we be able to wean ourselves off an admissions process that is based on a single parameter? We are obsessed with JEE and all our eggs are in the JEE basket. Offering admission based on a single exam completed in 6 hours on a summer day does not sound convincing. When will we ask the question whether this admissions process is really giving us the best raw intellectual talent that is out there?’

Dr B. Roy’s (Aerospace Engineering) pungent aside could be construed as an answer: ‘We are certainly getting more brawny students than
the brainy ones. Surviving two years in Kota and several such 6 hour tests ensures that.’ And Joshi provides the curtain closer: ‘Sadly, in a fiercely competitive system, this is inevitable. About the only thing we can do is to design the selection process in such a way that those who have had a relaxed childhood, have cultivated healthy thinking habits, and who go entirely on their own, will find it easier than those who are always on the run. In the present set-up this is unthinkable.’

For an examination whose format over its first two editions remained largely invariant for something like twenty years each, the JEE’s recent history has seen a rash of tweaking and tuning, and here and there a drastic makeover too, keeping its paper-setters, examinees, and no less the coaching institutions that live off it, constantly on their toes. Has this flurry of chop and change been wisely directed; has it been astutely thought out? More broadly, can the JEE ever be made an ‘ideal’ exam, testing precisely that which needs to be tested, patterned for selection and not elimination? Can it sift specifically those students that are best cut out for an engineering education, as against those most fiercely driven to gain the ‘IIT stamp’? The challenges are many, and will ensure that JEE organizers and paper-setters keep their thinking caps firmly on for long years to come.

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f In keeping with the recent spurt in JEE tinkering, the exam underwent a change in pattern for the second year running in 2007 when, in place of three papers of 2 hours duration each in JEE-2006, it was condensed to two papers, each lasting 3 hours.
Psychologists will never tire of telling us that the zest with which we approach our tasks are set largely by the regard in which we hold ourselves, and no less by the regard in which we’re held by those that matter to us. As for individuals, so for institutions; and IIT-Bombay’s levels of zeal and buoyancy, too, have been tempered over the years as much by what the world thinks of it as by its own self-esteem.

Those who matter to IIT-Bombay are as varied as they are numerous. They include its primary client, the student; the government, which props it financially and watches over its functioning; and society at large, whose expectations it cannot afford to ignore and whose eyes are many, including the lay public, the media, industry, and the peer community of academia. As for the Institute’s self-image, it finds voice not just in official musings on its affairs but equally in those of the individuals that form its inner circle: its staff, students and alumni.

In exploring perceptions related to IIT-Bombay over the years, two broad features emerge. One, that at all times, IIT-Bombay’s image is en-twined inseparably into that of the other IITs. No surprise here, for the IITs have been looked upon and run virtually as chain of schools might be, the IIT Council exercising a strong homogenizing influence on them. In the public eye, too, there has been little to differentiate one from another. Second, unlike other facets of the Institute’s existence which lent themselves to being portioned out into four distinct phases, IIT-Bombay’s image at large can be seen to have evolved over three. The earliest was marked by scant external recognition but distinct inner hopes; there came a middle period of ascending acknowledgement by the world marred by
an erosion of credibility in certain quarters and by subdued self-esteem; and the third has seen a suddenly soaring, all-round admiration coupled to resurgent inner hopes.

‘THEY ARE WORTH FAR MORE’

In the 1960s IIT-Bombay, like its sister Institutes, had reason to feel confident and poised: if not quite for greatness, then at least for good things to come. Incorporated by an Act of Parliament, championed by Pandit Nehru, invested with unheard-of autonomy and funded liberally by the standards of the time, their air of optimism was understandable, and mirrored newly independent India’s hopes for itself, which ran high over most of the 1960s.

But for the populace at large the IITs would appear to have been more or less an unknown quantity. Though the associations just mentioned did place them on something of a pedestal, generating a vague sense of expectation, there was hardly any pointed awareness about them. Dr S.S. Talwar, who took his M.Tech. in Chemical Engineering in 1964 from the Institute, and was to serve on the faculty of Chemistry 1971 onwards, recalls that when he was scouting for postgraduate courses in 1962 he wasn’t sure if IIT-Bombay would be the best place for him. It was then that an uncle of his working at the BARC happened to spot an article on the Institute in the Illustrated Weekly of India that mentioned how IIT-Bombay’s foundation stone had been laid by Nehru, and how Dr Radhakrishnan had graced its first convocation. This was enough for the uncle to wonder aloud how Talwar could ever think of not going to a place that boasted such exalted patrons.

For school-leavers around then, as we’ve heard from alumni Parag Rele and Dr J. Vasi (both 1964 entrants), it was even less obvious a destination than for Talwar, somewhere they ended up more by chance than by design. And alumnus Dr H. Narayanan, of the same vintage and also a Bombay boy, recalls hearing of it only as ‘the Institute the Russians had set up’; not even the name, ‘IIT’, was much cast about. Seven years later in 1971, for alumnus D.G. Banhatti, ‘It was just one of those places. Happened to be good (enough) to come to.’
Once students had settled into its campus, signs of the goals the Institute had set for itself were soon in evidence. Dr B. Singh, one of IIT-Bombay’s early alumni (B.Tech. 1965), writes: ‘I remember occasional speeches by Brigadier Bose telling us he wanted to make IIT the best educational institute in the world. He made great efforts to invite great academics to the IIT campus; I remember a seminar by Neils Bohr at the Institute.’

By and large for the world outside IIT-Bombay’s gates, the 1960s and some of the 1970s can be said to be a time of waiting and watching, accepting that it would take time before one could confronted it with the question: had it delivered on its promise?

One way in which the Institute did start to deliver fairly early on was in the quality of its products. By the early 1970s, Indian industry was recognizing the IITs’ graduates as a cut above other engineers produced in the country. Alumnus Sharad Saraf (B.Tech. 1969) tells the story of his brother, also an alumnus (1970) who was taken up by Mahindra and Mahindra’s tractors division along with a few of his contemporaries. M&M had also hired a contingent from what used to be the city’s leading engineering college until IIT-Bombay appeared on the scene, the Victoria Jubilee Technical Institute (VJTI) – and they paid them a substantially lower stipend than the IIT-Bombay recruits. ‘So the VJTI guys went to the Chief Executive Officer and protested, look, we also have the same degree, why should there be this difference?’ The CEO’s reply was pitilessly candid. “Look friends”, he said, ‘one year from now almost all you VJTI people will be staying back here, but I’ll be very happy if even one of these IIT guys does. In spite of the higher stipends we give, it’s still very difficult to retain them. They are worth far more’, he said point blank, “than what we are paying them”. Which shows vividly that the IIT brand had already come into existence in 1970, and that it was driven mainly by the performance of its alumni – something that perhaps holds today as well,’ concludes Saraf.

The Review Committees’ assessments of the IITs – carried out in 1972, 1986, and 2004 – also provide engrossing insights into the account the Institutes have been giving – together and severally – of themselves. Published in 1972, IIT-Bombay’s first review complimented it on its undergraduate curricula, towards which it felt the Institute had ‘maintained a
dynamic approach’, and for which ‘the faculty is well aware of the need for constant review and change.’ Especially interesting was the sharply local role it visualized for the Institute in years to come. Note in the following the reference to IIT-Bombay’s postal locale, Powai:

In the next few years, the most useful role that IIT-Bombay can play is to orient its training as well as R&D effort in developing equipment and machinery that industries in the area immediately need. There is a great potential in this region around Powai and vigorous efforts must be made to project the IIT as an institution which provides both manpower and backup R&D work for the industries.

**PROTEAN MEN, EXPECTED TO BE LEADERS ...**

Mid-seventies onwards, one discerns three distinct markers of the Institute’s external image to have evolved: as a provider of excellent education; as an elitist institution absorbed in its own narrow universe; and as an efficient conduit for the ‘brain drain’ that had come to bedevil the nation’s efforts at advancing its technological base.

So reckons someone whose job it was to mediate relations between IIT-Bombay and, as she calls them, the ‘publics’ it needed to address: the Institute’s Public Relations Officer between 1985 and 2007, Ms Aruna Thosar-Dixit. She counts three publics in the main: government, the media, and industry. ‘If we look at the 70s and early 80s,’ she says, ‘the IITs were perceived as ivory tower institutions where good education was available but only to a very few. And our product, the student, was considered fairly on par with international students anywhere.

‘But the perception also most definitely was,’ she qualifies, ‘that the IIT education was really benefiting the western world more than us. When you talked of IIT, you talked of the ‘brain drain’: that was the closest association. That the IITs were privileged was also part of the picture. The whole aura of the campuses, the seemingly idyllic life they afforded, the good equipment, the excellent student intake filtered through the JEE, the low student to teacher ratio, all this added up to tremendous privilege. And it was felt that not much was being done to extend the benefits of IIT education to greater numbers.’
For students fortunate enough to savour the idyllic life, the privileges they enjoyed appeared to be cause for introspection as much as for celebration. In issues of IIT-Bombay’s student magazine, *Technik*, from the 1970s, much was made of the fact that Rs 50,000 per year was being expended by ‘the taxpayer’ per student, and no little soul-searching went on as to whether their own predilections, tilted strongly Westward, vindicated the investment made in them. Their self-image, despite such ruminations, could be pretty smug: ‘IITians are expected to be leaders – ran an editorial in one issue – protean men with confidence, initiative and sheer nerve. Try and pattern yourself on such men, and you’ll be worth far more than that half a lakh.’

Even as these youthful exhalations swirled about the air of the campus, the minds of some Bombay boys a few years younger were still oblivious to an Institute at the city’s edge manufacturing ‘protean men with sheer nerve’. Dr D. Khakhar, who finished school in 1975, ‘didn’t really know until the 10th standard that there was this institution in Bombay called the IIT. Late that year somebody brought along a reproduction of JEE papers, and that was the first time I came across the name. So my first introduction to IIT was this very badly printed, dog-eared set of question papers, almost like newsprint. And I don’t think the majority of my friends knew about the Institute either.’

Certain others in the city, however, had been keeping a beady and rather ominous eye trained on the Institute and the promise it held for students. Just how ominous, would start to become apparent in not much time. The mid-1970s were also the years another kind of institution grew into a force to reckon with: the JEE ‘coaching classes’ that would funnel increasing numbers of school-leavers into the IITs by the simple expedient of remorselessly drilling them for the entrance exam. (As seen in the last chapter, the Bombay based Agrawal Classes were already the biggest advertisers in the 1976 Mood-Indigo souvenir.)

If school-leavers like Khakhar had no idea about IIT-Bombay in the mid-70s, it was probably because their families weren’t driving them too hard towards a certain kind of ‘success’. For this was also the time that parents had started to dream the IIT dream for their children, whether the latter liked it or not: mainly as a ticket to the better life, typically in the
US. The IITs, in this view, had been reduced to a cheap and efficient conduit of escape from the depressing conditions of 1970s India, a perception that was to persist well into the 1980s and 90s. And many school-leavers became the bemused and hapless agents for the vicarious fulfillment of parental ambition. So pervasive had the phenomenon become that the IITs found themselves represented in dramatic scenes in mainstream fiction, as in Rohinton Mistry’s *Such a Long Journey*. Set in the Bombay of the mid-70s, it immortalizes, in one scene, the IIT-provoked conflict between a middle-class Parsi, Gustad Noble, and his son Sohrab, who’s already won admission to the Institutes but has other plans for himself. Toasting Sohrab on his birthday, Gustad ends with: ‘And may you do brilliantly at IIT. Make us all very proud of you.’

To which, after a couple of exchanges, Sohrab says: ‘I am sick and tired of IIT, IIT, IIT all the time. I’m not interested in it ... and I’m not going there.’ Tense moments later, ‘This is a birthday dinner,’ the stunned Gustad says, ‘not the right time for discussion. We will talk tomorrow.’ ‘Why can’t you just accept it?’ retorts Sohrab. ‘IIT does not interest me. It was never my idea, you made all the plans.’

How many IIT students over the years, one wonders, have paid the price Sohrab Noble nearly paid, driven by misguided parental craving for the IIT education?

**‘EVEN YOUR 1500TH STUDENT DOES NOT JOIN US’**

Chapters 8 and Chapter 9 outlined how, as the 1970s blurred into the 80s, it started to dawn on the Institute that all hadn’t shaped up as it should have done. Before its very eyes, its dreams had soured. There was the unremitting funds crunch, the fast collapsing infrastructure; and, with IIT-Bombay’s financial fortunes tied intimately to the nation’s, the frustrations of its hopes in R&D. It was during this troubled phase that another unhappy fissure appeared: between the three connected goals that had been foreseen for the IITs, of education, research and extension. Having fulfilled their first goal, that of producing high-end engineering graduates, the IITs had been unable to realize to any appreciable degree the other two. Failure on the third front in particular – with the IIT-industry inter-
face proving refractory to suggestion or persuasion – caught the gaze of society and the media.

By the mid 1980s the IITs were firmly ensconced in the public imagination as ivory tower institutions insensitive to societal needs.

One often hears IITs being criticized as elitist institutions unable to interact in their own environment and with other technical institutions,’ remarked the 1986 IIT review. ‘Their charter is to act as the ‘brain banks’ of our country. Therefore they should concentrate more and more on the extension aspect of their three basic roles … integrating themselves with industry, technology development and specialized production. 3

This wasn’t, of course, fated to happen. Dr M.V. Hariharan, who was Dean of R&D during this phase (he held office between 1981 and 1984), transports us to the mood that prevailed on either side of the IIT-industry chasm, and what each thought of the other.

‘While I was Dean I had organized an industry-IIT meet to thrash out these problems. I remember Prof Mukherjee asking,’ – this was Dr K.C. Mukherjee, of Electrical Engineering – ‘why industry wasn’t taking any interest in our activities and our students. He also asked why no funds were forthcoming from industry for our laboratories, rendering IIT-Bombay totally dependent on the government. The industry contingent returned, what would we get from investing in your laboratories, supporting students for projects? Your students aren’t going to be available to us, they’ll all be leaving Indian shores. There will be no returns for the money or the precious time our engineers in industry spent with students. I remember the Deputy General Manager of Larson & Toubro saying, ”Prof Hariharan, even your 1500th student does not join us. Does this mean that we are so bad that even your last ranker does not consider our company good enough for him?” Hariharan concludes, somberly, ‘We had no answer.’

A telling sub-text to this dialogue is that local industry saw IIT-Bombay mainly as a source of potential recruits, not really a centre for R&D delivering new processes or products. There was, however, another segment of industry that did see IIT-Bombay useful in a different way, if again not the most wholesome way. It viewed the Institute mainly as a resource for testing and certifying its products by way of consultancy assignments. Again,
there was no real R&D involved. As time passed this variety of industry ‘inter-
teraction’ bloomed into large volumes, leaving behind a curious legacy, as
the same office that Hariharan had occupied – the Dean of R&D’s – was to
discover more than 20 years later.

When I spoke to the present and immediate past Deans of R&D, Drs. K. Ramamritham and K.C. Khilar, about the said mode of engagement with industry, Khilar said: ‘We used to do around 800 to 900 consultancy projects every year and out of those I’d say close to 400 used to be routine testing projects – involving materials, water quality, corrosion. It wasn’t really too much in terms of money but the volumes were quite large. It was going fine but then the numbers kept increasing, so much so that it changed the way people saw IIT-Bombay. They’d call the Dean R&D saying, “I want to get this testing done, where do I give the materials and the cheque?” Or they’d come in with their packages saying, “Here’s the mate-
rial. Please do this test and give us a certificate.”’

This was certainly not the image IIT-Bombay wished to project of itself, however inadvertently it might have arisen: of a high-throughput, high-profile tester of products. The need to clamp down was clear and acute. ‘I thought,’ says Khilar, ‘enough is enough. The long term effect of this kind of thing on IIT-Bombay’s image was going to be irreversible if we didn’t arrest it there and then. We did it very slowly, taking an entire year, discussing it in our advisory committee, taking on board faculty who were active in consultancy. It was a question of IIT-Bombay’s long term reput-
ation, of whether we’d be seen as a teaching and research institute first or a testing establishment. Faculty concurred with our view, and we decid-
ed to phase it out.’

And Khilar’s successor, Ramamritham, was glad for it: ‘I’m happy to say that it had a big impact. We don’t do much mundane testing of any kind any more. In fact a Customs official came by to see me personally, saying this was hurting them.’ (Customs, for years, had relied heavily on IIT-Bombay for categorization of materials and evaluation of costs and duties.) ‘So we said sorry but this is what led to it, and he appreciated it and after a while these approaches completely stopped.’
FOR THE BENEFIT OF THE WEST

Until the 1980s and 90s, the IITs hadn’t succeeded in ‘extending’ themselves to industry; and little notable research was being done within their own laboratories. Naturally, the verdict here too was cheerless: the 1986 Review committee was compelled to observe, ‘Research work pursued by the IITs did not appear to have so far an effective imprint on the national scene’.4 Many who deposed before the committee pointed out that research productivity in the IITs was much lower than expected. This was double jeopardy indeed: it was as if the IITs weren’t just ivory tower institutions, they were unperforming ivory tower institutions.

IIT-Bombay’s academic peers, too, tended to have not the highest opinion of its research prowess and its utilization of public funds. Dr A. Mehra recounts that in the mid and late 1980s, especially at the University Department of Chemical Technology (the UDCT, now the University Institute of Chemical Technology) where he’d worked previously, it was generally felt that most faculty at IIT-Bombay weren’t active in research. Irrespective of its inner difficulties, the Institute (along with its sister IITs) was considered a pampered organization which, by the standards of a poor country, received liberal central government grants but ‘didn’t really deliver’ on them. Bearing out this disparity was the fact, says Mehra, that the per-capita publication rate at UDCT was considerably higher than at IIT-Bombay, despite the latter’s many perceived – and real – privileges.

And when you caught the IITs looking inward, here too one ran into the blues. Deprecation came from someone who had known the IITs first-hand longer and more intimately than most others: IIT-Bombay’s former Planning Officer and Director, Dr Kelkar. In a letter to the 1986 Review Committee, he revealed that he thought rather poorly of the way the IITs and their senior faculty had allowed themselves to slide into a trough of lassitude. ‘It looks as though most of the senior members of the faculty, in general,’ he rued, ‘have a “tired” outlook and have very little enthusiasm for change or new ideas or an inner drive for achievement.’ He also worried that there seemed to be ‘no peer pressure of any significance to rouse in some of them at least, a psychological urge to make a special effort for doing something outstanding.’5
Mortifying words indeed... and to top it all, IIT-Bombay’s most immediate audience – its own students of the time – saw little of note emanating from the IIT stables. As part of its Silver Jubilee observances in 1983, the Institute organized a student essay competition titled ‘Perspectives for IITs for the remaining part of this century’. Joint first prize winner Nitin Nohria, now a distinguished alumnus of the Institute, began on a crushing note: ‘To take the liberty of passing judgment before an exposition, the IITs have failed in most respects to achieve their purpose. Their success in terms of realizing their objectives has been dismal.’ A few paragraphs later, he lashed out: ‘In more than two decades of existence we in the IITs have not been able to create an ethos of excellence; of commitment to national development; of dedication and perseverance in the pursuit of education. We have not been able to produce a single technological breakthrough on a national scale.’

The person Nohria shared the prize with, Rangan Banerjee, now on the Institute’s Mechanical Engineering faculty, had no succour to offer either, saying ‘the IITs have made negligible contribution in fulfilling the national goals of poverty eradication, employment generation and economic self reliance.’

Nohria for his part added: ‘We cannot boast of more than a handful of distinguished scientists and technologists of universal stature and recognition,’ while Banerjee raised the most uncomfortable question of all: of ‘whether the nation should pay the social cost of running IITs which nurture our best material for the benefit of the West.’

There can perhaps be no better summary of the rather dim view in which the IITs had come to be held by the nation’s intelligentsia than these pithy volleys delivered by the very minds the Institute was trying to shape.

Confronted with a fast tarnishing image, was IIT-Bombay doing anything to mitigate its effects – for instance by way of that time honoured public relations exercise, ‘image-building’? Thosar-Dixit, who joined at a time when both external and internal perceptions had ebbed to an all time low, says, ‘I think there was no felt need to project IIT-Bombay to the general public. PR is related to creating an image of an institute so that it stays in the public mind, after which you can approach that public for your own needs, such as to get the best students, or better funding. But student re-
recruitment was never a problem for IIT-Bombay from the earliest years, and funding was totally government based. The only public on that front was the Ministry of Education or later the MHRD, and all of that was being handled at the highest level, by the Director and the Registrar.

The ‘student recruitment’ part here is significant for another reason. In Thosar-Dixit’s estimate, ‘Although the overall public perception in these days was negative, it was never hostile.’ And why did it sink only so far and no further? ‘Because finally the middle and upper classes which would be aware of these things, would also be the people who’d want their children to go to an IIT.’

Quite so: if you’re aiming to climb aboard the gravy train yourself, you can scarcely carp about its iniquities.

So far as the media went, contact with them over this phase was limited to events like the Convocation, when the Institute invited the press over, ‘and then too,’ Thosar-Dixit recalls, ‘it was a struggle to get them to come.’ She feels, nevertheless, that some effort on this front could only have helped. ‘Though we didn’t feel the need to address the public, certain elements of perception could have been corrected. We needed to say we were not just creating students to go abroad. That so many alumni had stayed back, and had helped form the backbone of Indian industry, public sector organizations, and academia. And to emphasize that we were contributing to national projects, with so many of our research projects being funded by government.’

This never came to be, however, since PR had never been a thought-out policy at IIT-Bombay. Even though there was a PR department, its PR functions had never been detailed. It was profiled along the lines of a utility department, to the point that its chief tasks revolved on managing the Institute’s internal publications and printing press, its guest house and arrangements for official visitors. Alumnus P. Rele captures it pithily in his dig: ‘IIT-Bombay never had PR, it only had a PRO.’ Perhaps in the mid-80s and early 90s this was just a sign of the times: PR units were a new idea; corporate PR agencies had just recently arrived on the scene. Yet it was a pity, feels Thosar-Dixit, that ‘in spite of the data being available from the Sukhatme-Mahadevan studies on the brain drain [this was late 1980s onwards], nothing was done as a matter of systematic policy to correct public impression.’
WHEN BEING GOOD IS GOOD ENOUGH...

Where public perception was concerned, the only solace IIT-Bombay was able to draw upon in its time of adversity, and which it shared with the other IITs, was the aura of excellence that surrounded the education they offered. ‘The five IITs have attained, but more importantly maintained such high academic standards over the years,’ said a Business World article in 1985, ‘that their engineering graduates command a worldwide market, and are eagerly sought after by academic institutions and industry not only within the country but abroad - notably the US - as well.’ They had established, it continued, ‘reputations for academic excellence that compare favourably with the world’s foremost institutions of higher learning.’

In pretty much every other domain, though, the Institutes had to square up to the disheartening charge of mediocrity, as exemplified by an article in a 1993 issue of the Illustrated Weekly which pronounced:

The Indian Institutes of Technology are not the centres of dazzling excellence that Nehru envisaged. They are, however, functioning research institutes and extremely strong teaching institutes, which produce well trained graduates every year.

And it closed with this thrust, cutting the IITs right down to size for their apparent complacency:

And that, in a sense, is the IITs’ tragedy. When being good is good enough, why should they bother to strive for excellence?

This for the IITs must have been the bitterest pill to swallow, being divested of their dearly cherished badge of excellence, relegated to the ranks of the merely good.

Not surprisingly, the spectre of mediocrity stalked the pages of the Institute’s own records. In the Concluding Remarks of its annual reports from the late 1980s and early 90s, which are a reliable gauge of the Institute’s morale from year to year, IIT-Bombay appeared to fight shy of seeing itself as a player on the international stage, contenting itself with visibility on the national scene – that again a decidedly modest one. In 1988-89, for instance, the most it said was: ‘IIT looks forward to continuing its role of providing significant research input to national technology missions and expertise to policy planning in areas of Technology Research and
Development.’ And in 1990-91, ‘maintainance of satisfactory standards in all its academic and research areas and activities’ and ‘contributing to the nation’s manpower needs’ were all it could muster the grit to say.\(^\text{10}\)

The Institute wasn’t to know that in just a few years’ time, its fortunes would turn so swiftly around that it would be left blinking in disbelief. As if taking the cue from one another, its circumstances would be transformed at once on several fronts. Government funding would rise sharply; the Institute’s alumni would start to appear in the highest ranks of technology, entrepreneurship, finance, and management, not just in India but around the world; and many of its alumni would start giving back handsome to the Institute – events that have been traced in earlier chapters.

**ALL DRESSED UP – FOR THE WEST**

In the late 1990s unfolded a chain of events that bore quaint witness to the Institute’s dented self-esteem typical of the times. A department was to host an international conference. It became an occasion for days of frenetic and rather unusual activity. Departments in that not-so-distant era commonly existed in a state of aristocratic shabbiness; this one was no exception. Its walls, for years, had been mouldering and peeling; discarded furniture graced its corridors like heirlooms awaiting an auction. Most forbidding were the toilets, marked by an acrid stench and frank dilapidation: cracked sinks, missing faucets, waterless and caked urinal bowls.

Come the conference, and a celebratory mood set in. Corridors and landings were transformed. The department’s walls were scraped down, given licks of paint. Overnight, the aesthetic impulse, so far in slumber, stirred. Corridors mutated into galleries: paintings materialized upon their walls. Potted plants sprung up below the paintings, plus a sculpture or two. The old furniture was hacked, thrown out. And so forth. But the most striking changes came about in the toilets, where all was now spit and polish. New washbasins glinted with new brass taps; new mirrors sparkled and – unheard-of before – soap dispensers actually dealt out tapers of their viscous contents. In honour of their new avatars the toilets were rechristened: they were now ‘Cloakrooms’.

All this while, you could hear faculty and technical staff exhorting the workmen and cleaners: there will be people from abroad visiting the de-
partment. What will they think? – an argument evidently meant to inspire in them a loftier sense of duty. The cleaners heard them out cheerfully, helped along by thoughts of the windfalls of extra payment that an international conference promised. The whole affair recalled the nervous, touching preparations for the British inspector’s visit to a provincial school in Satyajit Ray’s Aparajito. When the West came visiting, the East, like a girl about to be displayed before suitors, scrubbed and polished itself as never before. Things hadn’t changed in a hundred years.

And the question arose, as at every such anxious prelude to an international conference: were only visitors from the West entitled to scuffed corridors, clean toilets? Would we never deem ourselves deserving of these simple civic necessities?

What ensued once the conference was over settled it. Even as the shoulder bags and grey suits dimmed from view, the clock was turned back full circle. Paintings were taken down, pottery removed. The biggest changes, as in the days of preparation, overtook the toilets. The fancy faucets were spirited away, replaced by their ragged predecessors, the idea being that the latter were less likely be pilfered. Most tellingly, the liquid soap in the swinging dispensers, once exhausted, wasn’t replenished.

This was but one of the many genuflexions towards the West routinely made in those years, or at least towards the idea of what the West expected of the East. Already in this book, other forms of the capitulation have found mention. The research agenda at the Institute had always borne a strong Western tilt, and still does. There was the incurable beeline that the Institute’s graduates made for the US. And in the nineties, standard dress code for students was T-shirts emblazoned with the crests of American universities, speaking of allegiances being forged long before the flights were taken. As for IIT-Bombay’s own T-shirt, it was hard to find, or if stumbled upon, disdained. Most tellingly, perhaps, the self-effacement spilled over into the realm of the semantic, finding its way into the smallest nooks of official parlance. IIT-Bombay’s official names for its semesters were Spring for January-April, Autumn for July-November (they still are). These, as anyone familiar with Bombay’s climate will attest, are utterly at odds with its seasons at the corresponding times of year. With Bombay’s famed monsoon holding sway for the first three months of the ‘autumn’ semester, this interval actually marks the time when the campus is at its
greenest, pulsing with renewed life – closer by far to spring than to au-
tumn. And it’s the first half of the year, January through May, that sees
heavy leaf-fall from the deciduous vegetation and browned grass: hard-
ly redolent of the word ‘spring’. When this fallacy was pointed out at an
Institute Faculty Meeting, with an appeal to change semester names to
echo local seasons, the proposal was turned down on the grounds that the
switch would confuse American universities receiving applications from
the Institute’s students, whose prospects might then be jeopardized. A
compromise solution was also proposed: to give the semesters semanti-
cally neutral (if unexciting) names, ‘Semester 1’ and ‘Semester 2’, say, but
nor did this idea win favour. Plain numbers still wouldn’t ring the same
sorts of bells, it was argued, in American minds as ‘Autumn’ and ‘Spring’.
Clearly in all this, such were the Institute’s perceived compulsions that
American universities were the only audience that mattered – even if it
meant a willful obliviousness to the evidence of our own sensations.

‘HOW RIGHT THE MAN WAS’

Even as the Institute struggled to come to terms with its bludgeoned im-
age in the late 1990s, there came about the sharpest of U-turns in media
perception, triggered by the exploits of its alumni. To start with ‘it became
a big thing to talk about which alumnus had given how many millions to
which IIT,’ says Thosar-Dixit. ‘They just loved that as a phenomenon, a
story.’ Indian academia had seen nothing like it ever before. And with IIT-
Bombay singled out as having attracted the largest endowments, every few
weeks some media person would want to do a story on it. And, of course,
there were awestruck stories on the IIT phenomenon itself. Phrases like
A Class Apart, A Cut Above Carnegie Mellon, Degrees of High Renown, and
Star Factory, became the order of the day in media headlines. It was as if
some giant hand had plucked the IITs from the shadows of obscurity and
gloom and pitched them into the dazzling sunshine of celebrityhood.

If the turn of the century had been a heady time for the Institute in
the national media, the encomiums of CBS’s ‘60 Minutes’ in early 2003,
Bill Gates’s address at the IIT Golden Jubilee event the same year, the US
Congressional declaration of 2005, and a flurry of other accolades on the
international stage catapulted the IITs even higher into the global lime-
light. 1965 alumnus Dr B. Singh was affected so deeply by these events as to say, ‘When I saw the show on CBS 60 Minutes telling the world that IIT was superior to MIT, Harvard, and Princeton,11 I tearfully remembered Brigadier Bose, and thought how right the man was. I can say without doubt that I am the luckiest person on earth because I was a student at such a great institution.’

No wonder, then, that IIT-Bombay’s self-assurance was also on the mend over this spell, as witnessed by the reappearance of the words ‘excellence’ and ‘global’ in the Institute’s visions for itself. It started with Sukhatme’s enunciation of IIT-Bombay’s ‘tryst with excellence’, and in 1999-2000 the Institute declared: ‘Our future task is cut out for us, to become a world leader in education and research with a distinct focus on science and technology.’12 This spirited tone has been maintained since. Yet the very people who had made a good part of the Institute’s renewed confidence possible – its alumni – surprised it with their stances on some issues. Both Sukhatme and Misra were clear in their minds that if IIT-Bombay wished to flourish on the international academic stage, it would have to make a mark in research, something that had eluded IIT-Bombay thus far. To his surprise, Misra found that alumni had other ideas.

‘In the very first meeting in 2000 I had with alumni,’ he remembers, ‘I pointed out that we wanted to take IIT-Bombay to the next level in research. Many alumni – he’s speaking here mainly of IIT-Bombay’s B.Tech.s – ‘thought otherwise, saying it should remain an undergraduate institution; that’s what we’re good at. We had quite a few arguments about it and I said well, if IIT-Bombay has to become a globally recognized institution the only way is for its research to go to the next level.’ In a bid to correct their misimpression Misra, along with the then Dean of R&D, Dr S. Suryanarayana, made a presentation to alumni about the range of R&D done at IIT-Bombay until then. ‘They were quite surprised,’ says Misra, ‘at the spectrum of ongoing research. After the presentation, they were a lot more convinced and agreed that this was the way to go. Indeed of late they have helped us a lot in taking research at the Institute forward.’

Why should alumni have initially felt the way they did? Some part of it owed undoubtedly to the fact that, as many of them have averred, they felt it was their undergraduate education that had played the biggest part in fashioning their success, and should therefore continue to be the brand
IIT-Bombay focused on. Misra, however, feels it was also ‘our fault as faculty not to have projected the ongoing research to undergraduates over the years. They went through their classrooms, did their projects without realizing that the same faculty were actually doing research.’ Seeking to remould the inner perception of tomorrow’s alumni, in 2002 the Institute started the undergraduate research opportunity programme (the UROP), where undergraduate students are involved in research projects under the mentorship of graduate students.13 Yet more, however, needs to be done: in the surveys conducted for this book, several undergraduates said they felt they still weren’t seeing enough of IIT-Bombay’s research laboratories, nor getting any idea of the demands and the joys of discovery and invention.

**AN IITian FIRST?**

At older institutions of established standing – the MITs, Caltechs, or Oxfords of the world – students arrive with a sense of destiny. They come assured that merely their association with the institution will furnish them with a ‘calling card for life’, opening for them all kinds of doors at all kinds of places. For long, IIT-Bombay had offered no such thing. Though it might have offered an increasingly coveted engineering degree, its alumni had had to work their own way to success without the backing of a special label. Along with a host of other things this, too, has been transformed in recent years – as borne out by the following ensemble of alumni reactions from the early sixties onwards:

1962: P.S. Sawhney (of the very first graduating batch): *At that time the IIT degree did not carry any special recognition.*

1981: Amrut M. Marathey: *When I joined IIT-Bombay, it was just one of the engineering colleges for me. In my personal case, I do not think that IIT tag has given me any special advantage over others.*


2004: Puneet Goel (reported in the *Times of India*): *When we were preparing our resumes for interviews, the placement co-ordinator advised me to emphasize my IIT degree rather than the Carnegie Mellon one, which ranks among the top universities in the US.’*
From having been a tag that was of ‘no help’ to one that was reckoned more effective than those of premier American universities, was to have travelled a long way indeed in the space of 40 years. As for the achievers who had made possible the ‘reverence’ the IIT name now elicited, they too started taking pride in saying they were IIT products. When asked to reflect on the ingredients for their success, a common thread emerged. Alumni unhesitatingly said that they owed their success to their IIT education – and to this almost solely. Such attributions snowballed into the creation of the IIT brand, spelling a sea-change in self-image of everyone associated with the Institute. As if overnight, it became useful to identify yourself as ‘IITians’, to highlight your IIT affiliation in your CV, which earlier you wouldn’t have bothered to do. Undoubtedly the greatest benefits of the avalanching adulation were reaped by the IITs’ graduating batches. The fabulous starting salaries industry started offering some of them became yet another phenomenon that left the media all agog.

A less sensational but perhaps inwardly more satisfying side to the swing in media perception was that IIT-Bombay was now seen as a repository of technical expertise, an asset that became greatly more sought after than before. ‘The moment they need expert opinion on a topical issue, be it the energy crisis or global warming or nuclear power, anything related to science or technology,’ says Thosar-Dixit, ‘they find themselves turning...”

What they said then, what they say now: Headlines on the IITs from the 1980s and early 90s (above), and some from the early 2000s (right).
naturally towards the Institute these days. It’s almost a weekly thing. All in all, Indian expertise is also getting recognized and IIT-Bombay expertise is one of the homes of Indian expertise.’

On the international stage, too, the IITs were compelling people’s attention to turn in their direction. Alumnus Dr S. Ramani singles out an important facet of this shift of sights when he says, ‘In this age of runaway globalization, the IITs have played a great role in, so to speak, globalizing India. Over the years that IIT students went all over the world, they helped attract trust and confidence in Indian capability, paving the way for the influx of international investment mid-1990s onwards.’
If media were all wide-eyed about the IITs, academia weren’t far behind. And the first symptom of attention from these quarters was the huge numbers of international academic visitors that started streaming through IIT-Bombay’s gates.

2003 onwards, two attributes marked the recognition IIT-Bombay received from other academic organizations. Thus far international visitors, especially from the West, had come as experts; they came now as seekers. Perhaps flattered by the attention, IIT-Bombay welcomed everyone that thought of dropping in – to the point where it became a logistical strain to accommodate the flood. Presently, it became a psychological strain as well, for the motives driving their visits were not quite as flattering as IIT-Bombay would have wished.

‘They were dropping in mainly because of the undifferentiated IIT repute,’ says Dr P. Banerji of Civil Engineering who, from his vantage post of Dean of Alumni and International Relations, has witnessed the phenomenon at close range. ‘IIT-Bombay was not recognized individually, it was just “one of the IITs”. It was predominantly the “IIT brand”, for example, that most people spoke of, never really the “IIT-Bombay brand”’. Banerji feels that part of the deluge IIT-Bombay experienced had this ego-deflatingly simple explanation to it: that Mumbai was a convenient international port of arrival and departure for international delegations, and it was the easiest thing for them to shoehorn IIT-Bombay into their itineraries.

The second trait was perhaps more worrying. International universities, although they’d say they were visiting IIT-Bombay to explore possibilities of striking up collaborations in research, came in fact mainly with their eye on the Institute’s students. Most made their way here because they’d heard of IIT-Bombay’s alumni, not its laboratories. And those alumni had almost all been undergraduates at the Institute, with no clear idea of IIT-Bombay’s capabilities or accomplishments in research. Today, Banerji avers, ‘I liberally say no to such proposed visits.’ He insists on first being sent an agenda, along with a follow-up plan to the visit. ‘We make it clear that IIT-Bombay is now interested in international collaboration only to further its R&D identity.’ ‘Collaborations’ confined to the undergraduate level are politely declined, as are prospective visits by those IIT-Bombay knows nothing about.
A similar sequence of events unfolded with that modern instrument of academic linkage: the Memorandum of Understanding. As with exploratory visits, IIT-Bombay adopted a heartily welcoming, open-doors policy to start with, and felt the need to clamp down later. ‘Initially, we were signing MoUs whenever people came along with them,’ says Banerji. ‘There was no filtering.’ This resulted in several of the early MoUs lapsing into a state of limbo because they hadn’t been underpinned by strategic aims. They were limited to understandings on student and faculty exchange, and that again loosely so: only in principle and without definite financial commitments being defined. The first MoU where funding and action points were carefully delineated was the one with the National University of Singapore, and the programmes under this linkage have been working well. ‘IIT-Bombay is interested today in signing MoUs,’ Banerji sums up, ‘only when their provisions are in line with the Institute’s strategic aims.’

Harmonizing with changing public and alumni perceptions, the third ‘report card’ on the IITs – their 2004 review – was upbeat all the way. It spoke of the IITs’ ‘exemplary alumni and faculty,’ and was peppered with statements of the hue: ‘In the IITs India can find a colossal resource of estimable worth to tap and display the country’s enviable richness in its knowledge-intensive human capital,’ and ‘Whether in original research or in product design or product development, IITs have often clearly demonstrated their high level of competence’ – lionizations that are a world removed from the soberingly mixed feelings the IITs elicited until the early 90s.

And as for IIT-Bombay’s third ‘public’, the aspiring student: it was inevitable that, given the apogee on which the Institute had now been placed, the hold the IIT-Bombay name exercised on their imagination should grow ever more tenacious.

We hear it from current student Annapurna Rath who, ‘coming from a small non-happening town of a remote corner of Orissa’, joined Humanities and Social Sciences in 2005 for her Ph.D. Calling it ‘my beloved institute’, she narrates ‘the story of a young girl which many girls of this Institute would identify with. The interview,’ she says, ‘was the toughest thing I could have imagined and I went back perfectly sure I’d never be able to make it to that phenomenon called IIT-Bombay. But lo! In the selection
chart I found my name in the list. It was a dream come true - parents cried out of joy and lighted deeyas in the family pooja room and in all neighbouring temples, relatives streamed in with congratulations and friends chimed for treats, secretly jealous at my success in entering the most renowned institution of India. My professors and teachers (even those who had felt I was worthless) boasted about me to junior students at the university. So began the journey on a triumphant note and I proudly entered the institute on July 26, 2005…’

Deeyas, pooja, both at home and in the temples, gushing (and envious) friends and teachers…Wouldn’t most of those who in recent years have received that decisive letter or telegram, whether admitted to undergraduate or postgraduate courses, whether from India’s mofussil towns or her metropolises, have had some version of this experience mirrored in their lives?

Media being what they are, and knowing their weakness for sensation, an important question that begs examination is: in how many parts is the adulatory image IIT-Bombay enjoys today a reflection of ground reality, in how many a mirage born of hype? It is here that it becomes imperative to strike a sense of balance, as we’re reminded by Dr M.M. Inamdar, B.Tech. Civil Engineering, 2000 (one of those ‘rare returnees’, he is now faculty in the same department). He helps cut through the hype with this considered summary: ‘I have heard mixed reactions to the IIT-Bombay tag: 1) Some people go all ooh-aah on hearing about IITB, but then all they have heard about IIT is from CBS or Newsweek. 2) Some people highly appreciate IITB because they know some really good colleague or student or employee who’s graduated from here. 3) A very pointed observation is as follows: The IIT brand has been created mostly by smart people working in the computer profession. In basic sciences or engineering very few IITians have made path breaking contributions, and this is something that IITs (thus IIT-Bombay also) have to improve upon.’

Over this last phase, then, many of the shadows that over the previous decades had fallen over IIT-Bombay’s external image and self-regard were gradually and surely lifted. The Institute, not long ago teetering on the edge, had been able to right itself, and ‘stand tall’ again. Perhaps the greatest challenge before it in days to come will lie in how to capitalize on
the glowing public perception it currently enjoys without getting carried away by it, or getting lulled into complacency. It will also need to see how it can actively build for itself the kind of image it wishes to project, rather than allow it to sway whichever way the publicity wind blows.
And now to peer into the periscope and see what waters lie ahead, and how the Institute might chart its way through them. Before training our eyes on what the next few decades might hold, however, a flashback to the last five. Even as it was gaining recognition for its achievements in the domain of teaching, producing alumni who excelled in varied fields, the Institute had thirsted for recognition in research, only to see it recede always beyond its grasp, mirage-like. The successes it notched up owed emphatically to the academic autonomy it enjoyed, to participative internal governance, to the commitment of its staff to its purposes, and not least to its exceptional students. Its failures were rooted in a slow start to its research, in the vulnerability of its R&D effort to the national industrial and economic climate, in the sometimes excessive external controls on its operations, and to shortcomings in internal management which bred pockets of inertia and dissatisfaction among its staff.

Over the decades to come IIT-Bombay seeks, amongst other things, to strike the elusive balance: to become a global forerunner in R&D while retaining its pre-eminence in teaching built up in years past. This will not be easy. During the years research at IIT-Bombay’s laboratories was lacklustre, its counterparts across the world were sprinting furiously ahead. Catching up with them in volume and sophistication of research will take time, money and much hard work. Frontline technology and product development may happen more readily, given the abundance of expertise available here and the marked rise in Institute-industry partnerships posted in recent years.
Accompanying the qualitative changes will be growth in numbers. In today’s competitive times, academic institutions have no choice but to abide by the same pitiless dictum previously reserved for businesses: grow, or die. IIT-Bombay, too, will need relentlessly to innovate and expand: into novel academic programmes, areas of research and modes of functioning, challenges it has already started addressing. So great may be the expansion that some of those whom I’ve spoken to have envisaged the Institute metamorphosing into a ‘University of Technology’, encompassing for instance a truly eclectic canvas of humanities and the liberal arts – a blend that could both draw upon and inspire novel technologies. Others have conjured up a research-driven, exclusively postgraduate Institute, its B.Tech. programme a thing of the sepia-tinted past.

For the Institute to translate any of its visions (even the more prosaic ones) into reality will require concerted effort on many fronts. Greater volumes and broader spectra of activity will call, for example, for speedier and distributed modes of governance. A near-collegiate system may emerge. Change will be inevitable; only its scale is open to conjecture. And it will affect all facets of life at IIT-Bombay. None of the academic expansion can happen without creating more of every category of infrastructure: ever more buildings, recreational areas, amenities. This will directly affect what has always been amongst the Institute’s most prized possessions: its campus. New entrants arriving 25 years hence may be greeted by a lot less verdure and a lot more concrete than is seen now – unless a swift decision is taken to ‘go vertical’ from here on, build only high-rises, spare the campus’s green cover. Future students may also find themselves lounging on the fringes of Vihar Lake – for the Institute may have to muscle its way to the far side of the pipeline and reclaim the outlying reaches of the campus.

A RAINBOW OF INCARNATIONS

In another few decades, then, the Institute may sport a persona, both physical and intellectual, barely recognizable as the one we know today. Where do the pieces of this picture come from? They’re culled from the thoughts of those who, by virtue of having both witnessed and mediated
the Institute’s growth over long spans of time, are uniquely equipped to anticipate its trajectory in time to come.

Perhaps the most arresting tableaux drawn up are to do with the shapes the Institute’s academic programmes and curricula, especially the undergraduate, might take. And certainly the most radical amongst them is for IIT-Bombay to do away with its B. Tech. programme altogether, and focus all its energies on the master’s and the doctoral. The author of this proposition, Dr M.V. Hariharan, sets out his stand thus: ‘I used to feel strongly about this point, and bring it up in the Senate even in the 1980s. I was alone, people thought me mad for saying we should detach ourselves from the B.Tech. – something for which IIT-Bombay was widely admired. But up until the early 1980s it was all right for the Institute to have done a lot of teaching; we were able to set a standard for emulation by other colleges, and train their teachers. Beyond that I felt, and still feel, that local colleges had grown in maturity, in status, and accomplishment. Many of their faculty held Ph.D.s from the IITs. That was when we should have started concentrating on postgraduate-driven research.’

And why, in broader terms, should the Institute undergo this transformation? ‘With lavish funds given to the Institute by the taxpayer,’ says Hariharan, ‘we should not have been competing with local colleges in training undergraduates. I always used to point to IISc Bangalore as a prominent example of this. They were able to gain eminence in frontier areas of research because they shed their undergraduate load. Our research output suffered because we didn’t.’

Hariharan, as can be imagined, stands as grandly solitary in his vision as he did 20 years ago. To most minds, for the Institute to divorce itself from its famed undergraduate programme would be nothing short of heresy. (Another moot point is whether taxpayers – who have always coveted the Institute’s B.Tech. for their wards – would ever warm to the prescription.) And all of Hariharan’s colleagues concur that IIT-Bombay will need to have a healthy mix of undergraduate and postgraduate education and research. It’s in the definition of ‘healthy’ that perceptions differ. In absolute numbers, it seems a given that IIT-Bombay’s student count will rise within the next few years from the present 5000-odd to around 8000 – an increase of more than 50% – stretching the campus to capacity. Dr
S.L. Narayanamurthy, looking at a twenty-year horizon, feels that in composition the student body needs to move towards two postgraduates to every undergraduate. Others have advocated ratios that are yet higher, climbing to 2.5 or 3:1. Current Director Dr A. Misra, however, would prefer it if PG:UG ratios are maintained at their present levels. ‘The current ratio of about 1.2 to 1 – that’s around 45 percent undergraduate and 55 percent postgraduate – I think is fine and we should hold on to it.’ And while some say that Ph.D. students need to be stepped up quickly to 2000 (from the present 1200), Narayanamurthy would rather ‘go easy on the absolute numbers, and focus on an R&D identity achieved through quality.’

Projections take on a variety of tints in the curricular realm as well. A good number would like to see greatly enhanced elasticity in curricula – so much so that they’ve spoken of the Institute transmuting into a ‘University of Technology’, housing a broad canvas of social sciences and liberal arts. The most voluble champion of an extended compass is Dr A.P. Kudchadker, who argues, ‘If we are to inculcate innovation, we need inspiration from lateral sources – it could be design, it could even be painting or music. We need to bring in biology and design right at the first year level. We have been talking about it for years but still haven’t done it. We also need to have a greater role played by the humanities and social sciences, instilling human values in our graduates – to care for society and for the environment.’ Echoing these thoughts, Dr N. Talwar of the department of Humanities and Social Sciences adds that these are exciting times for the humanities in the context of engineering, with interdisciplinary approaches to techno-scientific culture emerging fast. ‘There is a culturalization of technology,’ she says, ‘and my vision is that students would increasingly go into areas of technology used by the culture industry. New ideas and careers would emerge from the cross-fertilization.’

Dr S.P. Sukhatme agrees unreservedly with Kudchadker on the introduction of biology in the curriculum. ‘To me, learning biology in the first two years is vital,’ he says. ‘I personally feel that many of us who did their engineering in the 1950s lost a lot by not being exposed to the life sciences at all.’ His vision for the Institute’s academic rubric is fairly pointed: ‘IIT-Bombay should be identified as an institute of technology with a strong bias towards science leading to research and technology development.’ And the optimal route – other than doctoral research – towards achieving
this, he believes, is the Dual Degree programme. He would personally like to see the five-year Dual Degree programme prosper – to the point that it eventually replaces the stand-alone B.Tech. Although his stand appears to coincide with Hariharan’s on this point, it is distinct in advocating continuation of the post-JEE undergraduate programme – but confined to the Dual Degree option. ‘We’re well poised for it,’ he says, ‘provided its curriculum can be structured distinctly from the B.Tech. I think our research output will increase enormously. The outgoing student will also be more inclined towards research because they’ve already done a research thesis with us; and we’ll be recognized more as a research institute.’

Flexibility is another keystone for the future. ‘In the next couple of decades,’ says Kudchadker, ‘we need to graduate from a relatively static situation to a dynamic one, have very flexible programmes. We need to leave students free to think. We over-teach. Our students don’t need to be over taught. They just need an environment to grow intellectually.’ To Dr H. Narayanan’s mind, an emphasis on what he calls the ‘play element in studies’ and ‘academic risk taking’ could be critical to this growth. ‘Even in the present educational setup,’ he observes, ‘a great deal of learning often takes place outside the classroom. Here learning is usually from peers through imitation (such as when they pick up hobbies – photography, ham radio operation, electronics and now, computer programming). Students rarely associate virtue with this kind of learning. It is seen as play and any learning that takes place is largely unconscious. It may be worthwhile to make at least a part of curricular learning imitate this form. Of course,’ he cautions, ‘“play” and “consolidation” should alternate.’

It’s at this sort of juncture that one may be prompted to ask: how mixed, and how variegated, can an engineering curriculum be? If too diverse, does it risk losing its potency? As we’ve seen along these pages, between the old guard and the new there exists, at all times, an uneasy truce; and the Institute is sure to see no few lively battles waged on this turf as it moves towards its new points of equilibrium.

**MONEY, MINDS AND TEAMS**

In contrast to its listlessness over the first three decades, the Institute’s R&D tachometer has displayed happier readings in recent times. But will its R&D
enterprise bring it the same sort of applause in future as its teaching over
the first few decades fetched for it, 1990s onwards? This isn’t easy to tell;
and there is still, as acknowledged by the Institute, ‘a long way to go’ before
it can be counted amongst top-drawer R&D institutions globally. Some of
the reasons for the laggardliness appear to be attitudinal, as described by
the present and immediate past Deans of R&D, Dr K. Ramamritham and
Dr K.C. Khilar. Khilar’s perception, for instance, is that faculty in gen-
eral aren’t oriented towards research. ‘Only a few are passionate about
it,’ he feels, ‘or have the patience to solve significant problems. Second,
the Institute’s leaders don’t communicate through their actions that re-
search is important. It’s been happening through speeches and writings
but not, for example, through research intensification events like domain
discussion gatherings. We have to intensify the research atmosphere,’ he
suggests, ‘such that young faculty see a number of role models, feel that
the functionaries are serious about research and that being at IIT-Bombay
gives them an opportunity to solve significant problems.’

Both Khilar and Ramamritham identify another major culprit: the want
of academic leadership at the departmental level. When Ramamritham
took over as Dean and had his first meeting with recently recruited faculty,
he was aghast at the amount of misinformation they were labouring un-
der. ‘It started with what their seed grants could be used for,’ he recounts,
‘and ranged to the impression that “research doesn’t pay in IIT-Bombay”,
or that if they didn’t toe the Head’s line, they wouldn’t get resources, so
they shouldn’t speak their minds, and so on. It all left,’ he says regretfully,
‘a bad taste in my mouth, and made for a disheartening start to my tenure.
I was actually worried whether anything innovative could be done if the
Heads were not in tune with institutional thinking. Fortunately,’ he adds
reassuringly, ‘the number of such departments is small.’

Khilar agrees that most Heads do not play an academic leadership role.
‘They stop at administration,’ he says, ‘apportioning and spending depart-
mental budgets, routing papers to the Director. They don’t give much
thought to the R&D profile of the department. We should perhaps have two
Heads to a department, one for administration and one for academic lead-
ership, both research and education.’ A further insufficiency Ramamritham
pinpoints is that ‘although most of the challenging problems are cross
disciplinary, some departments have a culture of very limited, if any, col-
laboration with others. Everybody wants to have their own empire, control their own spaces. Some of this territorial culture has to be torn down. The number of firewalls here is very large.’

Attitudes apart, a second major imponderable is the question of money. With research becoming ever more reductionist, moving inexorably into the molecular and atomic levels in all fields, nature’s deepest secrets yield themselves only when probed with ever more sophisticated techniques, procurable at ever greater capital costs. In this scenario, the richest nations inevitably generate the greatest volumes of pace-setting research, particularly experimental. Comparisons on the international scene therefore give little cause for cheer. To take the example of a mid-level university in the US – the University of Wisconsin at Madison – its College of Engineering attracted upwards of $77 million in extramural funding for research in 2003-04 (about Rs 350 crore at the time).1 The same year at IIT-Bombay, sponsored research brought in about Rs 30.5 crore. This kind of difference matters most in the acquisition of state-of-art equipment and materials, in which India enjoys no price advantage. These inequalities, together with the suboptimal human resource (more on this below), oblige the Institute to be a follower, rather than a setter of trends, in research.

This may imply that some of the Institute’s dreams may not be realized until the time India becomes, in the plainest terms, a much richer nation. The national economy has been on a sharp upswing of late, bringing in better ‘Plan’ funding for the Institute than ever before. But in an era of shifting demographies of economic growth, there’s no saying how long it will be before the locus of high GDP leapfrogs to some other nation. About the only way to ensure that R&D thrives unimpeded by the kinds of periodic hiccups seen over its first five decades may be for the Institute to insulate itself from national economic swings. And the only way to do this might be to spread its risks by striking up international collaborations and attracting funding from international agencies, conferring immunity to local ups and downs.

No less important is the question of the hands and minds applying themselves to research. For the Institute to carve out a presence for itself, there is consensus that its doctoral and post-doctoral programmes (the latter is virtually non-existent at present) will need to be fortified substantially. Kudchadker laments the Institute’s continuing inability to attract ‘our
own best students to do their M.Tech. and Ph.D. here. Attracting bright Ph.D. students is a serious problem.’ In its middle decades, IIT-Bombay was seen by its own students – and by those of comparable calibre – as merely a stepping stone to the West, or to a job. There may now be glimmers of hope; departments are able to attract better Ph.D. students and in greater numbers than before. If this betokens a trend, it’s a heartening augury for the future; but there remains considerable room for intensification before the Institute can claim with confidence that it has matured into a research-driven entity. Alumnus Dr V. Borkar sounds a cautioning note here, saying that from his vantage point at the TIFR, it appears that ‘people who want to pursue a research career willl hesitate to apply to IIT-Bombay because of the somewhat excessive teaching load there’. The concentration on teaching also keeps the Institute’s faculty, he feels, from participating more frequently and effectively in research conferences and seminars.

By way of measurable output, there can be no two opinions about the scales on which one is judged today. International recognition can be won only if faculty publish in continuously greater quantities in quality journals. Director Misra sets great store, in addition, by visibility in research, garnered through faculty being invited to the editorial boards of respected journals, or to chair sessions at conferences, or to give invited lectures at reputed fora, all of which will need to be firmed up in order for IIT-Bombay to start humming in people’s minds as an Institute that performs in research. Another widely enunciated priority is team activity. Teams of faculty, ten or twelve strong, are envisaged as the desirable ‘unit’ of high throughput R&D, synergizing their interests and expertise across disciplines. ‘Team work should be given the highest priority,’ opines Narayanamurthy, ‘the highest recognition, the highest value. Strong teams should become, to my mind, the USP for IIT-Bombay. They’d also offer tremendous advantages to new faculty recruited in those areas.’ He dreams of an IIT-Bombay boasting a dozen teams that are the preferred destinations – counted among, say, the top five anywhere – for research students, prospective faculty, and academics contemplating exchange programmes and sabbaticals.

And to keep pace with the times, the Institute will need to impart a much stronger interdisciplinary stamp to its research. Areas most frequently mentioned as deserving special attention over the next decade
are the biosciences and bioengineering, energy sciences, and the nanosciences and technology.

For a good number of those who have chosen to work in an establishment engaging with technology, the holy grail is a process or a product that finds a place on the shop floor of industry or – better still perhaps – on the shelves of a myriad homes. ‘Technology innovation is crucial for this country and is partly why the IITs were set up,’ is how Kudchadker sees it. ‘The Sarkar Committee’s and Nehru’s visions were superb, but weren’t realized because industry wasn’t ready for our graduates, who went out armed with excellent analysis and synthesis skills. Indian industry is still not ready. They’re still outsourcing, they need to invest more. Faculty research has also to move towards solving our society’s problem, whether it’s in health care, education, or manufacturing.’

Every bit as judiciously as the Institute grapples with novelties, so will it have to grapple with the modern-day spectre of obsolescence. In a technological institute, obsolescence – not just of instruments and techniques, but also of ideas – can be more accelerated than elsewhere. In the current milieu, this can pose a threat to the existence of disciplines and areas of work that are momentarily quiescent compared to others. One of the most delicate, and critical, choices IIT-Bombay will have to make from time to time will be to do with academic selection and elimination: which fields of inquiry to promote, which to close the door upon. These are realms in which the Institute will need to ponder its role, in common with other institutions of higher education, as a ‘gatekeeper of oblivion’. It is in them that a society’s knowledge of itself is enshrined and preserved, and also at their hands that slices of this knowledge can be consigned to oblivion, such as when some domain of study or other is deemed to have become obsolete or no longer ‘useful’.²

ON FREEDOM AND RESPONSIBILITY

Given the wide range of foreseeable academic incarnations the Institute could pick from, it would appear spoilt for choice. Just as vital as the framework it eventually adopts, however, is the pace at which it will be allowed to advance upon its chosen path. There can be no doubt that freedom of academic action has underpinned practically all the success the Institute
has so far enjoyed. Does IIT-Bombay, however, enjoy the autonomy to do just as it wishes in years to come? It is here that the view through the periscope can turn cloudy – and for none more so than Narayanamurthy, whose musings represent a conflation of many others. ‘My main concern,’ he says, ‘is that we have too many approvals to seek, too many controls. Even our academic autonomy is fairly strongly circumscribed by the need for approvals. If you want to start a new department you need approvals. We have had to take roundabout routes – for instance, naming them Schools rather than departments – to launch new academic units at short notice, examples being the Schools of Management and Information Technology. Had we not done so, we would have lost the donations attached to them as well.’

‘And while we have so-called academic autonomy,’ he chafes, ‘we still cannot decide for ourselves the duration of the B.Tech. and M.Tech. programmes. They have to be “in tune with national policies”. I still believe we lost a lot when we moved from the five year B.Tech. to the four – a lot of life on campus in general and a lot of creativity. And these changes were pushed on us. These are issues which are academic in nature, yet are politically dictated. So our autonomy is somewhat illusory, and I feel very strongly about this.’ Narayanamurthy’s advocacy is for near-complete removal of controls, in the interests of institutional agility and responsiveness to change. ‘What will really get the Institute on the growth path is freedom almost on par with any private institution, enabling quick and timely decisions and, equally importantly, adaptability to new situations. Change is so rapid these days; how do you adapt if you have wait years to get approvals? And I think the system has demonstrated that if they give us greater responsibility we will measure up to it.’ And alumnus Dr S. Ramani has his own prescription for wresting greater autonomy. ‘The MHRD has supported the IITs well, but any Ministry is after all a bureaucracy. Can IIT-Bombay break away from governmental control, saying we’ll raise our own resources? One way to try it would be to stop thinking of the IIT education as a gift to the student which is then written off. Instead, why not charge students the true worth of this education, enabling access by way of soft loans? Considering the returns of the IIT education – something most alumni would vouch for – I feel this could be worked out.’
Also in need of attention are the very bodies – the Institute’s Board of Governors, and the IIT Council – which embody the degree of freedom the Institute enjoys, and which are entrusted with safeguarding it. The widespread feeling is that some Board members seem to ‘have little interest in IIT-Bombay’, or are simply ‘out of their depth when looking at issues’. This has allegedly rendered the Board largely reactive of late, content to deliberate proposals placed before it, rarely raising concerns on its own accord. The Institute’s past functionaries would like to see a situation where each Board member is a direct stakeholder in the Institute’s fortunes, is conversant with IIT-Bombay’s set-up, can champion causes and cast a critical eye on things.

‘Academic autonomy without administrative autonomy doesn’t mean much and administrative autonomy without financial autonomy doesn’t mean anything.’ Dr D.B. Phatak’s words sound like an aphorism for our times, and there is much of substance in them. For greater financial autonomy, Phatak’s prescription is to ‘look towards external money in order to handle things differently’, while the secret to wresting more administrative freedom lies, he believes, in using well the provisions that already exist. As seen in Chapter 13, once a measure of autonomy is granted, the ball falls in IIT-Bombay’s court; the Institute should also be seen to exercise its existing autonomy to the hilt, else it’s unlikely to be taken seriously when pressing for more.

Furthermore, if IIT-Bombay seeks ever greater independence while still relying on government for the bulk of its bankrolling, it will also have to accept correspondingly greater accountability in measures of performance – something it will in turn have to demand from its staff. The Institute will need to introduce much stronger incentives for performance, and deterrents to apathy, if general levels of involvement and enthusiasm are to be raised. This way lies the hardest of questions. While incentives are relatively easy to build in, it’s unclear to many minds if the framework within which the Institute operates – that of governmental employment regulations – will permit meaningful disincentives to operate. The hindrance this imbalance poses is evident to external observers, too, such as alumnus Nandan Nilekani, who feels that the Institute can’t do for much longer without introducing a strong internal review culture linked to per-
formance metrics. Another region where the exercise of autonomy is vital is in reworking the documents that embody this asset: the IITs Act and the Statutes. Though they sometimes appear remote from the Institute’s day-to-day functioning, they can yet powerfully determine the degree to which the Institute attains its avowed goals.

Even as some of these changes are effected, the Institute will need to keep in mind that internal autonomy is every bit as important as external. It will need to be wary of the ever-alive tendency to centralize authority and decision making (we recall instances when institutional instinct hasn’t worked in its own best interests, as in 1984 when it suggested that membership to its Senate be restricted to small proportion of its professors). In a related vein, it is to be hoped that there will be ever greater transparency of functioning, leaving no decisions that affect its staff or its campus populace – ranging from policies on career advancement to those on campus development – shrouded in secrecy.

KEEPING UP THE DRIVE

If the Institute expects faculty to perform in research, faculty will reciprocally expect the Institute to provide them at least two enabling conditions: to free up more of their time by relieving them of routine administrative chores, and to rationalize a host of antiquated procedures and processes that hamper their pace of work.

The effects of the existing impediments can be disturbingly visible. ‘We are still not able to get the best from the excellent faculty we hire,’ rues Kudchadker. ‘They could be anywhere in the world, in the best institutes. They come with tremendous enthusiasm and plans but are not able to contribute in proportion to their potential. Is it that we aren’t able to create an environment that extracts the best from them on a sustained basis?’

The midstream loss of drive Kudchadker is alluding to has been obvious even to recent students, then again to those who’ve been here for just a couple of years. ‘Dedication, capability and willingness to share knowledge,’ reckons alumnus B.K. Roy, who gained his M.Tech. in 2004, ‘are of prime importance. All my teachers in IIT have these in them. What they lack is motivation. And,’ he declares confidently, ‘I know the reason for
this. Maybe my quality as a student was not encouraging for them. Maybe government policies towards research and academics have disheartened them. I got more than I expected from my teachers at IIT-Bombay. Better, motivating conditions can make them perfect.

Roy has touched a raw nerve here. While his self-deprecation speaks for both his perceptiveness and his honesty (the relative quality of its postgraduate students has always been a sore point with the Institute), it’s clear that faculty disenchantment, too, can be all too apparent to the watchful eye. And we’ve seen along these pages how ‘government policies’ can dampen and demoralize the initially buoyant spirit – not least in the matter of wages. ‘Everybody else in India makes more money,’ rails Kudchadker, his hyperbole born of an exasperation that’s felt by many others, ‘than faculty here. Even a B.Tech. makes more money than an Assistant Professor. How do you convince a potential Ph.D. student, then, that it’s worth their while doing their Ph.D. and taking up a faculty position? We badly need to increase incentives.’

An advantage the Institute enjoyed before the 1990s was the stoicism, bordering almost on saintliness, that its faculty came armoured in, helping them put up with distressing standards of campus housing and work conditions. New recruits are a lot more demanding, and unless the Institute can offer them beckoning conditions all around, it will risk erosion of its most valuable resource: competent and committed faculty.

These influences will be no less decisive in the case of non-faculty employees. A major external bottleneck the Institute faces is in the creation of posts. Support staff structures and scales are entirely government driven, leaving no room for improvisation. And internally, support staff need to see themselves as equal participants in the Institute’s academic enterprise, making important contributions to its pursuits, a sensibility which is as much in the Institute’s hands to fashion as in their own.

In sum, nothing less than a comprehensive reconditioning of work environment for all its staff will do. Ramping up the efficiency of internal functioning will also call for revision of internal governance structures. In a recent survey, most faculty felt that the present structure wasn’t scalable and that in order for the Institute to grow and flourish it would need a new, more distributed governance format. It’s an idea current Director
Misra endorses, citing his own case as an example of the need to distribute tasks: ‘Two decades back, the IITs were largely inward looking. In today’s world interactions with the outside world – universities abroad, industries in India and abroad, alumni in India and abroad, and the like – have dramatically increased. Interactions with them have become imperative for adopting their best practices and winning their goodwill. They also offer the chance to represent IIT-Bombay’s interests and to leverage new opportunities. However, the world is such that they’re all looking at the Director as the key point of contact. When it comes to captains of industry, or leaders in government or academia, nothing else will do. So the Director has to continuously “look outward”. Which also means that the “inward look” will have to be shared by others.’ Misra anticipates that as much as 40 per cent of a Director’s time in the near future might be spent transacting with the outside world, necessitating greater levels of delegation for internal governance. What’s true for the Director is true also for his Deputy; part of the solution may lie in the creation of a greater number of Deputy Directors and Deans (or equivalent positions), each of whom is better empowered, and with responsibilities for each post better defined.

Refurbished governance is also imperative, many alumni feel, for the Institute to step up its responsiveness to overtures from its well-wishers. An example often cited is the speed with which projects funded by endowments are implemented, an area in which the Institute has at times been found wanting, to the chagrin of the donors involved. Structural changes by themselves, however, may not add up to much unless processes related to academic, financial and general administration are simplified and rationalized. Many of these are an inheritance of the long decades over which the chief precepts of ‘good’ administration were tight regulatory control, suspicion and mistrust. Many decision making paths are still convoluted and, as Dr A. Mehra avers, the predominant administrative mindset is still one that points to rules saying why things can’t be done rather than to routes through which they can be imaginatively facilitated. The pressing need, again, is for attitudinal transformation.

One of the most radical shifts to come in operational philosophy may well have to do with a subtle art IIT-Bombay hasn’t yet tried its hand at. It’s something that, until recently, was considered a dirty word in academia: the art of lobbying. In the eyes of many, there’s no room for doubt
about its looming necessity. IIT-Bombay, they feel, hasn’t been ‘street smart’ all these years, paying insufficient attention to lobbying with the government. And it’s felt in general that it’s the institutes that lobby the hardest that get the money. One telltale indicator that’s adduced is that all the IITs get the same level of funding, irrespective of whether they have close to 8000 student units or nearer 5500,\(^a\) even though the Ministry has laid down norms for student-unit based funding. The inconsistency is taken as evidence of lobbying – or the want of it. IIT-Bombay, it’s now said, needs to get a bit realistic. Lobbying needs to be done, and if it involves using professional help, this should be procured.\(^b\)

Won’t machinations of this kind tend to taint academic probity? Proponents of lobbying hasten to add that there remain a triad of core values the Institute should never compromise on. The first is its commitment to meritocracy, seen as a non-negotiable core value. The second is the Institute’s commitment to excellence in whatever it does; and third is the internal value system cultivated over the years, of arriving at academic decisions through inclusive discussion and debate.

**ON THE BRIGHTER SIDE…**

This chapter may already be sounding – if unwittingly – like a catalogue of ills too numerous and deep-rooted to tackle. Given the many faceted organism IIT-Bombay has grown to be, however, there are bound to be challenges – there are those who’d call them opportunities – wherever one looks. One can take some comfort from the fact that in each of these arenas, the Institute is trying to bootstrap to meet the demands of the future. On the question of academic preparation, an institutional committee, independently arriving at the kinds of ideas outlined earlier, has recommended opening up the doors to academic exploration for undergraduates.\(^3\) A bare minimum programme has been defined that would qualify a graduate to be called an engineer in a particular discipline. Beyond this, the programme is envisaged to free up a good deal of ‘sur-

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\(^a\) The government claimed to operate a funding formula based on ‘student units’ – calculated on weights given to B.Tech.s, M.Tech.s, and Ph.Ds.

\(^b\) Professional help of this kind has indeed been engaged by the Institute in recent months, in the capacity of a consultant.
plus time’ to satisfy the widely varying abilities and aspirations of students. If these ideas are implemented, tomorrow’s undergraduates should have the freedom to customize the surplus time to their tastes. The report recommends, for example, that ‘they may devote it entirely for extracurricular activities if they so desire and gain hands-on administrative, managerial or aesthetic skills. They can alternatively use it to credit an assortment of courses or projects to gain wide exposure.’

In the sphere of research, a ‘research ethos’ is slowly but surely creeping into the psyche of the Institute and its staff. Faculty are ever more conscious of the importance of doing publishable, high-end R&D, of the part it plays in invigorating their teaching, and of the opportunities it brings. The Institute for its part is trying to make up the shortfalls identified by Khilar, by attempting research intensification through a number of avenues, including orientation sessions, a range of incentives, and wide publicity for R&D achievements.

In matters of governance, the Institute is now sensitive to the perception among faculty that they participate excessively in administration, even in areas where professional expertise is readily available. It is also receptive to the idea of engaging professional administrators ‘wherever the matter is not directly related to academics and needs specialized skills’. Work and living conditions are also being addressed continuously, and thought given to ushering in notions of accountability in performance. Finally, a model for distributed governance is being contemplated.

Surely the knottiest question – and one that only time will answer – is whether these steps will equip the Institute for tomorrow, giving it the competitive edge it needs against others of its fraternity around the world, some of whom are moving ahead at breakneck speed. Alumnus Victor Menezes raises the concern that unless the changes are swift and comprehensive (there is no question, he feels, that the potential to excel exists), the gap between IIT-Bombay and today’s academic leading edge may only widen.

**DOING THE RIGHT THINGS**

The previous chapter traced how, in the currency of the way the world sees it, IIT-Bombay has come a long way in its first 50 years. No longer does
it carry the air of a faint flicker on the academic horizon; rather, grouped with the other IITs, it glints in the public consciousness as an outstanding exponent of engineering education on the Indian scene, remarkably uncorrupted by fraudulence or nepotism. But the glare of the spotlight can have its distorting and blinding effects, which the Institute would do well to shield itself against. ‘All of us would like to believe,’ says Hariharan, ‘that IIT-Bombay is among the world’s very best. But the media tend to hype things too much these days; one has to be a little cautious, and not get carried away.’

These are facets of its image that are foisted on the Institute almost without its having a choice in the matter; but there are zones where the Institute can play its own hand. One such is the intriguing question of whether a distinct ‘IIT-Bombay brand’ can precipitate out from the enveloping pan-IIT identity. Misra contends that IIT-Bombay need not be self-conscious about this, or contrive for it to happen. ‘Our core philosophy,’ he feels, ‘should be to do the right things and let those speak for themselves, let them construct the IIT-Bombay brand for the Institute. The right things being research, innovative education, and entrepreneurship, of such quality that people begin to take notice. And to acknowledge that the Institute is a leader in these. If this happens, the word spreads, and creates the brand.’ Alumnus Kanwal Rekhi agrees entirely, but qualifies, ‘The main thing to watch out for is not to dilute quality, no matter what. One needn’t have the establishment of an ‘IIT-Bombay brand’ as a conscious goal in mind, but if quality in teaching and research is sustained, faculty and alumni will make a mark and branding will take care of itself.’

In some respects, however, former PRO Aruna Thosar-Dixit maintains, IIT-Bombay should be assiduous in synthesizing a certain image for itself. ‘The Institute should use every occasion possible,’ she says, ‘to project itself as an institution of technological excellence contributing to the country in various ways. Its role in the national context is all-important. But for this it needs to be armed with data about its contributions.’

Signs of recognition accruing from ‘doing the right thing’ may already be in evidence. Dr P. Banerji, current Dean of Alumni and International Relations, tells of how IIT-Bombay has found a place in a recently constituted ‘Asia-Oceania top universities league in engineering.’ The Institute is
keeping the best company here, rubbing shoulders with the likes of Tokyo Tech, Monash, the Korean Advanced Institute of Science and Technology (KAIST), and Nanyang Technical University: the ‘creamy layer of Asia’ in science and technology. Misra adds that there is considerable movement in the Asia-Pacific region for cooperation, and when someone from India is to be invited, IIT-Bombay tends to crop up in organizers’ minds almost reflexively. There’s still some distance to go before the Institute springs as naturally to the minds of European and North American universities, Banerji admits, and that is the longer term target the Institute can set its sights on.

Thus far, the student body at the Institute has been monochromatic in more ways than one. There has always been the preponderance of males; but also, although the Institute has always had a vigorously cosmopolitan air, it has been preponderantly Indian. Sukhatme feels in this respect that as the Institute grows it needs to develop a healthier international character, such that ‘international students feel that IIT-Bombay is a place to go to for a learning experience, just as many of us as students went overseas for a learning experience. And I think it’s possible for IIT-Bombay to offer this. To start with, it could be larger numbers of students from countries around us – our traditional catchments, Bangladesh, Sri Lanka, Nepal, and hopefully soon, Pakistan. Next, we could hope for students from south-east Asia – Malaysia or Singapore. Ultimately I don’t see why we can’t also attract a few students from Europe and the US.’

**Balancing Act**

And lastly to the physical setting in which the rearrangements just outlined will take place. Like your favourite music playing in the backdrop while you plug away at your work, the campus has offered a perfect foil, by way of the contemplation of nature and its prodigious artistry, to the pursuit of science and technology. Many residents of the campus, particularly the older lot, seem to have been effortlessly at ease with their fairly undomesticated habitat, unfazed by the prospect of chancing upon a slinking panther or a coiled viper. Its more recent arrivals, however, appear less partial to the idea of close encounters of the potentially unsafe kind. This
is one factor that will play its own part in deciding the way the campus is apprelled in future; already it wears a look greatly more manicured and predictable than some 20 years ago.

And with a leap in campus student population of more than 50 per cent slated to happen soon, the Institute will have to take a call between two foreseeable options in its mode of expansion. One will be to somehow squeeze the additional buildings and infrastructure required – and this requirement will not be slight – into the currently operational part of the campus, its already boxed-in southern lobe. The sharp rise in traffic and bustle so caused will probably bring the curtain down on its once uncluttered layout and gracious, retiring air. If, however, something of these qualities are to be preserved, the second option will have to be exercised: which is for the Institute to work its way to the far side of the pipeline. There it will have to do what’s needed to reclaim the outlying reaches of the campus and fuse them with its southern body. Either way, the prospects are challenging, some would say daunting. There is finally the question of preservation. If expansion bites continually into the shrubland and wooded pockets that remain, biodiversity on campus may be dealt an irrevocable blow. IIT-Bombay is renowned as much for the natural splendours of its campus as for its technical expertise; and one part of public opinion will want to see what balance it strikes, how it preserves its natural spaces and its rich stock of flora and fauna while still pressing ahead in the world of science and technology.

And now for another spin in our time capsule. This chapter began with a sketch of the Institute as it might look in another 25 years; that portrayal was based on only the milder of the projections we’ve encountered. Stitch together some of the more radical pieces of the tapestry, however, pan over to year 2033, and consider the picture that might form. You drive over to IIT-Bombay for its Platinum Jubilee celebrations. Turning in from the 10-lane expressway outside, you enter a campus that looks like a leafy version of today’s Hiranandani Gardens, a rash of high-rises towering above the trees, each housing several academic or residential units. Renamed the Indian University of Technology, the new institution sports centres of linguistics and music side by side with those of femtotechnology. In the departments, there are barely any classrooms; they’re almost all labo-
ratories, each buzzing with large research teams. On the University’s rolls
are some 1000 faculty and 8000 Ph.D. students and post-doctoral fellows
(with perhaps a sprinkling of Master’s students). The average ‘student’ age
is 28; there isn’t a single 17-22 year-old undergraduate spiking the campus’s
air with youthful *joie-de-vivre*.

Unthinkable? And yet what history recalls for us is that the unthink-
able of today is often the passé of tomorrow.

**UNAFRAID TO DREAM**

In the course of tracking the Institute’s journey so far, I asked a number
of people where they thought IIT-Bombay was positioned in its growth
curve today. Fifty years is not a great age for an institution; but then, these
are days of accelerated growth as much for institutions as for people. Did
they feel, I wondered, if the Institute was still in its childhood; or if it had
attained youth; or was it already mature and settled? Almost to a person,
the vote was for ‘youth’; with the added remark that, as is true of young
blood of any kind, the Institute is probably poised at the steepest phase of
its growth just now, marked by restlessness and a host of inner churnings
– and no less by bright hopes for its future. This seems to be especially so
when set against the bleak times IIT-Bombay went through in the 1970s
and 80s; today, by comparison, there is much to cheer about. Cradled
between the lakes and hills of Powai, 1959’s yearling Institute had had a
hopeful infancy, followed by a troubled childhood. But now, in its adoles-
cence, the fates seem to be smiling on it again, and it isn’t afraid to think
that if all goes well – if it’s given a free hand in charting its course, if it’s
alert to the hazards that lie in the way – it might be able, as Nehru himself
might have put it, to grasp its dreams.
APPENDIX 1

NOTES AND REFERENCES

1. A BELATED BAPTISM

3. Data culled from respective IIT Bombay Annual Reports.

2. BORN IN THE REPUBLIC OF URUGUAY

1. Based on data collected by the Information Management Cell, IIT Bombay, in December 2007. The number of ‘hits’ numbered around 40,000 over a week, averaging a little under 6,000 a day. Of these, reckons Dr S. Roy, who oversees the IMC, ‘going by experience, the significant majority would be external visitors.’
2. http://www.iitb.ac.in/about/how.html
5. Ibid.
11. Ibid.
15. S.K. Bose, op. cit., pp. 11-12.
3. **BLUEPRINTING THE IITs: THE SARKAR COMMITTEE REPORT**


6. Ibid.


8. www.aicte.ernet.in/AboutAICTE.htm


4. **MAKESHIFT DAYS**

1. S.K. Bose, op. cit., p.15.

2. IIT Bombay Annual Report, 1958-9: Minutes of the 7th meeting of the Board of Governors (BoG), 14 Oct 1959, Item No 2; also Minutes of the 2nd meeting of the BoG, 25 July 1958, Item No. 9, R 36/58.


4. Ibid., p. 9.

5. Ibid.


9. Ibid., Item No. 8 (R.9/58).


12. Minutes of the 6th meeting of the BoG, 8 July 1959, Item No. 7.


15. Letters sent from IIT Bombay July 1958 onwards, DRR.


17. Ibid., Item No. 10.

18. Ibid.
22. Minutes of the 6th meeting of the BoG, 8 July 1959, Item No. 2 (Confirmation of Staff Members).
26. Ibid., p. 15
29. R.A Allen, op. cit., p. 615-634.
32. S.P. Sukhatme, op. cit.
34. There were seven other members in the Syllabus Committee, Shri A K De, Shri R S Ayyar, Dr R K Katti, Dr JT Panikar, Dr G K Bhagwat, Dr G S Tendolkar and Shri S M Machiraju. Ibid., Appendix V.

5. WITH FRIENDS LIKE THESE...
1. Based on the recollections of Drs M.V. Harihan and A.K. De.
2. As termed by Pandit Nehru in his Foundation Day speech.
4. S.P. Sukhatme, op. cit.
7. D.O. from CPWD-Delhi No. 04/458/G-II dated December 11, 1958, from J.M. Benjamin addressed to I.D. Mathur.
10. Ibid.
11. Minutes of the 6th meeting of the BoG, 8 July 1959, Item No. 3 (Building Construction At Powai), R32/59.
13. Ibid., pp. 33-4.
14. Minutes of the 5th meeting of the BoG, 11-3-1959, Item no 13, DRR, IIT Bombay
17. Ibid., p. 43.
21. Ibid., p. 47
22. S.P. Sukhatme, op. cit.
6. THE BEJEWELLED SETTING

10. Minutes of the 74th meeting of the BoG, 3 May 1978, Item No. 19, R.92/78. To begin with, SAMEER was called the Special Products Microwave Unit, or SMPU.
11. Some of these details are hosted at the website of the Maharashtra State Angling Association: members.tripod.com/MSAAPowai/index.htm
14. Ibid., p. 49.


1. IITs Act, Section 6(1)(b); IIT Bombay Annual Report, 1961-2, p.i.
2. Ibid., p.i-ii.
4. IITs Act, Section 38(b).
5. IITs Act, Sections 13-15.
10. Ibid., pp. 11-12.
19. S.K. Bose, IIT Bombay: The Early Years, op. cit., p. 52

2. Ibid., p. 10.
3. Ibid., p. 11.
4. Ibid., p. 17. It was here that perhaps the only attempt to lengthen the working week at IIT Bombay into a six-day week failed, ‘when a suggestion was made to the students about a six-day week of instruction with reduced working hours per day, they expressed themselves emphatically against it.’
5. Ibid., p. 18.
9. Ibid.
10. ‘Rules and regulations for the degree of B.Tech. (5-year course)’, Minutes of the 22nd meeting of the Senate, IIT Bombay, 1967, Appendix XII.
12. Ibid.
15. Minutes of the 51st meeting of the BoG, 27 July 1972, Item No. 31 (To review the question of Deputy Director’s (Supplementary) work and consider the appointments of two Deans: i) Dean of Academic Programmes, and ii) Dean of Research).
16. Ibid.
17. Ibid.
20. Data from the office of the Dean (R&D); also IIT Bombay Annual Report, 1973-4.
28. Approvals of IIT Bombay’s Senate for these programmes were recorded in the minutes of the following meetings: 59th (19 Mar 1977, Items 3 & 4); 74th (16 Mar 1981, Item 3); 77th (22 Jan 1982, Item 9); 87th (3 Feb 1984, Item 11).
30. This was approved ‘after considerable discussion’ to start in 1981-82. Minutes of the 74th meeting of the Senate, IIT Bombay, 16 Mar 1981, Item No. 7.
36. Ibid.
38. Ibid.
42. Data from the office of the Dean of R&D, IIT Bombay.


1. Data from IIT Bombay Annual Reports for the period indicated.
8. ‘On funding of IITs’ (Internal Evaluation), IIT Bombay DRR. Despite its title, the document focuses on the financial scenario for IIT Bombay.
9. Office of Dean Planning, Points for Discussion with the IITs Reviewing Committee on 6th July, 1984 at IIT Bombay. These were part of the notes submitted to the Reviewing Committee, 6th-7th July 1984, p. 40.
10. Minutes of the meetings of the IIT Bombay Finance Committee, 17 Nov 1984 (Item No. 4) and 15 Oct 1985 (Item No. 4), DRR, IIT Bombay.
11. The Chairman of the Board of Governors D.V. Kapur also concurred with these remarks and desired that this matter be taken up by all the Institutes with the IIT Council at its next meeting. Minutes of the Meeting of the Finance Committee off IITB held on 17th Nov 1984, p. 6.
15. Ibid.
16. Ibid.
18. Nayudamma did not live to see the publication of the report. He was killed in the Kanishka air explosion in 1985.
24. B. Bhaskaran, ‘How relevant are the IITs?’ Business India, Sep 29–Oct 2 1988, p. 5
25. S. Minwalla, op. cit.
29. 7th Five Year Plan, Section: Education, Culture And Sports, Item 17.52. http://planningcommission.nic.in/plans/planel/fiveyr/7th/vol2/7v2ch10.html
32. Personal Communication, Dr B.P. Singh, Department of Physics, IIT Bombay.
37. The Centre was proposed by faculty in the department of Chemistry: Minutes of the 97th meeting of the Senate, IIT Bombay, 28 Jan 1987, Item A2.

14. Ibid.
28. Director’s Address, 33rd Convocation, IIT Bombay; with inputs from Dr S.P. Sukhatme.
33. See for examples, Chapter 18.
34. The document was presented to the Senate (and met with its approval) at its 154th meeting on 21 Feb 2001 (Minutes of the meeting, Item A5).
36. Data from Accounts Office and Annual Reports, IIT Bombay.
38. Information from the office of the Dean (R&D), IIT Bombay.
39. Minutes of the 153rd meeting of the Senate, 17 Nov 2000, Item B.6. The Senate agreed, ‘after protracted discussion’, to a ‘positive need’ to have a separate School for biorelated activities.’
40. Report of the Committee to Review Activities of Non-Teaching Centres and Interdisciplinary Programmes, Annexure to the minutes of the 161st (special) meeting of the Senate, 18 Sep 2002, held to deliberate the Report.
41. Minutes of the 181st meeting of the Senate, 8 Nov 2006, Item A.1.4.
42. Minutes of the 178th meeting of the Senate, 1 Mar 2006, and of the 182nd meeting, 15 Feb 2007, Item A.1.b(iii).
43. Minutes of the 173rd meeting of the Senate, 23 May 2005, Item A.1.8.
44. ‘Business Incubation at IIT Bombay’: see http://www.sineiitb.org/bi_iitb.html
45. Data from Academic Office, IIT Bombay.
47. Ibid.

II. ENGINEERING THE ENGINEER

13. Status Paper from IITB as Reply To questionnaire from Shri. S. Vedantam, Letter No F.5-10/84-Tg 1984. Data extracted from answer provided to Q.2 ‘On the Nature and Mix of the academic programmes to be offered in the IIT’s’ p. 2.

NOTES AND REFERENCES 525
16. Ibid., p. 40.

II. BEYOND THE CLASSROOM

3. Ibid., p. 62.
7. IIT Bombay, Status Papers submitted to the 1972 Review Committee, DRR.
8. Ibid.
10. A bachelor’s degree was seen as sufficient preparation for employment in the engineering sector; in consequence, of the technical staff employed in public sector R&D organizations countrywide in the early 1980s, only 2% held Ph.D.s, and only 12% M.Tech.s or equivalent. In the private sector these proportions were lower still: 1% and 9% respectively. Ministry of Human Resource Development, GOI, Report of the IIT Review Committee, 1986, Chapter 4, Academia, p. 24.
13. Ibid., p. 23.
14. IIT Bombay Status Paper, 1984, op. cit. This was in answer to Q. 6, ‘On the nature of research to be conducted at IITs’, p. 26.
19. As recalled by Dr S.P. Sukhatme.
21. These were summarized in Chapter 10.
13. THE BOUNDARIES OF ACADEMIC FREEDOM

4. Ibid.
6. This was the response of Dr S.P. Sukhatme.
12. N. Lakshman, op. cit.
14. Ibid., p. 86.

14. KINDLERS OF THE FLAME...

7. See P.K. Kelkar, Address to the Convocation of IIT-Kanpur, 1981.

15. ...AND ITS TORCHBEARERS
4. This was carried in Technik, 26 Sept. 1973, p. 10.
5. The interested reader may follow this up at www.alumni.iitb.ac.in/lenahoga.htm.
8. Dictionary compiled by Uday Mahajan. It can be found at http://members.tripod.com/
   uday-m/slang.html
10. K.T. Chandy, Report of the Chandy Committee on the Admission of Scheduled Castes and
   Scheduled Tribes in IITs (Summary), IIT Council, New Delhi, 1973.
11. See, for example, http://youthcurry.blogspot.com/2006/05/manmohan-sirs-iit-entrance-
   classes.html.
13. Minutes of the 62nd meeting of the Senate, IIT Bombay, 19 Jan 1978, Item No. 11:
   ‘Minutes of meeting convened by the Education Minister on 14-7-1977 to discuss
   admission of SC/ST students.’
14. Report of the Committee to Consider the Problems of Scheduled Caste and Scheduled
15. P. Trivedi, Interim Report on Improving the Efficacy of Reservation System in IIT Bombay,
   2005.
22. Report of the B. Tech./ Dual Degree Curriculum Review and Revision Committee, 2007,
   IIT Bombay.
23. Ibid.
24. Ibid.

16. LIFE ON THE CAMPUS
1. V. Punekar, Life on Campus, 1992, Chapter 1, IIT Bombay.
2. Ibid.
3. These details are from V. Punekar, op. cit.
5. V. Punekar, Chapter 1, op. cit.
6. Govandi is a suburb some 10 km to the south and east of Powai.
8. As above.
   Bombay, p. 13.
10. V. Punekar, op. cit.

17. THE INSTITUTIONS WITHIN
10. Ibid., p. 4.
13. Ibid.
17. AMD is one of the global leaders in chip manufacture.

18. LENSES AND MIRRORS
6. ‘Perspectives of the IITs for the remaining part of this century’, Prize Winning Essays, DRR, IIT Bombay.
11. It’s to be noted that this wasn’t exactly what was said in the show; the significant thing is the impression created.

19. IN TIME TO COME
A CONCISE IIT-BOMBAY SLANG DICTIONARY

Abridged from ‘dictionary’ compiled by Uday Mahajan. See http://members.tripod.com/uday-m/slang.html

Bong: Someone from the state of West Bengal.

Chinko/Chinks: The Chinese joint located initially outside H-8, then moved to the NCC building. Famous for serving the exact same preparation under at least 5-6 different names.

chamkaa: The literal meaning of this word is ‘lit up’ or ‘glowed’, but in the IITian context, it is used to indicate an understanding of something that has been just explained/said/described to you. This use probably arose from the popular cartoon image of a bulb lighting up in a person’s head when he/she got an idea.

c belt: An abbreviation of clearing tensions: which is what one has when one is close to flunking a course.

crack: A short version of the word ‘cacophony’, it signifies the act of verbal communication, viz. talking. To crack is to talk (academic discussions do not qualify). eg. A group of people talking is having a ‘cack session’.

despo: A corruption of the word desperate, eg. that guy is despo for a schol.

dnot: (An abbreviation of ‘Dhandha-not’) A dnot is someone who has absolutely nothing to do in life or has absolutely no enthusiasm for doing what he is supposed to be doing. The act of being a dnot is known as ‘dnotgiri’.

dayaa: A Hindi word meaning ‘pity’, it is used in a similar sense, when people beg someone to stop what he is doing by telling him ‘Dayaa boss (have pity on us)’. It’s also used as an adjective (for describing something/someone that is avoidable) e.g. ‘That’s a dayaa Prof.’

crib: To crib is to raise objection(s) to something. In IIT cribbing is carried to great lengths by certain people, who are given the title of ‘criboos’ in recognition of their achievements in this field.

fight: To fight over something means giving it your best shot. It’s also used for encouraging people when they are under stress and have to do something very challenging and do it in a very short time.

fundoo: Anything good/enjoyable is ‘fundoo’. You can have a fundoo meal, watch a fundoo movie, meet a fundoo girl (not very likely inside the campus, and almost equally improbable outside it, due to the ‘not very hep’ reputation of IITians). One of those multipurpose words which creep into almost every sentence of the average IITian.

funda/fundae: These words are just abbreviations of the word ‘fundamental(s)’. The funda of something means the basic principle behind it. Fundae are just a collection of several ‘fundas’ and the person with the best fundaes is called the ‘funda man’.

general: Something or someone that’s vague or mediocre. e.g. Hostels 1-8 are pretty general hostels.

ghoch: A foul-up of any kind is called a ghoch. It can also mean a defect or flaw of some sort. e.g. A ghoch in someone’s reasoning.
**ghodagiri**: Ironically, this word means ‘donkey work’, whereas ‘ghoda’ means ‘horse’ in Hindi. *Ghodagiri* refers to any kind of work that’s very menial and/or involves very little brainwork (just pure effort). Those who do this thankless work are referred to as ‘ghodas’.

**hadaaaaaa...**: It’s closest English equivalent is the phrase ‘No Way!!’. However, nothing beats the distinct disbelief and contempt expressed by a loud ‘hadaaaaa’, where the last ‘aaaa...’ can be as long as one wants it to be.

**Hawa**: Hindi word meaning ‘Air’, it is something which every freshie is supposed to know, ‘hawa’ being an acronym for AIR (his All India Rank in the Joint Entrance Examination (JEE)).

**Hazaar/Hajaar**: It’s literal meaning being 1000 (one thousand), this word is used to denote ‘a lot of’ something. e.g. hazaar crowded, or hazaar tough.

**keeda**: Playing tricks on people and/or disrupting something is called doing keeda or ‘keedagiri’. The word means ‘insect’ in Hindi and probably started being used in it’s present context by the irritation caused by some of those pesky arthropods. This word symbolizes, better than anything else the image of H-9 in IITB.

**khaach**: To khaach something is to cancel/remove/destroy it; e.g. The concert got khaached because nobody turned up.

**lukkha**: Another term for a Dnot, i.e. a person who is a total slacker

**nabard/nbd**: This word’s origins lie in ‘nervous breakdown’. To take nbd over something is to get all worked up and worried about it. ‘Nabds’ are people who are always in this state.

**night out**: As the name implies, a night-out is the act of staying awake the whole night, sometimes due to a cack session, sometimes due to a combination of cack and intoxicants, and sometimes due to exam nbds.

**ok types**: Anything that is good or went off well. Basically this word can be used almost any place where a positive feeling/result is involved.

**pondy**: An ‘educational’ movie, in which all the facts of life are laid bare.

**pseud**: A derogatory term for anybody or anything that’s very heavily westernised or has pretensions to be very sophisticated.

**rg/rg-giri**: Derived from the word ‘Relative Grading’ (supposedly), this term defines the act of doing something for one’s benefit at the expense of someone else. A good example is submitting an assignment/homework to the Professor before everyone else, and that too without informing them.

**saax**: Saax, as the very sound of it suggests, is a positive exaggeration(!) and of anything that needs to be exaggerated, in the existing context of things. You can have a saax babe or saax course or even saax grub.

**Schol**: What almost every IITian used to live for, and something which is still in heavy demand, a schol is essentially a composite offer of Admission and Financial Aid from a US University. For many IITians, it is the culmination of their stay in IIT.

**scope/scope kyaa**: A word/phrase used to characterize something as being impossible or beyond the capacities of the person talking about doing it. A very commonly used word in IIT.

**sidey**: A word which can mean ‘fart’ or ‘shady’ (another one of those flexible context-dependent words).

**stud**: Someone who is extremely good at his/her field. Yes, even females are called studs in IIT.

**tension**: Tension is an inevitable part of life in IIT, with people ‘taking tensions’ over several things and people (esp. Profs) ‘giving tensions’ for several things too. ‘Tense’ is also used to refer to anything that is challenging or difficult. e.g. ‘A tense problem’. 
A PARTIAL CHECK-LIST OF THE FLORA AND FAUNA OF IIT-BOMBAY

The species listed here are largely to be found on the IIT-Bombay campus because of its proximity, and direct links to, the forests of the Borivli National Park to the north and the lakes to the south and west. Equally important is the fact that the campus boasts an impressive variety of ecosystems because of its geographical setting, and that generous areas are still left ‘wild’ for these life-forms to flourish in. Depletion of these as yet untouched tracts may eventually threaten the excellent biodiversity hosted here. The lists are based on the author’s observations.

**TREES**

<table>
<thead>
<tr>
<th>Aapta</th>
<th>Java cassia</th>
</tr>
</thead>
<tbody>
<tr>
<td>Amaltas</td>
<td>Kanchan</td>
</tr>
<tr>
<td>Areca palm [Supan]</td>
<td>Karnikar</td>
</tr>
<tr>
<td>Ashok [Mast tree]</td>
<td>Kate-asan</td>
</tr>
<tr>
<td>Australian acacia</td>
<td>Kumbhi</td>
</tr>
<tr>
<td>Bael</td>
<td>Mungo</td>
</tr>
<tr>
<td>Bamboo</td>
<td>Manila tamarind</td>
</tr>
<tr>
<td>Banyan</td>
<td>Mauve tabebuia</td>
</tr>
<tr>
<td>Ber</td>
<td>Morinda</td>
</tr>
<tr>
<td>Bhendi [Umbrella tree]</td>
<td>Neem</td>
</tr>
<tr>
<td>Bottle palm [Kailashpati]</td>
<td>Palash/Dhak/Tesu</td>
</tr>
<tr>
<td>Cannon ball</td>
<td>Persian lilac</td>
</tr>
<tr>
<td>Cashew</td>
<td>Pipal</td>
</tr>
<tr>
<td>Casuarina</td>
<td>Pink cassia</td>
</tr>
<tr>
<td>[Beefwood]</td>
<td>Pipal</td>
</tr>
<tr>
<td>Champa [Frangipani]</td>
<td>Pongam [Karanj]</td>
</tr>
<tr>
<td>Coconut palm</td>
<td>Queen’s flower</td>
</tr>
<tr>
<td>Copper pod</td>
<td>Rain tree</td>
</tr>
<tr>
<td>Coral Wood</td>
<td>Red silk-cotton</td>
</tr>
<tr>
<td>Desi almond</td>
<td>Sacred barna</td>
</tr>
<tr>
<td>Dhaman</td>
<td>Sausage tree</td>
</tr>
<tr>
<td>Drumstick</td>
<td>Scarlet cordia</td>
</tr>
<tr>
<td>Eucalyptus</td>
<td>Shirish</td>
</tr>
<tr>
<td>False kadamba</td>
<td>Sita-ashok</td>
</tr>
<tr>
<td>Fan palm</td>
<td>Son champa</td>
</tr>
<tr>
<td>Fish tail palm</td>
<td>Spotted gliricidia</td>
</tr>
<tr>
<td>Fountain tree</td>
<td>Subabul</td>
</tr>
<tr>
<td>Gulmohar</td>
<td>Tamarind</td>
</tr>
<tr>
<td>Haldu</td>
<td>Teak</td>
</tr>
<tr>
<td>Horse tail palm</td>
<td>True kadamba</td>
</tr>
<tr>
<td>Indian coral</td>
<td>Umber</td>
</tr>
</tbody>
</table>
| Indian cork tree [Akash neem] | Wild almond | Wild moong
| Jackfruit                 | Yellow cassia |
| Jamun                     | Yellow silk-cotton |

**WILD FLOWERS**

<table>
<thead>
<tr>
<th>American mint</th>
<th>Angled sida</th>
<th>Balsam</th>
<th>Bearded commelina</th>
<th>Bristle gourd</th>
<th>Burbush butterfly bean</th>
</tr>
</thead>
<tbody>
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</tbody>
</table>

**Confined to one or two isolated patches on campus:**

<table>
<thead>
<tr>
<th>American mint</th>
<th>Angled sida</th>
<th>Balsam</th>
<th>Bearded commelina</th>
<th>Bristle gourd</th>
<th>Burbush butterfly bean</th>
</tr>
</thead>
<tbody>
<tr>
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</tbody>
</table>

<table>
<thead>
<tr>
<th>Wild moong</th>
<th>Yellow spider flower</th>
</tr>
</thead>
</table>

Glory lily

Hill turmeric

Pink-striped trumpet lily

Purple feather bush

Sensitive smithia

Tiger’s-paw glory
### Birds

Species on campus: ~150. Some of these are spectacularly beautiful and fairly uncommon, such as the paradise flycatcher, golden and black-headed orioles, and some of the herons. Common species such as sparrow, house crow, and pigeon not listed here.

<table>
<thead>
<tr>
<th>BIRDS</th>
<th>MAMMALS</th>
<th>REPTILES</th>
</tr>
</thead>
<tbody>
<tr>
<td>Babbler, Jungle</td>
<td>Civet</td>
<td>Blind snake</td>
</tr>
<tr>
<td>Barbet, small (Coppersmith)</td>
<td>Jackal</td>
<td>Cobra, monocled</td>
</tr>
<tr>
<td>Bea-eater, Green</td>
<td>Flying fox</td>
<td>Cobra, spectacled</td>
</tr>
<tr>
<td>Bulbul, Black-headed</td>
<td>Mongoose</td>
<td>Dhaman (rat snake)</td>
</tr>
<tr>
<td>Bulbul, Red-cheeked</td>
<td>Indian fox</td>
<td>Green vine snake</td>
</tr>
<tr>
<td>Bush chat</td>
<td>Panther</td>
<td>Indian rock python</td>
</tr>
<tr>
<td>Cormorant, Little</td>
<td>Indian pipistrelle</td>
<td>Keelback, chequered</td>
</tr>
<tr>
<td>Cormorant, Large</td>
<td></td>
<td>Trinket snake</td>
</tr>
<tr>
<td>Crow-pheasant (coulcal)</td>
<td></td>
<td>Viper, Russell’s</td>
</tr>
<tr>
<td>Crow, Jungle</td>
<td></td>
<td>Viper, Saw-scaled</td>
</tr>
<tr>
<td>Dove, Spotted</td>
<td>Kite, Pariah</td>
<td></td>
</tr>
<tr>
<td>Drongo, Black</td>
<td>Kite, Pariah</td>
<td></td>
</tr>
<tr>
<td>Eagle, Fishing</td>
<td>Koel</td>
<td></td>
</tr>
<tr>
<td>Egret, Cattle</td>
<td>Lapwing, Redwattled</td>
<td></td>
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<tr>
<td>Flycatcher, Paradise</td>
<td>Magpie Robin</td>
<td></td>
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<tr>
<td>Flycatcher, White-</td>
<td>Mallard</td>
<td></td>
</tr>
<tr>
<td>spotted fantail</td>
<td>Moorhen, Purple</td>
<td></td>
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<tr>
<td>Heron, Grey</td>
<td>Munia, Redspotted</td>
<td></td>
</tr>
<tr>
<td>Heron, Pond</td>
<td>Oriole, Blackheaded</td>
<td></td>
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<tr>
<td>Heron, Purple</td>
<td>Oriole, Golden</td>
<td></td>
</tr>
<tr>
<td>Hoopoe</td>
<td>Owl, Barn</td>
<td></td>
</tr>
<tr>
<td>Hornbill, Malabar grey</td>
<td>Owlet, Spotted</td>
<td></td>
</tr>
<tr>
<td>Ibis</td>
<td>Parakeet</td>
<td></td>
</tr>
<tr>
<td>Iora, Common</td>
<td>Peafowl</td>
<td></td>
</tr>
<tr>
<td>Jacana, Bronzewinged</td>
<td>Shikra</td>
<td></td>
</tr>
<tr>
<td>Kingfisher, small</td>
<td>Ruffous-backed</td>
<td></td>
</tr>
<tr>
<td>Kingfisher,</td>
<td>Snake bird (darter)</td>
<td></td>
</tr>
<tr>
<td>White-breasted</td>
<td>Spoonbill</td>
<td></td>
</tr>
<tr>
<td>Kite, Brahminy</td>
<td>Stork, White</td>
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<tr>
<td></td>
<td>Sunbird, Purple</td>
<td></td>
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<tr>
<td></td>
<td>Sunbird,</td>
<td></td>
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<tr>
<td></td>
<td>Yellow-rumped</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Swift, Palm</td>
<td></td>
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<tr>
<td></td>
<td>Spotted owlet</td>
<td></td>
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<tr>
<td></td>
<td>Thrush, Ground</td>
<td></td>
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<tr>
<td></td>
<td>Wagtail, Grey</td>
<td></td>
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<tr>
<td></td>
<td>Wagtail, Yellow</td>
<td></td>
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<tr>
<td></td>
<td>Water-hen,</td>
<td></td>
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<tr>
<td></td>
<td>White-breasted</td>
<td></td>
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<tr>
<td></td>
<td>Weaver bird, Indian</td>
<td></td>
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<tr>
<td></td>
<td>(Baya)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>Woodpecker, Rufous</td>
<td></td>
</tr>
</tbody>
</table>
### 50 Years of IIT-Bombay: Timeline of Events

<table>
<thead>
<tr>
<th>Year</th>
<th>Event</th>
</tr>
</thead>
<tbody>
<tr>
<td>1946</td>
<td>Interim report of the Sarkar Committee submitted, recommending establishment of four ‘Higher Technological Institutes’.</td>
</tr>
<tr>
<td>December 1955</td>
<td>UNESCO’s Technical Assistance Programme (TAP) agrees to support the ‘Western Higher Technological Institute’ (WHTI, later IIT-Bombay) project with the help of the USSR.</td>
</tr>
<tr>
<td>1956</td>
<td>First phase of the UNESCO-USSR aid programme commenced.</td>
</tr>
<tr>
<td>1956</td>
<td>Dr P.K. Kelkar appointed Planning Officer for IIT-Bombay.</td>
</tr>
<tr>
<td>Dec 24 1956</td>
<td>First batch of Soviet experts arrive in Bombay.</td>
</tr>
<tr>
<td>1957</td>
<td>IIT-Bombay’s operations start at Victoria Jubilee Technical Institute (VJTI), Matunga, under the aegis of a Registered Society.</td>
</tr>
<tr>
<td>16 April 1958</td>
<td>First meeting of IIT-Bombay’s Board of Governors.</td>
</tr>
<tr>
<td>Mid-1958</td>
<td>IIT-Bombay moves to SASMIRA, Worli.</td>
</tr>
<tr>
<td>25 July 1958</td>
<td>First Batch of 100 undergraduate students for the 4-year B.Tech. programme admitted.</td>
</tr>
<tr>
<td>1956</td>
<td>Academic operations started at SASMIRA with 5 Engineering Departments (Chemical, Electrical, Mechanical, Metallurgical, Civil Engineering).</td>
</tr>
<tr>
<td>1958</td>
<td>IIT Bombay formally inaugurated by Humayun Kabir.</td>
</tr>
<tr>
<td>December 1958</td>
<td>Bilateral Agreement for assistance to IIT-Bombay signed between governments of USSR and India.</td>
</tr>
<tr>
<td>1958</td>
<td>IIT-Bombay’s postgraduate programme started with the 1-1/2 year M.Tech., in 2 specializations.</td>
</tr>
<tr>
<td>January 1959</td>
<td>Brig. S.K. Bose, IIT-Bombay’s first Director, appointed.</td>
</tr>
<tr>
<td>March 10 1959</td>
<td>Foundation Day: foundation stone laid by Pandit Nehru.</td>
</tr>
<tr>
<td>April 1960</td>
<td>IIT-Bombay’s move to Powai campus completed</td>
</tr>
<tr>
<td>July 1960</td>
<td>Commencement of 5-year integrated B.Tech. programme</td>
</tr>
<tr>
<td>1961</td>
<td>Decision to hand over part of campus land to NITIE.</td>
</tr>
<tr>
<td>1961-62</td>
<td>IITs Act enacted, IITs awarded status of autonomous “Institutes of National Importance”.</td>
</tr>
<tr>
<td>1961-62</td>
<td>Common Entrance Examination (later the JEE) initiated.</td>
</tr>
<tr>
<td>1962</td>
<td>M.Tech. duration augmented to 2 years</td>
</tr>
<tr>
<td>1962</td>
<td>Ph.D. programme initiated.</td>
</tr>
<tr>
<td>1962</td>
<td>IIT-Bombay Alumni Association formed.</td>
</tr>
<tr>
<td>YEAR</td>
<td>EVENT</td>
</tr>
<tr>
<td>--------------</td>
<td>-------------------------------------------------------------------------------------------------</td>
</tr>
<tr>
<td>April 1962</td>
<td>Formation of IIT-Bombay’s Senate, replacing its Staff Council.</td>
</tr>
<tr>
<td>1961-62</td>
<td>IIT-Bombay’s motto, logo and Institute song adopted.</td>
</tr>
<tr>
<td>22 December 1962</td>
<td>Institute’s first Convocation.</td>
</tr>
<tr>
<td>1963</td>
<td>Campus School started.</td>
</tr>
<tr>
<td>November 1963</td>
<td>Department of Chemistry formed.</td>
</tr>
<tr>
<td>1964</td>
<td>First 2-year M.Sc. programmes started, in Physics and Applied Geology.</td>
</tr>
<tr>
<td></td>
<td>Central School started.</td>
</tr>
<tr>
<td>1965</td>
<td>Department of Aeronautical Engineering established.</td>
</tr>
<tr>
<td>1967</td>
<td>IIT-Bombay’s First computer, the Soviet MINSK-II, installed.</td>
</tr>
<tr>
<td>1968</td>
<td>First Girls’ Hostel, Hostel 10, opens its doors.</td>
</tr>
<tr>
<td>1969</td>
<td>Industrial Design Centre set up.</td>
</tr>
<tr>
<td>April 1970</td>
<td>Dr P.K. Kelkar succeeds Brig. Bose as Director.</td>
</tr>
<tr>
<td>1970-73</td>
<td>Curricula and examination systems reviewed and revised for all undergraduate and postgraduate programmes.</td>
</tr>
<tr>
<td></td>
<td>System of course based, continuous evaluation introduced.</td>
</tr>
<tr>
<td>1971-72</td>
<td>5 year integrated M.Sc in Physics, Chemistry and Mathematics begun.</td>
</tr>
<tr>
<td></td>
<td>Creation of posts of Dean of Academic Programmes and Dean of Research.</td>
</tr>
<tr>
<td>1972</td>
<td>Radar Project Centre (later the Advanced Centre for Research in Electronics, ACRE) set up.</td>
</tr>
<tr>
<td>3-7 January 1973</td>
<td>First Mood Indigo held.</td>
</tr>
<tr>
<td>1973</td>
<td>Reservation for places for SC/ST students commenced.</td>
</tr>
<tr>
<td>1974</td>
<td>Dr A.K. De takes over as Director.</td>
</tr>
<tr>
<td>1975</td>
<td>Center for Studies in Resource Engineering (CSRE) established</td>
</tr>
<tr>
<td></td>
<td>Industrial Research and Consultancy Center (IRCC) set up</td>
</tr>
<tr>
<td>1976</td>
<td>Campus School started.</td>
</tr>
<tr>
<td>1978-84</td>
<td>Launch of interdisciplinary programmes: eight in six years</td>
</tr>
<tr>
<td>1979</td>
<td>IIT-Bombay’s swimming pool and Students’ Activity Centre thrown open.</td>
</tr>
<tr>
<td>1980</td>
<td>B.Tech. in Computer Science and Engineering initiated.</td>
</tr>
<tr>
<td>1980-81</td>
<td>Institute shut down for 3 weeks following students’ and staff unrest. Only closure of its kind in IIT-Bombay’s history.</td>
</tr>
<tr>
<td>1981</td>
<td>Dr R.E. Bedford holds Directorship during Dr De’s deputation.</td>
</tr>
<tr>
<td>1982</td>
<td>End of 5-year B.Tech. era, 4-year B.Tech. takes over.</td>
</tr>
<tr>
<td>1983</td>
<td>Department of Computer Science &amp; Engineering established.</td>
</tr>
<tr>
<td></td>
<td>IIT-Bombay’s Silver Jubilee celebrated. Distinguished Alumnus Awards conferred.</td>
</tr>
<tr>
<td>1983</td>
<td>2-year M.Tech. reverted to 1-1/2 years’ duration.</td>
</tr>
<tr>
<td>September 1984</td>
<td>Dr B. Nag takes over as Director.</td>
</tr>
<tr>
<td>1985</td>
<td>Center for Technology Alternatives for Rural Areas (CTARA) launched.</td>
</tr>
<tr>
<td></td>
<td>Technofair (Techfest precursor) organized.</td>
</tr>
<tr>
<td>YEAR</td>
<td>EVENT</td>
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<tr>
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</tr>
<tr>
<td>1985-89</td>
<td>5 year integrated M.Tech. programme commenced successively in various departments.</td>
</tr>
<tr>
<td>1986</td>
<td>IIT-Bombay’s first fourth generation mainframe computer, the Cyber 180/840, commissioned.</td>
</tr>
<tr>
<td>1989</td>
<td>Launch of interdisciplinary programme in Biomedical Engineering.</td>
</tr>
<tr>
<td>1994</td>
<td>Yantri ki’s first appearance.</td>
</tr>
<tr>
<td>January 1995</td>
<td>Dr S.P. Sukhatme takes over as Director.</td>
</tr>
<tr>
<td>1995</td>
<td>School of Management launched, Master of Management programme introduced.</td>
</tr>
<tr>
<td>1995</td>
<td>Batch of ’70 raises endowment for scholarships.</td>
</tr>
<tr>
<td>1996</td>
<td>IIT-Bombay Heritage Fund formally registered.</td>
</tr>
<tr>
<td>1996</td>
<td>Distinguished Alumnus Awards revived.</td>
</tr>
<tr>
<td>1998</td>
<td>First Techfest held.</td>
</tr>
<tr>
<td>1998-99</td>
<td>First major endowments by individual alumni (Kanwal Rekhi and Nandan Nilekani). Kanwal Rekhi School of Information Technology (KRESIT) launched.</td>
</tr>
<tr>
<td>1999</td>
<td>Distinguished Service Award instituted.</td>
</tr>
<tr>
<td>1999</td>
<td>Awards for Excellence in Teaching instituted.</td>
</tr>
<tr>
<td>May 2000</td>
<td>Dr Ashok Misra takes over as Director.</td>
</tr>
<tr>
<td>2001</td>
<td>Women’s Cell established.</td>
</tr>
<tr>
<td>2002</td>
<td>Center for Distance Engineering Education Programme (C-DEEP) launched. M.Tech. reverted to 2 years’ duration.</td>
</tr>
<tr>
<td>2002</td>
<td>IIT-Bombay’s Alumni Association registered as a Section 25 company.</td>
</tr>
<tr>
<td>2005</td>
<td>Society for Innovation and Entrepreneurship (SINE) formed.</td>
</tr>
<tr>
<td>September 2007</td>
<td>Golden Jubilee celebrations begin.</td>
</tr>
<tr>
<td>2007</td>
<td>Department of Energy Sciences &amp; Engineering launched.</td>
</tr>
<tr>
<td>2008</td>
<td>IIT Bombay designated a UNESCO ‘Knowledge Heritage Centre’.</td>
</tr>
<tr>
<td>2008</td>
<td>8 new IITs set up. IIT-Bombay asked to mentor IIT-Indore and IIT-Gandhinagar.</td>
</tr>
</tbody>
</table>
APPENDIX 5

INTERVIEWS CONDUCTED FOR THE BOOK

VIDEO
Drs B.G. Bhat (retd.) &
D.D. Deshpande (retd.), 2 June 2006
Dr A.K. De (retd.), 17 Dec 2006
Mr S. Gandhi, 18 July 2007
Dr Dipan K. Ghosh, 06 Jun 2007
Dr Dilip K. Ghosh (retd.), 10 April 2007
Dr M.V. Harirahan (retd.), 20 Nov 2006
Dr S. G. Kane, 20 Jun 2007
Dr P.P. Kane (retd.), 25 July 2007
Dr R.K. Katti (retd.), 6 Apr 2006
Dr D. Khakhar, 17 Feb 2007
Drs K.C. Khilar &
K. Ramamritham, 05 July 2007
Dr A.P. Kudchadker (retd.), 12 Jan 2007
Dr K.P. Madhavan (retd.), 17 Feb 2007
Dr A. Mehra, 18 Jan 2007
Dr A. Misra, 14 Mar 2007
Dr S.L. Narayananurthly, 05 Jan 2007
Dr H. Narayanan, 03 July 2007
Mr S. Pandya, 16 Aug 2007
Dr D.B Phatak, 04 Sept 2007
Mr P. Rele, 04 Oct 2006
Mr S. Saraf, 21 Jun 2007
Dr K. Sudhakar, 20 Sep 2007
Dr S.P. Sukhatme (retd.), 18 Oct 2006
Mrs N. Swamidasan (retd.), 17 Feb 2007
Mrs A. Thosar-Dixit (22 Sept 2006)
Dr J. Vasi, 6 June 2007

AUDIO (unrecorded)
Dr P. Banerji, 5 Nov 2007
Dr V. Borkar, 28 Mar 2007
Drs A.W. Date & M. Sohoni, 8 Dec 2007
Mr T. Hukku, 28 Sept 2007
Mr V. Menezes, 8 Jan 2008
Mr N. Nilekani, 21 Jan 2008
Dr R.R. Puniyani (retd.), 3 Dec 2007
Mr K. Rekhi, 22 Jun 2008
Dr B. Sabata (retd.), 30 Dec 2006
Dr N. Talwar, 11 Nov 2007
Dr S. Waghulker, 20 Dec 2007

GROUP INTERVIEWS (unrecorded)
Dr D.J. Bagul, S. Datta, R.R. Deshpande,
V. Jetiya, A.V. Khandekar, V.B. Khapre, V.L.
Kshirsagar, N.Y. Mohite, K.B. Singh, R.B.

E-MAIL
Dr N. Balachander, 2 Nov 2006
Dr D. Choudhury, 5 Oct 2007
Ms K. Mukherjee, 15 Apr 2007
Dr G.K. Suraishkumar, 4 Mar 2007
Dr B. Ravi, 11 Nov 2007
Dr U. Yajnik, 10 Feb 2007

Interviews of Drs Bhat, Deshpande
and Madhavan conducted by Dr A.Q.
Contractor; of Drs Hariharan, Bedford and
Mrs Swaminathan conducted by Dr H.
Narayanan; and of Drs Katti and Gaitonde
conducted by Dr S.P. Sukhatme

NOTE
Some interviews were conducted over
more than one session, on more than
one day. For these, only the first date is
mentioned here.
In addition to personal interviews, a web
survey was conducted, the respondents to
which were numerous.
APPENDIX 6

PICTURE CREDITS

Most of the names identified here are sources from whom pictures have been obtained; in many of these cases, the identity of the photographer was not known. Such sources have been prefaced with 'courtesy'.

CHAPTER 1
p. 6, 9, 10: courtesy Sunil Hattangadi.

CHAPTER 5
p. 70: Narayan Govindaswami;
p. 72: A.P. Mull;
p. 73: Satish Kulkarni;
p. 76: Kirat Patel.

CHAPTER 6
p. 92-93: top, A.P. Mull;
bottom, Mukesh Trivedi;
p. 103-104: Rohit Manchanda, Joseph Tharion

CHAPTER 7
p. 115, 116, 117: courtesy PR Office, IIT-Bombay;
p. 118: Rohit Manchanda;

CHAPTER 8
p. 153: top, courtesy Sunil Hattangadi;
bottom, courtesy PR Office, IIT-Bombay.

CHAPTER 9
p. 189: courtesy Sunil Hattangadi.

CHAPTER 10
p. 215: left, Rohit Manchanda;
right, courtesy Robotics Lab, IIT-Bombay;
p. 217: left, courtesy Dr D. Choudhury;
right, courtesy Micro-electronics Lab, IIT-Bombay.

CHAPTER 11
p. 251: top left & right, courtesy Sunil Hattangadi;
bottom: Ramesh Agarwal.

CHAPTER 12
p. 279: Rohit Manchanda.

CHAPTER 14
p. 326: courtesy PR Office, IIT-Bombay;
p. 329: courtesy Sunil Hattangadi;
p. 331-341: courtesy PR Office, IIT-Bombay;
p. 357: top & middle, courtesy Sunil Hattangadi;
bottom, Ramesh Agarwal.

CHAPTER 15
p. 377: top, Narayan Govindaswami;
bottom, A.P. Mull;
p. 379: courtesy Dinesh Mohan/Dunu Roy;
p. 386-387: courtesy Sunil Hattangadi;
p. 389: top: courtesy Dinesh Mohan/Dunu Roy;
bottom: Kirat Patel;
p. 391: Parag Rele;
p. 393: Ramesh Agarwal;
p. 403: Deepak Sabnis.

CHAPTER 16
p. 423, 431, 442 (left): courtesy Sunil Hattangadi;
p. 442 (middle): Anonymous, but artist’s signature visible;
p. 443: Kirat Patel.

CHAPTER 17
p. 457, 461: courtesy Sunil Hattangadi.
ROHIT MANCHANDA grew up in the coal-mining townships of eastern India. He went on scholarship to the University of Oxford, where he gained his Bachelor's and his D.Phil. in the physiological sciences. He is now on the faculty of the School of Biosciences and Bioengineering at IIT-Bombay, where he teaches and conducts research on electrical signalling in the nervous system. He has published research articles in some of the premier journals in his field, including the Journal of Physiology, Medical and Biological Engineering and Computing, and the Journal of Computational Neuroscience. His work has been recognized through, amongst others of their kind, the AICTE's Career Award for Young Teachers and IIT-Bombay's Excellence in Teaching Award. Other than the professional, Manchanda's writing has travelled into the creative; his novel In the Light of the Black Sun won a Betty Trask Award, given to writers from the Commonwealth under the age of 35, and was published by Penguin India; a second novel is in progress. Quickened by the rich holdings of IIT-Bombay's campus and by treks in the Sahyadris, Manchanda has developed an absorption in natural history reflected in the pages of this book; and it's an arena in which his wishes coincide with those of Raja Mohanty's (below).

RAJA MOHANTY fervently wishes that more of Mumbai was as green as the campus, everytime he ventures out of the Main Gate to negotiate snarling traffic. He also believes that the trees on campus are far more evolved than he is. Over the years, he has had an abiding interest in creating illuminated books for 'grown-up-children'. An alumnus of IIT-Bombay, he bonds well with colleagues in the teaching fraternity at IITB who subscribe to the magic of storytelling, to infuse an increasingly automated world with warmth.

Author photograph: Venkat Damara
"The book...is stunning. I don't think I have ever seen an institutional anniversary volume (in the US or India) of such quality. The writing is superb."

PROFESSOR ROSS BASSETT
Department of History, North Carolina State University

"Rohit Manchanda presents a brilliant profile of one of India's premier institutes that stokes nostalgia and curiosity about this unique world away from Mumbai's madding crowd."

The Indian Express

"Manchanda, a writer of uncommon talent...views institutional history with a sense of professional detachment that is both valuable and instructive. A wonderfully crafted account...uplifting and inspirational."

PROFESSOR P. BALARAM, Current Science

Just fifty years into its existence, IIT-Bombay can be counted among the best-known institutions of technical education worldwide. *Monastery, Sanctuary, Laboratory* traces IIT-Bombay's evolution over its first five decades, as related by one of its own faculty. Written in the style of a narrative history, it has a wealth of arresting, intriguing, and little-known facts — a product of careful research — accompanied by evocative sketches and period photographs.

While an authoritative history, *Monastery, Sanctuary, Laboratory* is presented with considerable drama and delightful wit by an accomplished author, Rohit Manchanda, who has won a Betty Trask Award for his fiction and is currently a Professor of Biomedical Engineering at IIT-Bombay. The book will appeal to the historian of education, to the serious student of India's engagement with science and technology, and to the curious casual reader alike.

Rs 850

FRONT Illustration by Raja Mohanty
BACK Photograph courtesy IIT Bombay Photo Library