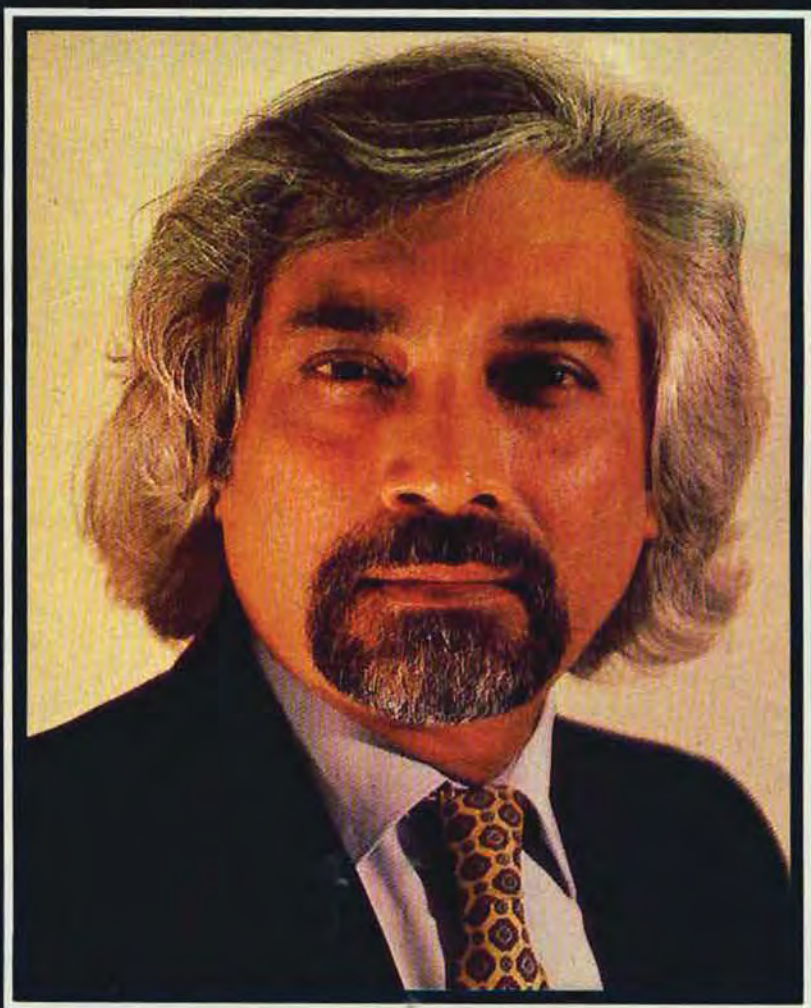

SAM PITRODA



MAYANK CHHAYA

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A Biography

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Dedicated to:

*My (late) father Manharray and
mother Snehlata and brother Trilochan
without whom I wouldn't be what I am.*

Acknowledgements

I F I have been able to make my life worthwhile so far, it is due largely to my mother and eldest brother Trilochan. They do not have a direct bearing on this book but they do have a direct bearing on whatever I am. This book is something of an event for my immediate family without whom my life would be non-existent. My sister Pallavi, my other brother Manoj, my sisters-in-law Anju and Sonali, my brother-in-law Rambhai, my favourite nephew Atrey, my uncle Bhaskarray, aunt Chandrika, cousins Nirjhari and Ratna mean more to me than I have cared to express and certainly more than they know. One never acknowledges one's family. One simply loves them. I see this book as a product of all that they have given me.

Before it sounds too sentimental and familial let me introduce others.

Tarun Basu, Chief of Bureau for South Asia for *India Abroad*, the paper I work for, has been singularly responsible for the most crucial break of my career. Had it not been for his insistence that I join him in New Delhi it seems highly unlikely that I would ever have written this book. Tarun, despite his position as my superior, showed uncommon indulgence in letting me work on this project. His contribution has not merely been in not interfering but affording me remarkable liberty. He was the first person I discussed the book with.

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Thanks are also due to Deepak Vohra, a popular television host. He knows what he has done for me.

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Finally, to my dearest friends whose names shall remain anonymous and who, I hope, wouldn't mind.

MAYANK CHHAYA

Introduction

BOMBAY is a city with international pretensions, generating largely provincial news, struggling to make national headlines. That was bad enough for me in 1986. What was worse was that I headed a news syndicate which mostly survived on leftovers of correspondents of national dailies. You can imagine the quality of journalism I practised. Our private motto was "Routine stories we don't cover, special stories we can't find." It was a pardonable extenuation of a professionally desperate situation. We survived in the margin of mainstream journalism, which shrank by the day due mainly to my congenital lack of enthusiasm.

So when Lekha Dhar, the then correspondent of *The Telegraph* of Calcutta assigned me to interview college students on a particular man and his work I instantly smelled leftovers. She said her news editor had been bugging her to do the story herself but she did not have the time to do it. I was supposed to ask three simple questions. Do you know Sam Pitroda? Do you know C-DOT? What do you think of his work? I knew neither Sam Pitroda nor the kind of work he was engaged in. So I could not possibly have formed an opinion for or against either. I thought with a name like that one could not do much better than making people curious. A hack, which I am, is one who writes on subjects he knows nothing about with an arrogance which is entirely ill-founded. It is a different story that I was paid Rs 75 for that arrogance.

Since St Xavier's College was famous for its trivia lovers it was an ideal place to conduct my interviews at. I landed up

at the college during what I thought was the lunch recess. It transpired that classes were very much on and lecturers spoke mostly to inanimate objects. I had to look for students who would not suspect my complete ignorance. I found a large number of them. I would have forgotten the interviews as one of the many forgettable assignments a journalist is condemned to work on but for the startling replies my questions elicited. "Sam Pitroda," said a pony-tailed biochemistry student, "is the answer to our inefficiency." That was big.

The enormity of the girl's remark and her emphatic statement made me think for a while. But only for a while. I wrote the story and forgot all about Pitroda and C-DOT. Two years later, I saw him in the flesh. The occasion was more dramatic this time. At least, former Prime Minister Rajiv Gandhi had intended it that way. Gandhi was to re-enact the famous Dandi March to mark its 58th anniversary in 1988.

It was early morning; early enough for crows not to have left their nests on the *neem* trees of the Sabarmati Ashram. It was also too early for many Congress Party leaders to have woken up during normal times. Since Gandhi's presence was not normal times for them, they turned up in full force. Pitroda, presumably not a party leader, was there too. Apart from journalists he was the only one not clad in the regimental Khadi. But he was adept at flashing a non-committal smile that Congress leaders are so well known for. It appeared to me that after Rajiv, Pitroda was the most sought after man. Most journalists forced themselves on Pitroda. I kept aloof and watched the man who was supposed to be "the answer to our inefficiency."

"Coming to the Gandhi ashram for the first time. I saw it (ashram) in Attenborough's 'Gandhi'*", Pitroda said looking at no one in particular. I saw at least three journalists take that one down as if they were the last words in wisdom. I suspected that Pitroda smiled at me as if he knew me. To my

* For the historically-minded 'Gandhi' was not shot at the actual location of the Ashram but at a set near Pune.

embarrassment I found that he was smiling at a Congress leader standing behind me. A journalist asked him the inevitable question about his proximity to political power. "You are powerful if you think you are powerful," Pitroda said.

My second encounter with Pitroda was at the *Times of India* newspaper's sesquicentennial debate on the future of Bombay, where he was one of the speakers. Instead of the future of Bombay he talked about his vision of the world of the future. Pitroda was aware that his speech had struck many as odd and out of context. But by the time he finished it he had clearly established a relation between the world of the future and the future of Bombay. My final and decisive one-to-one encounter with him took place in January of 1990. Pitroda had just entered the minefield of politics. His rapidly breaking equation with his Minister K.P. Unnikrishnan had hit the headlines and there were enough indications that Pitroda was headed for the worst period of his life.

My impression of Pitroda's enormous clout and power between 1987 and 1989 under the Rajiv Gandhi administration was based entirely on what I had read in the newspapers and magazines. Being on the same side of the fence I took these stories with circumspection. Pitroda was supposed to be one of the five most powerful men in India at that time, and in some areas such as telecommunications he was the most powerful man. Rajiv Gandhi was said to have a deep respect for his ability and listened to whatever he had to say with abiding interest.

I knew a little bit about his background. Things like how he had given up his multi-millionaire's lifestyle in the United States solely to answer a sense of guilt he felt at having left India in the sixties. I also knew vaguely about his internationally acclaimed achievements in digital switching technology. But beyond these sketchy and often unconfirmed details I knew nothing and could not care less.

Even when I met him that January afternoon in 1990 to find out what was troubling his working relationship with Unnikrishnan I had nothing more than a story in mind. I thought

I would wrap up my meetings with a few quotes, some background and things like that. But the meeting turned out to be far more than a perfunctory contact. What struck me the most about Pitroda during that encounter was his self-assurance and the fact that he made no apology for it. Fortunately or unfortunately, that story did not end there. It began exploding into a major national controversy which culminated in Unnikrishnan indirectly accusing Pitroda of having "looted the national exchequer."

This biography was entirely incidental. I did not seek to write it. Neither did Pitroda, I feel, seriously seek it to be written. The Publisher of this book suggested to Pitroda how about a biography. Pitroda, in turn, asked me. I had no compelling reason to disagree.

Authorised biographies have a reputation of being an apologia of their subjects. This is an authorised biography in so much as it means that Pitroda cooperated with me. Whether or not it is an apologia of Sam Pitroda is something I am not going to dignify with a response. You simply will have to take my word for it.

I am a journalist. It is a professional hazard to meet people who are intellectually vacuous and on an incompatible level of literacy. What struck me about Pitroda was his perspicacity. In a city where people take years to come to the point and even longer to make sense, Sam Pitroda does it faster than you are ready for. In fact, at times he makes more sense than is good for his well-being.

Why should I, or for that matter anyone, write Sam Pitroda's biography is a question that need not be addressed with any degree of seriousness. To me it is a fascinating human story that affords immense scope for good writing.

Before I went to Chicago, where Sam Pitroda lived for nearly 22 years, I thought it was his return to India and the work he attempted to do here that merited a book like this. But after visiting his favourite city and talking to over 100 people, both Indian and American over a period of a year and a half, I discovered a facet of his life which too deserved to be written

about. I shall not give you any hint of what the book contains in this introduction for the purely selfish reason of making you read on.

Finally, I am quite conscious that I will be prone to judgements that may not be particularly palatable to me simply because I have chosen to write this book. But that's a self-defeating factor for any debut-making author to consider.

—MAYANK CHHAYA



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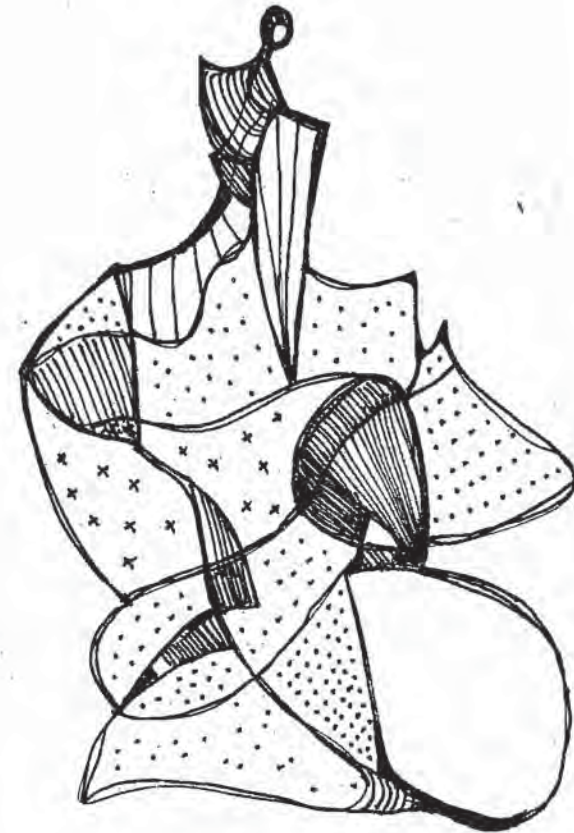
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PART ONE



THE MIGRATION

The Presentation

THE desert cooler outside my bedroom made a squeaky noise that night. I had postponed lubricating it for too long. Behind the door a cricket chirped incessantly. God had omitted lubricating it altogether. The two noises combined to produce an eerie effect. I was gradually slipping into sleep when the phone rang. There is nothing more exasperating than being interrupted in the first stages of sleep. I have this habit of looking at the clock by my bedside everytime I am woken up by a phone call. It was 11 p.m. on May 21.

Shreyans Shah was calling from Ahmedabad. Shah, the owner of *The Gujarat Samachar*, the largest Gujarati daily in the world, asked me a matter-of-fact question. "Is it true that Rajiv Gandhi has been assassinated?" Without realising the shattering import of his question I said I didn't know. Shah sounded pretty certain about the news, but since I live in New Delhi he probably thought I would be better informed about such matters. I promised to get back to him as soon as I found out the truth.

I called Sam Pitroda to ask him if he had heard anything about Rajiv Gandhi's assassination. There was silence on the other end, a silence jagged by anguish. I realised my mistake. Pitroda had recovered from a quadruple bypass surgery a few months before, and despite his protestations to the contrary he was still not fit enough to take such news with equanimity.

If hurt could be seen on telephone I saw it that night.

Before Pitroda could answer I said there was something about Gandhi having been killed in a bomb blast. "Na, na hoy (no, it couldn't be)" he said in Gujarati. To extenuate my indiscretion I said may be it was just a rumour. He recovered soon enough and said he would find out. He called India's Chief Election Commissioner T.N. Seshan, who told him that apparently Gandhi had been blown up by a mine but his death had not yet been confirmed.

What followed was an endless night of endless telephone calls from many parts of India as well as the United States, Canada and Europe. Pitroda and I must have called each other at least a dozen times. "Before he left for election tour (of Orissa and Tamil Nadu) Rajiv had George (Vincent George, Gandhi's faithful secretary) call me to find out if I wished to see him. I told him, he was here for a short while and I should really not eat into his time with his family. How could I have known then that I would never see him again?" Throughout the night Pitroda talked about Gandhi's death and what it meant to the country. "He was preparing to lead India once again. He and I had discussed all kinds of plans. In fact, I was to hand him over his personal plan for the next 30 days, chalked out by me, in case he became Prime Minister again. 'Sam, this time I had better do it,' Rajiv would tell me. You know he was raring to go."

The dawn came but did not bring with it the assurance of a new day. Pitroda had slept out the wee hours of that morning, once in a while stirred up by the sordid death of his alter ego. Although distinctly groggy, he could not help thinking about his first meeting with Rajiv.

The two men were as different from each other as any two men are ever likely to be. One was the heir apparent, if somewhat a reluctant one, in India's feudal democracy. He boasted of one of the most illustrious political backgrounds in the world. He was someone to whom the question was not whether he would become Prime Minister but when. Ruling a country of over 800 million people with all its problems seemed like a boring *fait accompli* to him.

The other hailed from the obscure recesses of India's oppressive social system. His was the least illustrious background as he could trace his ancestry to carpenters and ironsmiths struggling to make both ends meet. He was someone to whom the question was how best he could survive with dignity. The only *fait accompli* in his life was relentless struggle. Short of a splendid quirk of fate Sam Pitroda and Rajiv Gandhi were as less likely to meet as water is ever likely to turn into ice on the sun.

Pitroda did not know Gandhi till the two met in 1981. Rajiv's younger brother Sanjay had died in a plane crash the year before. Indira Gandhi, then Prime Minister of India, had just begun to groom her eldest and the only surviving son for a role which she had envisioned for Sanjay. Rajiv, still a pilot with the Government-run Indian Airlines, felt very awkward about the career his mother had drawn up for him, but since "Mummy" needed help he did not mind rendering it. He was 37 then.

Pitroda was a multi-millionaire based in Chicago who had 50 worldwide telecommunication-related patents and a reputation in the discipline which was nothing short of awe-inspiring. Rajiv knew as much about Pitroda as the son of a Prime Minister is expected to know about such things. He had not heard of the non-resident Indian telecom engineer. Pitroda knew as much about Gandhi. In Pitroda's case it was not "Mummy" who needed help but "Motherland". He was two years older than Rajiv Gandhi. The two men of such sharp contrast met one evening in November, 1981.

If self-assurance was a horse, Sam Pitroda would ride it roughshod. Perhaps without the reins. Once in a while he may tumble over. But not that evening at any cost. In his suite at the Taj Mahal Hotel on Mansingh Road in South Delhi Pitroda made sure of that by pouring over 68 loose pages printed in bold words interrupted only by an occasional diagram. Some hours later he was to make the most important presentation of his life. But there was nothing in Sam's conduct to suggest that he was making any special effort. It was like any other such meeting to him. This time it was with Prime

Minister Indira Gandhi. That detail was of no apparent consequence.

The presentation to Mrs. Gandhi was arranged after an exasperating routine which seekers of such an audience had to go through. Among the first people he met to explore the possibilities of such a meeting was P.C. Alexander, then her Principal Private Secretary. Sam explained the purpose of the presentation as something that was fundamental to the progress of the country. In a rare generous gesture Alexander granted 10 full minutes to Pitroda. The man from Chicago gawked at him and said, "In 10 minutes I can't do anything. I need 60 minutes with her. I'd come back to you if you can arrange that. Ten minutes will be really wasting my time and hers."

Evidently, Pitroda was not well-versed in the art of seeking an appointment with Madame. For most Indians 10 minutes with her was a lifetime. Pitroda was being greedy and demanding six lifetimes. No wonder then that no meeting took place.

Pitroda had made several trips to India by then in quest of that one meeting. There were probably two men then who did not need an appointment to see her—R.K. Dhawan, truncated to RKD, and Rajiv Gandhi.

Gandhi was less chubby then. Among the advantages of being the son of the Prime Minister was that he didn't need an appointment to meet his mother. In any case, Rajiv had already become Mrs. Gandhi's right hand man. He attended important meetings and expressed opinions on subjects which, strictly speaking, were not aviation, ham radio, chocolates and ice creams—some of his personal favourites. Often he was heard not because of what he said but because who he was. There was one area, however, where even his most virulent critics couldn't fault his understanding and knowledge. It was technology. That was the clincher for Sam Pitroda, his would-be friend and adviser.

Mrs. Gandhi did not understand technology in its scientific complexities. But she fully comprehended its importance in nation-building. That was good enough. She did not view

technology with suspicion but with curiosity and keenness. It was important for Sam Pitroda to pitch in his presentation somewhere between mother and son. The rest of what Pitroda was hoping to achieve in that meeting did not really matter. In Mrs. Gandhi's government there was none who would seriously contest her decisions. It may not be healthy for democracy but for the limited purpose of conveying his ideas the situation was perfect for Pitroda.

After Alexander's wet blanket treatment Pitroda turned to his friend Damodar Bharatiya, a Bombay-based man of some influence in Delhi. Pitroda credited Bharatiya with being "significantly responsible" for his entry into India's Capital. Sam had earlier tried to meet the then Defence Minister Jagjivan Ram. "I don't think I made any sense to him." Bharatiya contacted a classmate of Rajiv's. "He declined to help. Another classmate too excused himself. When you try to pitch in great things it happens," Bharatiya said.

Things were not looking particularly promising when help came from unexpected quarters. Sam's father-in-law, Haribhai Chhaya, a former Collector (a district head), had some association with Jaidipsinh Baria, a former ruler of a small principality in Gujarat, who was a Congress leader with contacts. Baria was most helpful. He put Sam in touch with Rajiv's portly cousin Arun Nehru. Arun Singh, a recluse friend of Gandhi, who went on to become his Minister of State for Defence, was also very helpful in Pitroda eventually getting an audience with Mrs. Gandhi.

Sam's appointments with Mrs. Gandhi were cancelled several times at the last moment. He had made up his mind to let this be known to her. After an agonising wait the meeting was fixed one evening in November, 1981. It was called at Mrs. Gandhi's official residence, 1, Safdarjang Road in South Delhi. She called practically the whole Cabinet. Quite in keeping with the tradition of the day Communications Minister C.M. Stephen was missing from the meeting, a detail which Pitroda noted with some incomprehension.

Sam reached early in order to set up the projector and

screen, see the sitting arrangements, check the wiring and see that everything was in order.

Sam entered the room and briefly surveyed it. Mrs. Gandhi had not yet arrived. She was running late because of earlier engagements. Rajiv came after a while. He was followed by Arun Nehru and Arun Singh. Sam introduced himself to the trio. Then something happened which in Pitroda's words sounds almost romantic.

"I saw in his eyes a spark and I thought we had established a contact." If either of them was a woman it would be love at first sight. Their conversation was exploratory with Gandhi asking many technical questions. Some 15 minutes later Mrs. Gandhi entered. Everybody in the room became stiff except Rajiv and Sam. Rajiv knew her too well to react in such a manner; Sam did not know her at all. Rajiv introduced Sam to his mother. "She smiled very warmly."

There were brief greetings among the dignitaries and it was time for the presentation to begin. Ramaswamy Venkataraman, then Finance Minister who later became the President of India, looked most attentive.

Pitroda began in his characteristic matter of fact tone, which many found to be arrogant and blunt. In reality it was nothing more than a statement of fact made without couching it in unnecessary tact. "Madame, it is difficult to get my appointment in Chicago. People would not get to see me for six months. I have managed to see you after several cancellations." His remarks were so direct and unexpected neither Mrs. Gandhi nor her son took any offence. In fact, Rajiv even looked impressed by Sam's approach. Mrs. Gandhi gave a hint of a smile which was more patronising than apologetic.

Having made his point Pitroda made some introductory remarks about what he planned to talk about. His presentation was titled "Telecommunication in India: Issues and Alternatives." It looked at India's telecom scene with exceptional clarity and spelled out in precise, no-nonsense terms what he thought could be done about it. He elevated the telephone from being a mere instrument to conduct inane conversations

to the level of a tool for social change. That caught Mrs. Gandhi's imagination. "She heard me with so much interest that at times I found myself looking only at her." She did not ask any question. Occasionally Rajiv would move closer to her and explain a particular point. Rajiv and Venkataraman were the only ones who asked questions. One asked technical questions and the other financial. "Gandhi's questions seemed to come out of knowledge."

The presentation lasted one hour. At the end Mrs. Gandhi politely acknowledged Pitroda's labour and took her leave. Rajiv and Sam exchanged a few ideas while Venkataraman invited him to his office the next day. The meeting ended with Sam having made a distinctive impression on the two Gandhis. "I knew Rajiv was with me from the word go."

Sam returned to his suite at the Taj. He told his father Gangaram, who had come to spend some time with him, how well the meeting had gone. Gangaram looked at his son with pride and then looked beyond him. Probably he was travelling back in time. To a village, which had no particular reason to exist, where an ironsmith hammered his life into as smooth an affair as he could.



2

Break from the Grind

TIKAR Ran was on the outskirts of civilisation. It was the sort of village which never asserted its existence. The threshold of contentment of its inhabitants was very low. If they ate well, they slept well. A good night's sleep was a blessing that the people of the village sought. Most people were blessed thus. Except one man, Kalyanji Pitroda. He did not spend sleepless night. But he was in a perpetual hurry to wake up.

Kalyanji's survival chores began well before the sunrise. He was always on the run. It was not as if he chased a better future. He merely attempted to stay a step ahead of his bleak present. For his family of eleven starvation was just a meal away. That one meal never allowed Kalyanji to relax. His strong will, which remained unbent by the harshness of living, had something to do with his profession. He was an ironsmith. Quite evidently, an ironsmith's was not a very paying profession in the Tikar Ran of the 1920s. If Kalyanji did not seem like a particularly poor man, it was because there were no particularly rich men around. His poverty merged well with the general poverty of the village. Kalyanji struggled even to keep pace with Tikar Ran's poverty.

His long hours at work did not yield anything more than the wherewithal for survival on a daily basis. There were times when it did not fetch even that much. On such occasions Kalyanji would go around the village seeking leftovers. It would

be patently inaccurate to call that begging in a village that got by on such communal inter-dependence. Kalyanji was so pre-occupied with fending for his family that he hardly found any time for his children. Gangaram, the youngest of the eight children, was troubled enough by his father's hardships but not old enough to do much about them. He contributed by going on rounds seeking food once in a while.

Like all poor children who skip their childhood, Gangaram was ready to forsake his education for more fundamental issues of life by the time he reached the seventh grade. He had lost his mother when he was only two. A motherless childhood made him responsible for his own life.

Things hardly ever happened in Tikar Ran, a village in north-west Gujarat, close to the desert of Kutch. And with the Pitrodas, never at all. The most notable event in their life was a transit halt of a wealthy railway contractor on his way to Kutch. The contractor, Haridas Padharia, was based in Bolangir, the district headquarters of Titilagarh in Orissa. Every time Haridas halted at Tikar Ran the village's economic graph went up dramatically for that brief period. But at the same time his wealth debased the village's poverty even more.

Kalidas Patel was a 12-year-old neighbour of Gangarams. The boy was hospitable and made an art out of serving a cup of tea to Haridas. The rich railway contractor offered to take Kalidas to Orissa on one of his transit halts. Kalidas went. As it frequently happens among migrating Gujaratis, Kalidas helped Mulji Rugnath, a cousin of Gangaram's, find a job in Titilagarh. Mulji, in turn, did his bit and got Gangaram over to the forest-rich district. That was the beginning of the well-known Pitroda enterprise.

Gangaram's eldest son Manekbhai believes that his father was not assailed by doubt even at that young age, and he chose to migrate to a place he did not know existed. For that matter he did not even know what a train looked like. His imagination, curtailed by lack of education, conjured up an amusing picture of a train. He thought it was a kind of big cart that a monstrously strong man pulled. Gangaram was not

so uneducated as not to know that a train was something that moved.

His 300-km journey from Tikar Ran to Vadodara (Baroda) was his first brush with the outside world. During the first part of the journey Gangaram had to ride a camel. Those who have ridden a camel or a horse would know that it calls for a particular rhythm to avoid being hurt on the thighs. Gangaram did not know this. He ended up with bleeding thighs. He reached Vadodara disoriented. For a young man who had ventured out of his small world entirely on the reassurance of his sense of enterprise the experience so far was shocking. But pretty much like his father, Gangaram did not let it overwhelm him.

Before Gangaram set out for Orissa, an eastern coastal state some 1300 kms from Gujarat, something that his sons believe radically altered his life happened. He married a relatively urbane and educated girl living in Vadodara. Shanta was a forceful, if somewhat obstinate, but very warm-hearted woman. "Gangarambhai was old fashioned in matters of women. He greatly respected his wife and loved her but did not demonstrate it openly," Haribhai Chhaya, Sam Pitroda's father-in-law recalled.

Gangaram was barely out of his teens when he left Saurashtra, a province in north Gujarat. Since anything beyond his village was alien to him it did not quite matter how far he went from it. He had no plans for himself in Orissa. That there was a job waiting for him was something he was told. He had no idea of what lay ahead of him. There was no time for social graces like allowing a newcomer to settle down before pressing him into work. On his arrival at Bolangir in western Orissa Gangaram was instructed by Haridas to go to Titilagarh. The job description was not elaborate. He would do what he was asked to do. His first assignment was to help supervise tree felling in the thick forest near Titilagarh. The science of ecology was clearly not heard of in Titilagarh. From all available accounts Gangaram could not quite stomach the site of a falling tree. But he could not stomach hunger either. So, he chose

to ignore his environmental sensibilities for a while.

For all his community spirit Haridas was a businessman at heart. He paid Gangaram 20 rupees every month, a respectable sum initially. But as his work load increased his salary failed to rise commensurately. Ambition began to brew in Gangaram. He asked his employer for a raise. As it happens with such requests it was turned down. Gangaram did not have the patience to bide his time. He quit. It was not long before Gangaram found another means of livelihood. This time his own. On urgings from a well-meaning Marwari businessman Gangaram began making nails. He raised the initial capital by mortgaging his wife's ornaments.

The business boomed and Gangaram was in the big league. He made 2,000 rupees a month, 100 times more than what he had ever seen of money. There was a problem of comprehension of numbers when Gangaram first saw the crisp rupee bills. He later told his son Sam that he kept counting the notes till he was finally convinced that the money was indeed his and real. That was the time he also decided not let money talk down to him. Drawing upon his poverty Gangaram managed to distinguish between money as a means of survival and lucre as a source of greed. By the late 1930s Gangaram was no more an obscure and apologetic native of Tikar Ran. He was a no non-sense fanatically uncompromising businessman. A businessman in the sense of his time and not someone who would wear a business suit and carry a snake leather briefcase. He wore *dhoti*, a loincloth tied up with pleats at the centre, a black coat, a white bushshirt and a black *topi*, a kind of brimless hat.

Gangaram was in the business of carpentry and forestry. He made furniture. He never called himself a cabinet maker like modern day carpenters. In fact, he would say with pride in Gujarati that he was a "*suthar*" (carpenter). At the end of the decade of the 30s Gangaram was a father of two children, daughter Manjula and son Maneklal. He was earning enough to take care of his family. By his father Kalyanji's income standards Gangaram was a wealthy man. That may not be

saying much but Gangaram was the sort who lived in relation to his past. The advantage in being poor early in one's life is that anything one does later on seems like progress. Even by this cynical view Gangaram's life was certainly looking up.

By the middle of 1942 the Indian independence movement was approaching its most decisive phase. Mohandas Karamchand Gandhi was finalising details of the Quit India Movement against the British. Despite the growing patriotic fervour, it was a time of turmoil and anxiety. Louis Fischer, the celebrated biographer of Gandhi (*The Life of Mahatma Gandhi*) described the period thus: "What an unhappy country! That was my first impression of India in May, 1942, and the impression deepened by my two months' stay. Rich Indians were unhappy, poor Indians were unhappy, the British were unhappy. One did not have to live in India for more than a few days to realise how abysmally poor the people were. American and many European farmers would consider it bad for business to keep their livestock in accommodations as unhealthy as the tenements I visited with Dr. Ambedkar in Bombay; hundreds of thousands live in them. Gandhi was fully dressed compared to the nakedness of peasants one saw in villages. The vast majority of Indians are always, literally always, hungry."

Gangaram Pitroda was no exception to this bleak scenario. The Quit India Movement was launched in August that year, four months before Shanta Pitroda was preparing to deliver her third child. On November 16, 1942 Gangaram was out in the jungle when his wife went into labour pains. She was already used to child birth but she did miss her husband. Within a couple of hours Shanta had given birth to a swarthy complexioned boy. The boy was not quite born with a telephone receiver in his hand. Some days later he was named Satyanarayan, meaning God of truth.

Gangaram was a man of robust health and strong arms. His second son seemed like a toy in his lap. Satyanarayan was a great but somewhat unwieldy name. Quite predictably it was truncated to Satyan. As he grew his name became shorter. From Satyanarayan to Satyan to Satu to Sam. Come to think of

it, Satyanarayan Pitroda might not have created as much a mystery as Sam Pitroda did. Never mind what Shakespeare said. Satyan began growing up amid familial warmth that was never in excess but that was never found wanting either.

Satyan was assertive as early as when he was three and a half. He would frequently cry to go to school with his elder brother and sister. He must have cried long enough because his father felt compelled to advance his date of birth to May 4, 1942, solely to make him eligible for kindergarten. It was not quite as fashionable as that in Titilagarh but for want of a better term it may be called kindergarten.

Manekbhai believed that his father never could reconcile himself to his inadequate formal education. Soon after Satyan's birth he decided that his eldest son Manek should be sent for primary education in his mother-tongue Gujarati to a public school in the campus town of Vallabh Vidyanagar near Vadodara. It was not a public school of the same league as some of the elite schools of the day. It was a public school in so much as it meant that students could lodge and board there. While this was still being debated Satyan was busy discovering mica deposits in the backyard of his house. Till he entered his teens the discovery of mica deposits was Satyan's greatest achievement. His mastery over the quaint Indian game '*Gulli Danda*' ranked only second.

More than Gangaram it was Shantaben who was keen that her sons went to a public school. "My mother was far more modern and progressive than my father." Finally when it was decided to send Manekbhai to Vallabh Vidyanagar Satyan declared his intention to join his brother.

Satyan, by his own admission, was a "troublesome" child. He was naughty and mischievous. Every morning as his father prepared to leave for work on his bicycle Satyan would somehow materialise. He would hold the bicycle in a somewhat exaggerated hope that his father would not be able to set himself free. This routine was aimed at extracting some money from Gangaram. Before he reached ten Satyan was ready to leave for Vallabh Vidyanagar with brother Manekbhai.

Vallabh Vidyanagar

Satyan and Manek reached Vidyanagar after over 48 hours changing trains four times. Sam does not remember having cried while leaving his parents. Manek was a year ahead of Satyan in school. In the 1950s Vidyanagar was one fifth of what it is today. And it is not much even today except that it provides passable middle ranking education in various faculties. But in the days when Satyan was a student it enjoyed more credibility because the memory of Sardar Patel, after whom it was named, was still fresh in people's mind.

The school's name was Sharda Mandir. It was the kind of school where idealism meant that boys and girls did not study together. Segregation on the basis of sex was the order of the day to ensure that boys did not slip into unedifying situations. Despite its conservatism, which had a lot to do with its rural proximity, Satyan remembers his school days with a forgiveness one can develop only in hindsight. In fact, he is openly laudatory of some features of his school. The most important recollection of his school days was that of a refreshingly sagacious teacher called Suman Vaidya. He came to Vidyanagar in 1955. By the standards of the day Vaidya was a radical. He insisted on co-education. He employed unconventional methods of teaching. Vaidya did not quite instigate irreverence for norms in his students but he managed to unclutter their minds of conformist ideas. Sam would unhesitatingly admit that Suman Vaidya laid his moral foundation. The enduring lesson he learned from Vaidya was "unshakable faith" in truth.

Among the most bizarre incidents from his school days is the one involving a classmate called Zaver. Every school has a Zaver—unconventional, wild and eventually shocking. Zaver was fond of collecting fused bulbs. He made chandeliers out of them. His ways often earned him severe reprimands from his teachers. Once he was pulled up rather badly. Zaver was so hurt that he threw himself under a train. His classmates did not miss him on the first day. The next morning a student, who was in the habit of jogging, found Zaver's badly mutilated body. His head had rolled off on one side of the railway track.

This student picked up the head and came running back to school. He was so shaken by the ghastly sight that he thought nothing of lifting his friend's head. "Nothing that happened in my life after that incident has horrified me as much."

Of his academic performance Manekbhai says Satyan was a "weak student" upto the sixth grade. "It was more because of lack of application than any lack of intelligence," he says. In the seventh grade Satyan scored his first rank. And wonder of wonders, in Hindi. Today when he listens to the Hindi news on television he admittedly understands about five per cent. More than anything else the school made Satyan and Manek totally self-reliant. They washed their clothes. They cooked their food. And they sorted out their problems.

In the tenth grade Satyan began to chart out his life. He had already opted for technical education in the eighth grade. After finishing the ninth grade at Vidyanagar Satyan and Manek decided to move to Vadodara. Satyan joined M.S. University's Kalabhavan Technical School. Manekbhai on the other hand had lost interest in persisting with education beyond matriculation. It is very clear that during his formative years Manekbhai was the most important influence on Satyan. His elder brother, though not as devoted to formal education, was strong on common sense and innate intelligence. This was a quality Sam shared with him. "I find that more than the acquired sophisticated engineering skills it is my innate intelligence that has always stood by me," is how Sam describes his ability. Sam believes that the difference between him and his elder brother lies in the "not so important a fact" that while he could translate his innate intelligence into something bigger, his brother could not.

Sam's was the last batch to pass out from Kalabhavan school, which closed down after that. Out of 126 who appeared for matriculation examination only six could clear it. Satyan was one of them. "I think it should be noted that Manekbhai and I were absolutely on our own. We had nobody to turn to for guidance. We made our own mistakes and we corrected them." They did not make too many mistakes. The only prominent mistake that Sam could think of was changing their surname. An acquaintance who had admitted them to school in

the 1950s had by mistake given their surname as 'Suthar'. On finishing school and joining college Satyan changed his surname back to Pitroda. But somehow Suthar remained with him. In fact, many of his classmates used to call him by that surname.

In the Hindu social system Suthars are considered not too far above the lowest caste. Despite their tremendous utility Suthars never quite acquired a position of respect in the discriminatory stratification. Surprisingly, at a time when the stranglehold of the caste system was much stronger than today Satyan never felt burdened by his background. It is to the credit of his friends that Satyan's origins were not referred to as anything than a fact of life. "I don't quite remember having ever had to suffer because of my birth. No one made me conscious of my supposedly low origins. They also never went out of their way to accommodate me. It was all very normal."

The only time his caste came in his way was when he decided to marry a so-called high caste Nagar* girl in 1964. He did not quite trip over his caste but did have some problems overcoming it. But we shall come to that a little later. At the end of his school Satyan was ready to decide the direction of his life and stick to it. Becoming a telecom engineer was a possibility he never considered because he did not know something like that existed. But he knew he wanted to do physics and then electronics. Electronics in those days was the preserve of the chosen few and those who manage to enrol themselves for the course walked with a distinct swagger. "It was fashionable but damn tough." Vadodara's Maharaja Sayajirao University was among the better universities of the day and was far more cosmopolitan than anything Gujarat had to offer.

Among the consequences of its cosmopolitanism were relatively sociable girls. Satyan was somewhere between puberty and adulthood. Quite naturally, he was drawn to some of what he saw at the campus. There was at least one girl, who played his wife in a play, who wished to translate dramatics

* Nagars are mostly found in Gujarat. In the social system they consider themselves even above Brahmins. They used to be orthodox in the matter of marriage.

into reality. She would invariably wait for Satyan outside his class. There was enough in her demeanour to suggest that she was in love with our man. But somehow it never materialised into anything substantial. One day the girl, who shall remain unnamed in the interest of her domestic peace, went to Satyan and said, "I got married to a guy in England." That was the end of his first potential affair. Nearly 20 years hence Satyan saw that girl, already a woman his age, in an elevator in Washington. Satyan tapped her on the back and filled the gap of two decades in a few minutes. After that meeting Satyan again lost track of her.

Since education is the last thing on students' minds while they are at college let us see one more of Satyan's encounter with girls. As a student he was in the habit of stroking his moustache; something that continues till date. One afternoon Satyan was gossiping with his friends when Shobha, a college mate known for her brazenness, walked past them. A fellow student said something mischievous when Shobha was within earshot. She turned and looked at the boys. Satyan was still stroking his moustache. That sent out wrong signals. Shobha thought not only did Satyan have the cheek to say nasty things about her but was even audacious enough to make suggestive gestures. She went charging at Satyan and was about to teach him a lesson or two in social decency when the college's dean N.M. Bhatt happened to pass by. He saw that his students were engaged in something he would not approve of. He went to them. Shobha told him what had happened. The dean sized her up and then harangued her. "He knew me enough to side with me. He did not even ask me if I had indeed made those remarks." That was not the last time that people would side with him without bothering to seek an explanation from him.

Before moving over to more serious matters such as his academic performance let us be done with one last anecdote about Satyan and women. His first teenage crush was on his mathematics teacher Vinodini, who was an elegantly beautiful woman. Her class would fill up to the full for reasons which every student knew but none admitted. During one lecture Vinodini was explaining a particularly complex problem. The

intensity with which Satyan was looking at her was mistaken by Vinodini for unflinching attention to what she was saying. Having found an attentive student in Satyan Vinodini asked him at the end of her class, "So what did you understand of it?" "No" came the reply. After a few seconds he realised he was being asked something. Satyan said, "Madam, I did not quite understand it fully. Why don't you explain the last part again!" Before she could finish the bell went off. Satyan sat there with stars in his eyes. "There was nothing serious about the whole thing. It was innocent fun."

There was more to Satyan than girls and romance lest the reader should think that way. His leadership qualities were evident soon after he joined college. In preparatory science he organised a cross country tour of 32 students of his class. Right from making reservations to booking rooms at guest houses Satyan did everything. His leadership seemed to take a beating when he left behind 5,000 rupees in a taxi. To his luck the cabby returned the money. The cross country tour had established Satyan was the leader of the class. Students naturally sought his advice on subjects as wide ranging as physics and dramatics. He never seemed condescending while offering advice. That was one reason why his friends kept coming back to him.

In the meantime, he found himself developing an obsessive liking for science in general and physics and electronics in particular. He scored the first division in both quite effortlessly. Soon he was eligible for a princely scholarship of 60 rupees. After spending nearly ten years with his elder brother Manek, Satyan was now alone. Manekbhai returned to Orissa not being able to continue his studies. Since Satyan could always do with more money he began tutoring a military officer's son for a fee of 500 rupees. Gradually his savings grew to 20,000 rupees. Satyan invested the money in a 34,000 square feet of land, which now stands in his brother Manek's name. The deal posed a problem for Satyan. He fell short by 1,000 rupees. He asked many of his friends who declined to conduct any transactions since it was "Dhan Teras", two days before Diwali, when businessmen make offerings to Laxmi, the Hindu god-

dess of wealth and material prosperity. Satyan stood to lose the plot if he did not make the payment that day. He thought of one friend he knew would not turn him back. Thakore Sukhadia, a close friend from his school days, was the son of a small time dairy owner. Satyan went to "Sukhadiyo" as he calls him. Thakore gave him the money although he was not very well off himself.

Satyan never laboured too much on his studies. Once he understood a subject there was no way he could not have done well in it. As a result he found time for other activities. He was a sure speaker at college debates. Among the first debates he participated in he was asked to speak on cooperative management. It had nothing to do with his subject. But that was no reason why he would not take part in it. Satyan exchanged his slip with another student who was to speak on planning. He went on to give a highly successful lecture on planning. His ability to take a plunge into areas he was not familiar with was to come in handy some two and half decades later. Satyan was a favourite actor of his college. Some of his friends believe that had he taken dramatics more seriously he could have been a leading actor by now. "He just does not know what stage fright is about. He does not think one should feel nervous on stage," Bhupen Trivedi, a classmate and an intimate friend of 30 years, said of Satyan's acting prowess.

By the time he reached his final year, Satyan was already a leading light. He was elected university representative. Even as a student he enjoyed a high profile without appearing to be working for it. Still there were those who took Satyan with mounds of salt. Bharat Thakkar, a top engineer with the Bell Lab at Illinois, who was a classmate of his, said: "He was more like a vagabond. I used to call him a goonda, someone who chased girls. I was very dismissive about him." It's a different story that later in his life Bharat became a confirmed and unabashed admirer of Sam Pitroda.

Satyan was six months past his teens when he fell for a vulnerable, pretty and nervous daughter of a top civil servant. That was in June, 1962. Anju Chhaya was 19 and unaware of her charms. That only added to her appeal for Sam. In Sam's

words "Anju was a riot on the campus." And Satyan decided to police that riot. Satyan had an edge over others in striking it up with Anju. Her sister Pankaj had married Kirit Vaidya, a close friend of Satyan's. Anju's father Haribhai was then posted as deputy commissioner Koyli refinery. Higher education was a problem there and so Haribhai sent his daughter to Vadodara. Thanks to the good offices of Kirit, Satyan became Anju's guardian, a strange beginning considering the ideas he had about her. In June, 1962 Satyan began courting her. "I liked the attention, but I did not quite know what to make of it," Anju said of those days. Her father had no "inkling" of what was happening to his daughter. A son of a mere carpenter carrying on with a daughter of a "Nagar Grahasth" family had the makings of a painful social dilemma.

Neither Satyan nor Anju realised they were posing a deep social question to their families. More so to the Chhayas than the Pitrodas. A cynical view in those days was that the Pitrodas had everything to gain, while the Chhayas everything to lose. Although during this author's interview with Haribhai it could not be clearly established that he was against the relationship on grounds of caste, there was a feeling among the Pitrodas in general and Satyan in particular that caste was certainly a factor that caused hesitation in Anju's family. "I had no sense of community superiority," Haribhai said putting those days in perspective, "Anju was brought up in a manner which was not common then. I was not sure if she would get that if she married Satyanarayanbhai." There was a problem of lifestyle. Satyan was raised in an atmosphere of frugality. Anju was raised in relative excess. Her father had 24-hour orderlies, official vehicle and prestige that Satyan could not even visualise. She was used to people stiffening up in respect in her presence. He was used to ignoring hierarchy, not out of contempt but out of a genuine conviction about its uselessness. Their backgrounds were as different as chalk from cheese.

Satyan and Anju's courting was like any other courting—forgivably illicit and charmingly devious. Satyan would meet her everyday not because he had something to say but because he had nothing to say and did not know how to do it. Apart

from the mandatory visits to generally unkempt gardens, Satyan would occasionally take her for a ride on a borrowed motorcycle. There used to be a pole in front of Satyan's apartment in the Dera Pole neighbourhood. Satyan often stuffed slips containing lovely nothings inside a relief on the pole. It was a somewhat unconventional mail box, which Anju would faithfully empty.

Sometime in 1964, Satyan and Anju went to Ahmedabad. They stayed in a hotel. The inevitable did not happen. "I can't comprehend why we did not make love then. Perhaps it did not occur to us." Sam and Anju would not say it in so many words but it was their conditioning since childhood that came in the way. Those were the days of quaint notions about sex in India.

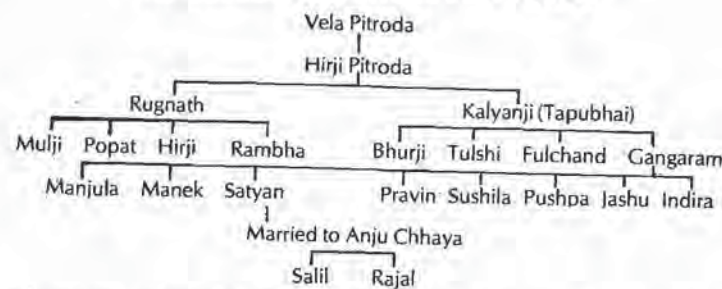
To briefly mention the academic side of Satyan's campus life, he was finishing his master's in physics, while Anju was in second year of course with Gujarati as her main subject. The two were ready to marry. Her father was not. When Haribhai first heard of Satyanarayan his reaction was "What a name?" That was before he knew this man was going to ask for his daughter's hand. "They came in contact without my knowing. I used to be extremely busy those days, I hardly found time to go into Anju's college life," Haribhai reminisced.

Haribhai, an extensively read man of great intellectual depth, began his career as an estate manager under the political department of the erstwhile state of Kutch in December, 1943. That was nearly six months after his daughter Anju was born on June 28, 1943. From there he rose to the rank of the Revenue Officer of a Taluka. He was appointed Deputy Collector of Rajkot in 1949 and later Collector. He was taken into the Indian Administrative Service. He also worked as Additional Collector of Surat and Collector of Godhra. Haribhai later served as Deputy Commissioner and Director of Transport and Inspector General (Prisons). Throughout his career he made a name as an honest and efficient officer. He had seen enough of those in power in Gujarat and was not immediately impressed by Satyan.

Manekbhai wished that his younger brother went abroad. Abroad in those days meant either the U.S. or England. Manekbhai himself wanted to go but he could not at that time. Satyan got admission at the University of Oregon for the 1965 semester. But he decided against it and settled for the Illinois Institute of Technology, then famous for its technical education. Satyan Pitroda had decided to use all modes of communication—steamer, train, plane and bus. They left for Bombay in December, 1964. They were to set sail for the U.S. the same month. Anju went to see off Satyan along with the entire Pitroda clan. Anju's parents Haribhai and Jyotsnaben did not know she had gone to see off Satyan. The departure may not have been similar to his father Gangaram leaving Tikar Ran in the late 1930s. But for its sheer enterprise Satyan was doing the same as what his father had done—charting a new world oblivious of the hardships it entailed.

Anju stayed on in Vadodara waiting for Satyan to call her. Her father came to know about her plans. If he felt anything he chose not to show it. He had known Satyan as Kirit's friend. In fact, the two got along very well. "I was not very comfortable with the idea but my daughter seemed decided. There was no point in my persisting with my wish," he said. For a man, who by his own admission was given to great fits of anger, Haribhai's grudging reconciliation surprised many.

The Genealogical Tree of the Pitrodas



The surname Pitroda is derived from *pittal* (brass). The Pitrodas were originally brass inlay artists. Their work is evident among the other places at Patan, according to Manek Pitroda.

3

Bound for America

SATYAN Pitroda and Bhupen Trivedi, a classmate since 1958, boarded the steamer bound for Genoa. Their hearts were heavy, eyes moist and steps tentative. Satyan's luggage was a suitcase full of clothes, a 'dholak' (an Indian drum which he played rather well) and 400 dollars. On the same ship was Mahen Tamakuwala, Satyan's schoolmate in grade V. The trio huddled together, bound by the pain of having left their roots and anxiety about their future in an alien land.

Satyan's first problem was toilet paper. He did not know what paper was doing in toilet. Like all Indians going abroad for the first time he used a much more efficient natural alternative—water

The journey to Genoa was via Karachi, Aden, Cairo, Pompeii and Naples. An Italian woman singled out the three young men for attention. Her motives were revealed a little later. She wanted them to carry her six suitcases. Since they were in transit they did not have to go in for Customs clearance. The gallant men could not say 'no' to the lady. After disembarking Satyan found out that the lady was, in fact, a smuggler transporting clandestine goods from Hong Kong to Europe. She had used students on earlier occasions too. If any of the three were caught then, his fate would have been sealed.

From Genoa Satyan and Bhupen took a train to London,

where an old friend Vinodini Patel lived with her husband. Due to some miscalculation they landed up in London two days too early. Vinodini was not home. Satyan, 22, went to a telephone booth to make a call to her. That was for the first time he was using a telephone. Strange for a man who, two decades later, would become synonymous with the telephone. "We had only a few phones in India. There was no need to call anyone because no relative of mine had a telephone." London was freezing. The two friends spent the rest of the day in the telephone booth till Vinodini came to fetch them with two top coats. They stayed at Vinodini's place and flew to New York two days later.

New York was hit by a January snowstorm that evening. So their plane was diverted to Montreal in Canada. The airline put them up in Sheraton Hotel. That was another first for Satyan after the telephone in London: It was the first time he was staying in a hotel, let alone a five-star one. After a lot of difficulty Satyan managed to turn the door knob the right way to enter the room. A third first was awaiting him. There was a television set in the room. As an electronics student he knew how the television worked but did not know how to put it on and tune in.

Satyan and Bhupen went to a restaurant in the hotel. Both were tired, sleepy and disoriented. They were also hungry. They studied the menu but did not quite understand it. Satyan asked the waiter "What's your speciality?" "Steak", said the waiter. With a great flourish Satyan told a waiter, "I will have steak." The waiter asked "Well done, medium or rare." Of course, Satyan did not know what the hell steak was. He knew even less about the types, so he said "Rare". Bhupen, a painful vegetarian then, struggled to put together an order. As they waited for their food to be served Satyan and Bhupen looked around trying to absorb details of an alien world. A little while later their food was served. Satyan gaped at what was kept in front of him. Bhupen could not even look at it fully. Sitting plonk on the plate was cow meat full of blood. "I ate it since I did not know any better," Sam said. That was

the beginning of Sam's amazingly and often shockingly wide taste in food.

Satyan and Bhupen were just one day old in the new world. Things had begun to make sense. The next day they flew to New York. "From Titilagarh to Vadodara to London to Montreal to New York. Not bad at all." From New York they took a bus for Chicago. It was the famous Greyhound service. A thing that Satyan was missing the most was water. It was quite a shock to him that no one in the west drank water the way Indians did. He was unmanageably thirsty by the time the bus reached Cleveland. He headed straight for a restaurant. Before the stewardess could say hello to him Satyan had gulped six glasses of water. "Sir, are you alright" she asked Satyan.

The next job was to order some food. "D' you wan' hash brown or sunny side up?" The man at the counter asked Satyan. Satyan stood there perplexed and somewhat embarrassed. He did not know what to say so he just said, "Yes". The man said, "Yes what?" Sam replied "No". Eventually he figured out that the man was referring to potatoes and placed an order. America was not as romantic as he had thought. What shocked Satyan and Bhupen more than anything else was the hostile winter.

Within a few hours they reached Chicago. The scene at the central bus station was quite memorable. It was overflowing with blacks. The weather was grey. Their mood blue. "I had never seen so many blacks before. I was scared." Satyan's image of Chicago dated back to the Al Capone days when illicit liquor flowed as freely as human blood. An American professor had come to receive them. They were driven to a bleak brick building which housed the YMCA hostel. Satyan and Bhupen were very depressed. They kept looking at each other in disbelief. The image of the America of neonlights, blue Hollywood skies, vivacious blondes, ruggedly handsome men and Impala cars had collapsed faster than they had imagined. Downtown Chicago, which is close to Lake Michigan, can be very inhospitable during winters, especially for those who have no experience of it. Cutting icy winds can wreck morale.

To compound their horror Satyan and Bhupen discovered through a newspaper there had been a murder on the floor above theirs.

After dumping their luggage the twosome decided to go to the Institute Campus. From the YMCA to the Institute wing they were supposed to visit was a long walk. They could have taken a bus but the 25 cent fare seemed exorbitant. During winters the walk seems endless and hazardous. They were not experienced in walking on snow. They wore ordinary shoes, a sure guarantee of breaking bones. They realised their mistake the moment they stepped on snow. Satyan and Bhupen had to walk as if they suffered from a particularly bad case of hydrocele. The campus buildings were single-storeyed (ground plus none) and indistinguishable.

Satyan was already regretting his decision to come to the U.S. when he spotted an Indian student. He turned out to be his friend from Vadodara Bharat Thakkar. Under normal circumstances Satyan would not have been so happy to see Bharat. But an alien country has a way of making ordinary friendships from home look great. Bharat was equally joyed to see the two old friends. He gave them his apartment keys and promised to see them later in the evening. Satyan and Bhupen went to Bharat's apartment and began cooking. It was a typical Gujarati fare. Bharat came home tired, but his spirits lifted when he saw the meal. That one meal was enough for him to change his low opinion of Satyan. They had some time before their semester began. So they acted as temporary cooks for Bharat and others.

Once the semester started, Satyan got immersed in electrical engineering and electronics and Bhupen in chemistry. The syllabus was exacting. It made them forget their homesickness. Satyan took the 536 course, a highly advanced course in electronics "without a clue". He managed all A's in mathematics. Satyan and Bhupen moved to a 45 dollar a month apartment and bought their first car for 225 dollars earned by Bhupen, who was on scholarship. It was the sort of car that did not fall apart and ran.

Satyan met several others from Vadodara. Among them were a diminutive and inquisitive engineer Madhu Mehta, a low-key and softspoken engineer Girish Mitra, who was senior to him by two years and a somewhat dishevelled and highly spiritual chemistry student Dilip Desai. All these were to become his life-long friends. Dilip was the only one married among them. His wife Pratima was studying for doctorate in chemistry. Being the only woman among seven friends she quite naturally took charge of food. Although Satyan was a good cook himself and frequently employed his culinary skills to the delight of his friends, Pratima did not allow her "brother-in-law" to do too many kitchen chores.

Satyan struck the most important friendship of his life soon after he reached Chicago. Prakash Desai, a psychiatry student and a man of flowing intellect, was studying for his doctorate. He was from the same community as Anju and was given to counselling people. Prakash has an amazing capacity to intellectually dissect people. Of the lot he was perhaps the most cerebral. If there was anyone who influenced Satyan on an intellectual level it was Prakash. The two knew each other in Vadodara in 1958. They met again at a movie hall on the campus.

By and by the initial fears about Chicago waned and Satyan was beginning to get into the American life style. He was missing Anju. He would work all day, first for his M.S. degree in electrical engineering and then as a technician in an electro paramagnetic (EPR) laboratory. Satyan spent most of his time working for a more rewarding future. Anju arrived in Chicago on December 5, 1966. She was on a visitor's visa and carried a return ticket, which she lost later. The loss dashed their hopes of 500 dollars in refund. They had no money for their marriage plans. Madhu Mehta and Dilip Desai gave him money to marry. Anju came with Satyan's younger brother and her favourite brother-in-law Pravin, affectionately called Pinu.

After nearly four years of courting, Satyan and Anju married on December 26, 1966. A visiting Indian professor doubled as

a "pandit" and administered the nuptial a vedic solemnity in presence of friends and just one family member—Pravin. Anju's parents knew of the marriage but did not readily approve of it. Satyan's parents too knew of the marriage but did not object to it. His mother Shantaben was said to be totally against it but his father Gangaram was all for it.

A NBC television producer who was supposed to film it reached late by half an hour because of traffic jam. An Indian marriage was an exotica which the producer thought would sell well on television. He descended on the hall with his crew. When he was told that the wedding was over, he thought for a while and said, "Why don't you marry again just for the NBC camera?" Satyan had no inhibitions while Anju did not mind it. So they married again. The whole ceremony was later televised on Chicago News. Publicity was never a problem for Sam Pitroda.

After her marriage Anju applied for the Green Card. She got it within three months. In those days the Green Card was not such an achievement as it became in later years. The newly married couple set up a home not too far from the institute. Satyan had finished his M.S. and was beginning to recognise the need for more money. He had a job at Oak Electric, a local electronic company. This is when his name was changed, without his knowledge. An old lady secretary in the engineering department thought Satyan was too complicated. So on her own she changed it to Sam on the payroll. He found out only when he received his first pay cheque. Sam Pitroda was born out of one American's inability to pronounce his original name.

He continued his studies for seven years after that. He was working on a doctoral thesis which he never finished.

The day after their marriage Pratima asked Satyan to fetch some milk. He had one dollar in his pocket. "There goes my 67 cents," Satyan mumbled to himself. That was the price of a pint of milk. He was down to 33 cents, and that was all he had to tide over the last three days of the month. He worked as an assistant in a nuclear instruments company, which later moved

to Cleveland, Ohio. He followed that up with a job at the General Telephone and Electronics (GTE). He worked for the company for about ten years. What he learned at GTE laid his technical foundation.

There was an incident from Satyan's life those days that illustrates a quality which his friends believe is responsible for what he eventually became. Before Anju came to the U.S. Satyan picked up a job in Chrystal Lake, 50 miles from Chicago. He found a rental offered by an old American lady, Olie Wilson, whose son did not live with her. The landlady took an instant liking to Satyan. Satyan would do things for an old woman that any Indian would do. He helped her in domestic chores. He got her grocery and often bought her medicine. On Fridays he took her to eat out. This was something no ageing American is used to. Most of them are discarded by their children. The landlady's son visited her occasionally more out of duty than love. The landlady grew so fond of Satyan that she would often wait for him to return. Once he returned late. Olie was still up and awake. When he asked her why she had not gone to sleep Olie said something unforgettable. Satyan had just bought a new pair of shoes. "You wore new shoes today. I thought you may not have a very good grip of the brakes. When you did not turn up at the normal time I began to worry if you met with an accident," Olie told Satyan.

Olie's son was said to be quite anxious about the growing warmth between his mother and Satyan. Sam surmised that the son feared his mother may bequeath her property to him. Satyan had no such design. Satyan left Chrystal Lake and moved back to Chicago once Anju arrived.

After Satyan joined GTE he began to grow on two different levels. On one as a telecom engineer and on the other as a family man. He worked in the design and development of computer control, digital Electronic Switching Systems and corporate management. As the major bread-earner in a family of ten it fell on Satyan to raise his brothers and sisters. His younger brother Pravin was already there studying bio-technology. He started thinking in terms of inviting sisters Sushila,

Pushpa, Jashu and Indira and brother Manekbhai. His eldest sister Manjula was married to a businessman in Raipur, Madhya Pradesh. He assumed the role of father often forgetting his limits and demanding things of them which they resisted. "I now realise that in my enthusiasm to see that they settled well I often came down heavily on them. It was not my job to be their father but then I could do anything about that," Sam said with a touch of regret. His sisters along with their husbands migrated to the U.S. one after the other, all looking up to him for help.

Despite his family responsibility, the late 60s were full of fun and frolic for Satyan and Anju. Friends, some dozen of them, met every weekend. They went on long weekend drives. There were longer vacations too. During those they toured all over America and Canada. Satyan was now adept at doing things with an air of confidence and elan. He no more faltered while ordering potatoes—hash brown or sunny side up. He had become more catholic in his tastes. He ate everything that could be eaten. Anju stuck to her vegetarian food. On some weekends there used to be night-long card sessions. Satyan was struck by the "feudal" nature of the game. "Why should there be a king, queen and jack? Why can't we be more equal?" This question was a forerunner to an invention.

Satyan's friends were equals, he was more equal than them. He never thought twice when it came to helping others. There is not a single friend who does not have an incident or the other to illustrate how Satyan would go out of his way to help others. Once an Indian student fell ill. He could not get an American physician because he could not afford it. Satyan came to know about it. He persuaded Dr. Prakash Desai to treat the patient, saw that he was well did not even mention to the student the fees he had already paid Dr Desai.

Piyush Vyas, now a wealthy radiologist in Chicago, remembered his first encounter with Satyan in 1969. Dr. Vyas went to the County Hospital the day he arrived. It was Friday night. Many administrative offices were closed for the weekend. He looked lost and, like Satyan five years before, he was ready to

return to India the very day. Dr. Vyas then found an Indian doctor who said he had a Gujarati friend who would help him. Dr. Vyas met this Gujarati who was uncommonly effusive in his welcome. He arranged for everything. "He took me to a store, bought me whatever I needed to start the kitchen, paid for it and on top of that gave me 200 dollars," Dr. Vyas recalled how Satyan helped him. "The best part was that he did that as a matter of routine," he said.

Satyan never quite objected to his name being Americanised. "It does not matter what they call me so long as they call me." All his close friends made it a point to tell the author that they knew Satu and not Sam. "They are two different people, we choose to know Satu," Madhu Mehta, Satyan's future partner clarified. Satyan had no plans to get into telecom before he joined GTE. He accepted the job because he needed it. "As I worked on ESS I realised how complex and demanding it was. For the first time in my life I felt my mind was really being worked," he said. The job gave Satyan's engineering ability a direction he hitherto lacked.

In the late 60s and early 70s digital Electronic Switching Systems were still in their early stages. GTE was at the forefront of its development. In GTE Sam was a member of the core group working on the state of the art technology. Every invention, small or big, was patentable and Satyan began filing patents after patent. "I would not say everything I did was pathbreaking. But it was certainly something that made the functioning of a switch easier and far more flexible," he said of his patents.

The switch is the heart of any telephone system. When a caller lifts the handset of the telephone a highly complex process is initiated and it is completed within a few seconds after a number is dialled. The system known as a switch selects a path not in use at that moment. It finds out whether the dialled number is free or engaged and accordingly it sends back signals to the caller. If it is free the caller hears a ring. If it is occupied the caller hears a busy tone. The equipment should also be able to understand when a call is completed in order to

make the line free for another call.

On lifting the receiver the first of a series of switches is closed. Each number dialled sends out pulses to the central office. Depending on the system the first two or three digits connect the caller to the central office. Every dialled digit closes a switch in gradual but rapid process of completing the circuit. The last digit sends the signal to the called number. When it is answered the last of the series of switches also closes. That is how a call matures. The whole process is ideally completed in 30 seconds or so. But this is true only of old electromechanical switches.

By the time Satyan began working at GTE four types of systems existed—Manual switch board, step-by-step switching, panel system and crossbar system. All these were electromechanical switching. In the electromechanical system the switches move physically, both vertically and rotationally. This physical constraint puts a limit on the system's flexibility. In other words they are blocking systems. This shortcoming reduces the system's call-handling capacity by nearly 50 per cent according to some experts. A system like this is akin to the human heart with blocked arteries. Such a heart finds it increasingly difficult to function and often collapses. A blocking switching can also pack up if the call intensity becomes unmanageable. Satyan recognised this shortcoming and began attacking it with a single-mindedness that led him to do a pioneering work in ESS. By 1971 Satyan knew where to make a name for himself. Career-wise he was on the right track. He decided to divert his attention to his family. This is where his wife took over. The first task that she took on was finding a girl for her brother-in-law Pravin. She took a trip to India.

Anju met a large number of girls. Finally, she chose Sadhana, a Maharashtrian girl. It was a measure of Satyan's standing in the family that his elder brother Manekbhai asked him to find a match for him. "I told Satyanarayan you choose whoever you like for me," Manekbhai said and added, "Nearly three decades of happy marriage proves my trust in him." Satyan

and Anju helped his four younger sisters also settle down.

In the late 70s, there was a time when Satyan's six-bedroom house in Downers' Grove, Illinois, was overflowing with family members. So much that a haughty neighbour complained to the police on the ground that there were too many people staying in the house. Satyan's house was the training ground for all his brothers and sisters before they went their own way. Each one of them remembers those days with a degree of reverence for what he did for them. But at the same time they also obliquely complain that he was often too harsh on them in his attempt to see that they did well. Satyan's friends believe that his brothers and sisters never quite appreciated what he did for them. But on the other hand some of them felt that Satyan was driven by a wish to dominate. But the consensus has been that what Satyan did for his family was uncommon and at times unbelievable. "My husband is not given to tomtomming but I know the pains as he as gone to make his family happy," Anju said. Satyan, on the other hand, has unqualified praise for his wife. "She was the one who did all that, not me", he would say. Satyan's relationship with his family has been somewhat unequal. He gave all he could, but did not receive much. During the 70s and 80s the Pitroda clan witnessed much indifference among its members. Satyan's parents, Gangaram and Shantaben, stayed with him. Anju was Gangaram's favourite. The familial warmth was not so pronounced in the clan for quite sometime. But the 1990s have turned out to be unprecedentedly cordial for the Pitrodas. Not that their relations were ever soured, but a coldness had crept in which bothered Satyan a lot. The Pitrodas are back to their old jovial selves, especially Manekbhai, who has undergone a transformation. "I see things with some generosity now," he said.

The Pitrodas saw family reunions which they had never known before. Each of them was emotional at a party which his sister Sushila hosted during Christmas of 1990. The reunion had something to do with a heart attack that Satyan suffered in October, 1990.

Satyan and Manek were once inseparable. "In fact, he

would do whatever I did" Manekbhai remembered. But after school they began to grow apart. Satyan was equipped to deal with situations typical of America. Manekbhai, who went to the U.S. late despite suggestions otherwise from Satyan, did not possess tools to deal with the American lifestyle. It took a good ten years for the two to return to their old familiarity. The other brothers and sisters were either too young for Satyan or simply on irreconcilable levels. With all of them having settled down the family is once again witnessing an upswing in interpersonal relationships. What caused indifference in the family was that many of them could not relate to Satyan on different levels, while he could. If Satyan was blamed for the state of affairs it would be on account of his status of being the head of the family. For a long time he believed that his way of doing things was right. It mostly was but people don't like to be told that theirs is the wrong way.

All his brothers and sisters acknowledge that whatever he was doing was out of deep love and nothing else. "Perhaps there was a problem of communication." It must be said to the credit of the Pitroda family that each one of its members showed an openness not easily seen in other families. It was precisely because Satyan had a wife like Anju that he could stay unaffected by the painful details of running a large family. He provided whatever was asked of him. But the more demanding job of keeping a balance in the family was something that Anju did without complaints. For someone hailing from background like hers Anju had done a remarkable job of adapting herself. Professor Anil Bhatt, an old friend of the couple's and a professor at the Indian Institute of Management (IIM), Ahmedabad, testified to this fact. "Not many people recognise it but I would. Anju is as much responsible for Satyan's success as he himself."

By 1974 Satyan had learnt whatever he could of the most modern telecom technology of the day. He had even helped pioneer it. A wish to become an independent entrepreneur was growing in him. But he did not have the resources.

4

Switching to Fame

HIRJI Pitroda* was not doing anything historic on March 10, 1876. He had no sense of posterity. But 10,000 miles away a professor of vocal physiology at Boston University was uttering words which were too commonplace for the history they promised to herald. If Alexander Graham Bell then knew the importance of his invention, he would not have spoken such undramatic words. He telephoned his assistant and said: "Mr Watson, come here, I want you."

Sam Pitroda was too far away in future when Bell filed his patent application for the telephone on February 4, 1876. He was granted the patent on March 7 that year. The longest-distance one way call that Bell made was 13 kms in August of the same year. Two months later he made the longest distance two way call over three kilometres. This was a primitive telephone system. There was no central office (telephone exchange) through which Bell's call was routed. It was a simple cable connection between two points. Bell's telephone was improved upon several times, beginning with the invention of a more powerful transmitter by Emile Berliner in 1877. Then came Thomas Alva Edison's alteration. This was followed by important works of David Hughes, Frances Blake and Reverend

* Sam Pitroda's Great grandfather.

Henry Hummings a year later. The prototype of modern transmitters resulted from the work done by Anthony White in 1890. But the modern telephone was developed in terms of the operation of its components a decade earlier. In 1877, Edgar Thomas Holmes designed the first panel switchboard. It was installed to serve Boston's six telephone subscribers. It was a telephone system during the day and a burglar alarm at night. Two years later Almon B. Strowger came out with the first successful automatic telephone system where the switches were electrically operated and controlled.

By 1895, there were over 330,000 telephones in the United States. Long-distance transmission was being worked on, and by 1915, when it was accomplished, the number of telephones jumped to over 10 million. It very nearly doubled by 1932 and quadrupled in 1950. There were too many people using the phone. The telephone system had grown phenomenally since Bell's first call. By 1954, a majority of American households had one telephone. Switching had to grow simultaneously in order to handle the telephone traffic.

Four switching systems were in use till the 70s—the manual switch board system, the step-by-step switching system, the panel system and the crossbar system. All these had an inherent shortcoming in that they could handle a relatively small number of telephones. On the evolutionary scale the crossbar system was certainly at the top then. But it was still a blocking system. They were all electromechanical systems which required vertical and often rotational motions of the switches. This limited the flexibility of the system.

At GTE Sam Pitroda was a senior scientist. Though only in his late 20s, he was one of the members of the core group working on the state of the art digital electronic switching system. The idea behind such a system was to eliminate the physical motion of the switch through solid-state devices. The response time of an electronic switch was one-thousandth of a mechanical switch. In simpler language an electronic switch is 1000 times faster than a mechanical one. That was the quality of engineering that Sam was involved in all through

the late 60s and early 70s. "GTE was at the forefront of developing digital electronic switch. Not too many others were doing that then. So whatever I was doing was patentable."

His stint at GTE was one of the most productive in terms of his patent output. Sam was scoring patents faster than any of his colleagues. The patents were in his name but they were assigned to the company. It did not mean much in terms of money. There used to be a patent dinner every year and he was paid 200 dollars per patent. "GTE was a tremendous experience for me. That was the time I realised where my genius lay. Before GTE telecom was like any other field. Once I joined there it became my passion."

Sam was in the middle of a digital revolution in telecom that was sweeping America. The telephone was no more considered a utility tool which need not look good. By the late 60s new telephone designs were flooding the market. They were quite different from Bell's Gallow's telephone. Although the switching system was not thought of as something where aesthetics mattered, it still had to be engineered well. Apart from his uncommon understanding of the complex concept of electronic switching Sam was particularly good at its architecture. Everytime the team ran into a complication it was Sam who was called upon to troubleshoot and innovate. Practically every correction he made had patent potential. That explains the unusually large number of patents he had notched up for an individual in the field. Bell received 30 patents at a time when the field was wide open and competition non-existent. Sam received over 40 switch related patents when telecom was becoming too specific and detailed and was teeming with competition.

On the home front things were normal except that Anju had not conceived nearly seven years after her marriage. She had a gynaecological problem which was cleared. By 1973 Sam Pitroda was reviving up. He began to recognise disadvantages in continuing with GTE. The company was making more money on Sam than Sam was making on the company. It was also the time when his parents were visiting him. Gangaram's

paternal instinct told him that his son was getting too settled in his job. This was something Gangaram could never appreciate. "My father told me I looked too comfortable in my job, it was time for me to move on."

Moving on was easier said than done. Sam had a talent that any major corporation would grab but he did not have the financial resources to exploit it himself. He began looking for potential investors. He found two American businessmen, Clint Penny and Alan Brown, who were ready to take a plunge with him. They were familiar with his name through the various articles on switching that Sam wrote for specialised telecom magazines. According to the deal struck with them, Sam would own ten per cent of the proposed company subject to what he did. If he failed to deliver he would not be eligible for a share. That appealed to the Americans.

Wescom Switching Inc. was born in 1974. Sam was to develop an electronic digital switch. He headed the project to produce what was known as the 580 switch*. The switch had revolutionary potential by sheer virtue of being one of the first non-blocking switches to be attempted. Sam knew what he was upto but was surprisingly matter-of-fact about it. Roger McLain, Wescom's Marketing Manager and a veteran in the business, describes those days of excitement thus: "He did not quite look possessed but he knew precisely what he was trying to accomplish. He was quite sober about the whole thing. But his genius was in full bloom."

Three years before Sam set up Wescom Switching Inc., something pathbreaking happened in electronics. Electronics engineer Tedd Hoff invented the microprocessor in 1971. The microprocessor is a quarter inch of silicon chip on which all components of a computer are etched. In effect it does all functions of a small computer. Sam had noted the development of the microprocessor with a feeling which was somewhere between comprehension and confusion. He realised it had the potential to radically alter telecommunications. Sam

*It was called 580 because it had five distinct new concepts and represented the technology of the 80s.

retained that bit of information in his mind. As a matter of fact Sam even met Hoff.

Wescom was one of the most exciting phases of Sam's life. His wife delivered a baby in 1975. His large family had started settling down. His parents were happy. His day began earlier than most and ended later than the rest. Sam recalled the bit about the microprocessor and began experimenting to see whether it could be used in his switch. "That was something ingenious," McLain says, "Nobody had thought microprocessors could lend themselves to computer networks to control the switch."

While Sam was on his way to what McLain said was a "revolution" he did not forget small courtesies. Tom Parker, an associate and friend for 18 years, who worked with Sam in Wescom focussed on an aspect which some of his friends believe could prove his undoing. "He has a unique quality to walk away from accomplishments without expecting thanks for them," Parker remembers. Frequently during the day at work his fellow engineers would run into problems. "They would all turn to Sam. Sam would walk upto them, solve their problems and before the engineers could say 'thank you' he would be gone. He never expected gratitude for problem solving," Parker says. The reason why some friends believe this trait could be his undoing is quite peculiar. They say people tend to take Sam so much for granted that they often underestimate his help.

Sometime in 1974, Sam first came in contact with what could be called Indian officialdom. A.K. Ray, then executive director of the Trade Development Authority had shown an inclination to have a dialogue with Sam on Pulse-Code Modulation (PCM) telecommunication technology. Sam had earlier met Defence Ministry officials to discuss the French PCM Battle Radios (RITA). The meeting was organised by Ray in August 1974. As evidenced by Sam's report to Ray in December, 1975, he was quite disappointed with his meeting with the officials. The idea behind meeting Sam was to use his knowledge of the PCM technology. "It is my feeling," Sam wrote in

his report, "that they (Defence Ministry) do not intend to invite external help viz, a consultant. If this is actually the case and my reading of the situation accurate perhaps I or people like me need not devote any further time and effort."

But more important than his apparent disappointment it was his transparent wish to return to India and do something for it that came through in the report. "At considerable personal sacrifice in terms of career as well as earnings there are people like me, as you well know, who are prepared to direct their talent towards successful implementation of such a programme of national importance. We are available. Should the country need us we will only wait to be called. We hope it will not be too late," Sam wrote. These sentiments were not expressed for public consumption. This much was obvious because they were voiced in a confidential report. The document is one of the telling proofs of the man's wish to help his native country. It is a different story that nothing was heard from the Ministry after that. It is very likely that Sam would not have returned even if the Defence Ministry had invited him. His 580 digital switching system was just a matter of time. Sam could see a personal milestone not too far away. After four years of "backbreaking" work he was within striking range of telecom immortality. "I did not quite feel that I was headed for something big. That happens when you get so closely involved with something that you lose sight of larger things."

Chicago had just gone through its usually severe winter. Spring was beginning to burst upon trees and people had started shedding woollens. The April of 1978 was drawing closer and Sam Pitroda was too busy to wonder what spring would shower on him. He was 36, fourteen years old in the U.S. and far beyond where any other Pitroda might have imagined reaching in his wildest dream. His elder brother Manek was visiting him possibly to explore if he too could settle down in the U.S. In those days Sam did not have time for anyone except an intricately designed system which to the uninitiated would look like a steel cupboard when shut. By his own admission no one in his family knew what was going on

at Wescom Switching. "Everybody was too busy trying to come to terms with America. Like me in '64 they too were not equipped to deal with the lifestyle. So they had no time to figure out what I was doing. Not that they would have understood my work in all its complexities."

Madhu Mehta, who was as much involved in the digital switch as Sam, said more than just trying to improve the existing telecom systems Sam was driven by a "peculiar wish to generate tremendous values through technology. As far as he was concerned the switch was a means. The end was much larger than just efficient telephone connections," remarked Mehta, without whose support on the software the switch would not have been possible. April came in all its glory. The grass outside Sam's house in which the snow had turned into sufficiently hurting spikes, returned to its soft, springy green self. But Sam never found the time to walk barefoot on the grass carpet. His son Salil, who was three by then, would often wallow in the grass to greet his father when he returned home in the evening. Sam's daughter Rajal was born that year and was barely a few months old. She did not know how to greet. That was among the many other things she did not know. Salil never cried except when he ran out of a response to a particular situation. Rajal, on the other hand, expressed herself in snatchy howls. Rarely did Sam engage himself in the trying domestic ritual of pacifying a howling infant. It is not altogether unlikely that Rajal cried even more upset by her father's unconventional looks. His long wavy hair and the thick goatee he sported did not add upto a visage a child would find reassuring, especially when it had a far better face to look at in its mother's.

Though Sam never neglected his children, he seldom gave the impression of being a doting father. He would readily admit that initially he was not very comfortable with fatherhood. He knew he would find that paternal instinct once he had children. But given his innate ability to improvise, he fashioned a role that was pretty close to a father's. Still there were gaps in his paternal persona. For instance, he could

never scold his son and daughter with any degree of conviction. His children did nothing to provoke in him that peculiar anger which only a father is capable of. It's the sort of anger that presupposes righteousness by virtue of age and fatherhood. As is the case with most fathers he initially limited his role to one of a trouble shooter, like the fire brigade that is only called in during emergencies.

Sam's studio at Wescom never quite looked like a place where something significant would happen. It did not have the charming disorderliness about it which one tends to associate with all such places of invention. It was too obviously proper to lend itself to romanticism. It had to be that way because of the kind of precise work that was going on inside. Sam's switch was unveiled in April '78 after four years of "backbreaking" work. It was already being watched closely by the giants in the field. Once again McLain must enter to put things about the switch in perspective. "Before this system came only 30 to 40 per cent of the lines could be used. Sam eliminated that shortcoming. Technologically Sam shook up the world by announcing the switch. His non-blocking switch was original," McLain says. The 580 DSS went on to become one of the four major systems in the market.

McLain was not the only one to see the 580's substance. David Dietert, a businessman from Minneapolis, joined Wescom as a manager in 1979. The company's banks had forced its management to bring in a professional manager. In David's modest words Wescom needed "someone to run behind the elephant and clean things." About the switch David says, "It's clear that at the time it was conceived it was the most advanced and well designed PBX in the country. It was a whole generation ahead. The market leaders had analog system while Sam's was digital, and way ahead." About the switch's design David says, "its architecture and hardware were very elegant and exquisite." The analog switch has a continuously varying signal while digital is a string of 1's and 0's—now there is signal, now there is not sort of thing.

Paul Pandyan, an executive with the multi-billion dollar

corporation Rockwell* International, was also watching the switch. Pandyan said the switch was "a pioneering work" which "guaranteed Sam a significant position in telecom history. It was the first design to incorporate microprocessors in multiprocessor configuration. In fact, he used microprocessors three to four years before Rockwell did." Sometime in 1978 Don Beall, chairman and chief executive officer of Rockwell International, asked Pandyan if he knew Sam. Pandyan was even asked to check Sam out at a seminar that he was to address. That was a prelude to something that changed Sam's life.

Alan Brown, a co-owner of Wescom, looks back on those days as a period of "incredible productivity". The switch, he maintains, "was far ahead of anything else that was available." "Sam was a real asset to Wescom," he says. Having delivered as promised Sam was made a ten per cent partner of the company and named its managing director.

Dick Cymbore, then Wescom's Director of Material, thinks the 580 was "probably ahead of its time. He designed functions which were not part of a switch. His concepts of digital switching were phenomenal."

The day Sam set sail for the U.S. he had defied the wildest imagination of what a Pitroda could do. Whatever he did after that was in the realm of incomprehension for most of his relatives. They had given up in 1964 figuring out what Satyanarayan was upto. There was a problem of scale. Their scale did not work beyond a point. And he had gone past that point long before.

When Sam unveiled the 580s he did not have in his immediate family anyone with whom he could share his excitement. His wife Anju had a general idea that the switch was something big. But beyond that incomprehension took over. If she did not participate in her husband's sense of achievement it was because she did not understand it in all its complex

*Rockwell is a 12 billion dollar corporation with 100,000 employees and deals in electronics, automotive aerospace and graphics.

technical details. His business partners could gauge the importance of his invention. Alan Brown said he knew that the 580s was fateful for Wescom. Clint Penny too was said to be splendidly overjoyed at what the switch promised. Their business instinct told them that the switch was a money-spinner.

Less than a decade after he began doing serious telecom engineering Sam was on the threshold of history. Quite characteristically though, he played it down to the extent that it seemed ordinary to many. Parker's assessment that Sam walked away from accomplishments was vindicated when he invented the switch. While Sam's understatement of his engineering ability may be a device employed to prepare the ground in case he failed, that he never overstated it was in keeping with his genuine humility. Madhu Mehta said that "Satu" tended to undersell himself while he may appear to be doing exactly the contrary. "One reason for this could be that he does not see invention in terms of invention but as something made for problem solving. His technical ability is just one aspect of his overall problem solving attitude," Madhu felt. What may be a moment of inventive genius for many is only problem solving for Sam. "All other switches then were blocking. That was a problem. So I tried to solve it," was how he described his work on the switch. Sam's excitement was not the excitement of having invented something revolutionary. It was the excitement of having finished a job.

Penny and Brown knew that the switch was something bigger than they had bargained for when they picked up this unknown Indian to invest their money in. Of course, they did not do it for a lark. But they did not do it out of any sagacious business calculation either. With a degree of literary licence their investment in Sam's talent could be called well reasoned gamble, if there is anything like that. They certainly did not let their chips fall where they might. At the same time they did not know where their chips might fall. So when the switch was finally ready for the market their problems started. These were problems of growing up.

With the switch came the inevitable fame and recognition.

For the first time Sam tasted popular success. At telecom seminars his name would instantly ring the bell. Quite interestingly for a man of his obscure background Sam took to the limelight like a fish to water. The switch did not give him self-assurance. It merely reinforced it. He became a regular speaker at seminars. Dan Fargo, former editor and owner of the prestigious *Telephony* magazine, remembers Sam at seminars thus: "At seminars organized by my magazine Sam was a regular speaker. He was a charismatic speaker even while talking about technical matters. He did not speak. He performed."

Fargo thought what set Sam apart from other engineers was his ability to communicate complex technology. "It is incredible how he would link every technology to the entire mankind. The switch was one such," he says. Sam frequently appeared in Fargo's magazine.

The two years that followed April '78 saw Sam expanding his reach. In fact, he started that in March while the switch was in the final stages. The government of Brazil was looking for help to develop its domestic digital switching capabilities. It had set up a national programme to design a whole gamut of computer-controlled switching systems suited to Brazil's environment. The invitation from Brazil was the result of a paper he had presented on the subject at an international symposium in Kyoto, Japan in October, 1976. Many engineers from the University of Sao Paulo, who were attending the symposium, kept Sam in mind for a future reference. Brazil sought Sam's help in scheduling, partitioning, monitoring, designing and developing the technology. Sam's visit was under the auspices of the United Nations.

In 1980, he visited China as one of a 23-member-team of technical experts giving lectures in major cities and observing the telecommunication scene. In keeping with his flexibility Sam savoured all the offbeat Chinese delicacies. "Snake was as common as potatoes. I am talking about things you would wrinkle your nose at."

Sixteen years after Sam faltered to place a simple order in a

restaurant he was a key member of a 100-million dollar turn-over company. "The business was booming but we had problems coping with it." The trio did not quite realise when they became a 100 million dollar company. Crossing the mark was like crossing the gravity barrier—if they broke through they would be destined for megabucks, if they did not they would become one of the many who tried but did not make it. Although it was never quite admitted, a lack of vision was one of the factors that inhibited them from taking a leap into the big league. The main reason was the absence of support systems to expand Wescom Switching Inc. into a comparable giant in the field. Ten years after Wescom was sold there was virtual unanimity that it had the potential to grow into a billion dollar business.

Penny, Brown and Pitroda had thought they would manage the problems of growing up. But somehow things began to become more difficult than they had thought. Wescom Switching looked increasingly undersized for the kind of expansion it ought to embark on in order that the 580 DSS could be marketable.



5

Plethora of Patents

MOHAMMED Haq was probably expecting a sumptuous Gujarati meal that evening. His friend Sam Pitroda had invited him for dinner. Haq reached the place at the appointed time. Sam had to shake off his post-dinner indolence before he could stand up to greet his friend. "Mohammed, good to see you. What brings you here?" Haq, somewhat taken aback by his friend's query, said, "What do you mean? You have invited me for dinner." Pitroda had completely forgotten his invitation. Anju sensed her husband's discomfiture and quickly fixed a passable meal. Politeness demanded that Sam did not tell his friend that he had already had his dinner. So he ate all over again.

It was just as well that he had a double meal because indigestion that night set Pitroda thinking. He had written down the dinner in his diary but had forgotten to check it. "I told myself there are things to be read in diaries, what we need is a read out diary." The next day Pitroda began working on a device that would "read out." Reading out in this case was an alarm or a beep that would go off at a particular time. What came out at the end of his work was an electronic diary, the kind you see with modern day executives. "Haq was a friend so I could take some liberty with him. But suppose I had forgotten an important business dinner it would have cost me dearly."

On October 10, 1975 Pitroda filed his patent with United States Patent office. It was called "Electronic Diary." The abstract that accompanied the patent read: "An electronic diary having combined clock-calendar means and diary storage means is provided wherein a random access memory is employed in a diary mode of operation for the storage and readout of preselected daily schedule and message events keyed for visual display in response to equal time comparisons with real time of day (TOD) as generated by clock calendar means. The electronic diary is capable of being added to the present state-of-the-art electronic calculators for facilitating economy of parts through commonality of keyboard, power supply and visual display features. The electronic diary is comprised of a keyboard selector panel, power supply means, a message storage and control unit, display control logic, time comparison logic, audible alarm and visual display means. Optionally the electronic diary is comprised of a keyboard selector panel, power supply means, memory, microprocessor circuit and visual display means. The electronic diary can serve to remind the user of an important message event through application of an audible alarm while visually displaying the associated message data."

The patent for the diary was granted to Pitroda on December 16, 1976. The patent carried 18 drawing figures and 21 claims. Some years later Toshiba, the Japanese company, began marketing a similar electronic diary. Pitroda decided to claim patent violation claims. The Japanese company paid him 80,000 dollars. "I still have a copy of that cheque."

Pitroda recognised early in his professional career that it was important to score as many patents as he could. As early as 1968-69 he began working on Multi-Frequency Tone-Generating system for a Pulse Code Modulation Digital Exchange. That was the first patentable assignment that he worked on. By his own admission it was "nothing revolutionary" but something that could be very useful. He got this patent sometime in 1971.

After scoring his first patent Pitroda never looked back. "The

advantage I had was that those were still early days. Whatever we did in telecom was patentable." This candid admission should not obscure the fact that the pace with which he filed his patents was truly extraordinary. In ten years time he had nearly 50 worldwide telecom-related patents. Madhu Mehta, whose contribution has found no recognition in media reports about Pitroda, was always around with him. There were times when the two sat through the night while trying to solve a problem. "Madhubhai's contribution has been immense. He is a man who would not easily talk about himself."

Pitroda's patents were the result of his penchant to solve a problem. Be it Progress Tones in Pulse Code Modulation (PCM) Switching environment or a Digital Conference Circuit for an Instant Speaker Algorithm, they were the outcome of wanting to solve a particular problem at a particular time. Most of his telecom-related patents are complex and difficult to understand for those not qualified in the discipline. Technical details are unlikely to make much sense to the lay reader. But their assessment certainly would throw light on his engineering ability. Pitroda himself was exacting in his judgement. He called his patents "average, not something that would change the world like Einstein's equation did." He said his patents were "useful and practical."

Madhu Mehta too had a similar view. "Sam (Sam) is essentially a problem solver. That reflects clearly in his patents. They were not extraordinary but they were quite useful and dealt with problems that not many would bother about." Dan Fargo, former publisher and president of the prestigious *Telephony* magazine, thought the patents were "not breakthroughs but something that could play a role in breakthroughs."

One patent that stands out for its ingenuity is the 580 digital switching system, which he developed for his own company Wescom Switching Inc. His use of microprocessors in that system was hailed as pioneering by most and even revolutionary by some others. There was unanimity that the introduction of microprocessors in switching systems could only have been thought by someone who had a masterly understanding

of the intricacies of a switching system and had the innovativeness to do something out of the ordinary. Quite easily the 580 was Pitroda's telecom highpoint. It established him as a name to reckon with in international telecom circles. That reputation was not shortlived. A speaker (D.K. Rai) at a function to mark the World Telecom Day on May 17, 1991, recalled his meeting with Roy Gibbs, once chairman of the British Telecom. Rai said when he told Gibbs that he knew Pitroda Gibbs stood up, shook hands with him and said, "Sam is the *guru* of all switching designers."

Pitroda did not restrict his inventiveness to telecom. "You find a problem and you want to solve it." But a particular patent was not borne out of the urge to solve a problem.

"I always saw my son Salil at his computer terminal. I once asked him why he and his friends didn't play cards the way we used to. He replied that playing cards were not binary." "Who cares about kings and queens? I like computers and programmers much better," Salil said. That evening Pitroda began work on computer-oriented cards. The new deck was to be based on the binary system or in other words were numbered 1, 2, 4, 8, 16, 32, 64 and 128. There were two of each card in each of four suits. Each number in each suit either has a greater value, as indicated by an asterisk, or lesser value as denominated by a plus sign. A newspaper article in *Chicago Tribune* explained "On Pitroda's playing cards, the binary numbers are expressed in normal numbers so players can work with them. The split values (* or +) for each number add a twist to any game that uses trumping. For example a 32+ in the trump suit played on a 16 of another suit will take the trick, but it can be overtrumped by a 4* of trump because the trump card is multiplied by or added to the highest card in the suit that was originally played to determine which trump wins. The 4 multiplied by 16 would be greater than the 32 added to the 16."

The card afficiandos would understand the jargon of this somewhat complicated but futuristic version of the game. Pitroda holds a patent for these compucards too. There is yet

another incident illustrative of the man's uncommon ability to solve problems. Once in the early 70s Sam and Fargo were lunching at a restaurant. Sam kept looking at a particular waitress for reasons which became obvious only sometime later. He noticed that she had to go up and down several times carrying orders. "The number of times that she went from a table to the kitchen or a table to the bill counter was something I thought she could do without if there was a restaurant automation system." Fargo said Sam thought of a remote controlled ordering system where the waitress would punch in orders, which will in turn appear on the monitor. "The idea was to eliminate the trips between tables and elsewhere." Pitroda did work out a full-fledged restaurant automation system and filed for a patent. Nearly 15 years later there are many restaurants in the U.S. which use a similar system.

Apart from his specific attention to practical problems Pitroda had formed a very clear view of the future telecom in the 70s. In an article for the house journal of his own company Wescom in 1976 he dealt at length with switching system of the 80s. He made some insightful comments in that article on the user's objectives. "The user, irrespective of his needs, always desires the maximum number of features at minimum cost. In many cases things that are of absolutely no immediate value are desirable because of unpredictable future needs. The needs of the end user change so rapidly that a long list of available features provides the necessary safeguards for the future." This comment is a telling instance of what some of his colleagues pointed out about Pitroda's unique ability to work backwards from the user to the product.

"Since the user normally does not want to pay extra for the facility to incorporate these features, an effective hardware-software tradeoff is required to segregate certain features and functions in hardware modules so that it can be implemented in the future with minimum cost. For example, in a stored programme system features like wake-up and speed calling could occupy a large storage area. As a result it may be desirable to separate these features in hardware modules."

"It is important to note that during the 1980s in the customer switching environment, the traditional features boundaries may disappear. That is to say, the features that are traditionally used in one area (such as hospitals) likely will find applications in other areas, such as business. For example, the wake-up service, a hotel-motel feature today, will be used in a business environment as an electronic diary to remind people of their appointments. Similarly, patient call division, a hospital feature, could find application in a business environment for third party call transfer."

Quite amazingly both his examples have turned out precisely the way he had predicted. The feature that often gets overlooked while judging a man of Pitroda's inventive skills has a lot to do with reluctance to understand how a patent is obtained. In a country like the U.S, where patents are being constantly filed even in telecom it is quite extraordinary that one man should have about 50 to his name.

The first step towards developing a patentable invention is to identify a problem. Once having done that one needs to examine all options in one's mind before choosing a particular one and begin work on it. This calls for an ability to recognise an option that is not already used up. After choosing the option comes the creation of a unique way of solving that particular problem. This could consume time depending upon the kind of invention that is being attempted. Once the invention is accomplished comes the most trying part of the endeavour: convincing a patent lawyer of its originality. Patent lawyers are known to first reject any new patent out of hand. A good patent lawyer has a good data base and knows an original work when he sees one. After having convinced the lawyer the patent has to be written in a manner that communicates all its original benefits. The Patent Office may take time which is often longer than the inventor bargained for. The office has to make it absolutely sure that it does not open itself to suits from other inventors who may already have a similar patent in their names.

"Not once has any of my patents been challenged." That

may not be necessarily because of the uniqueness of Pitroda's patents. It could also be that the patents he has worked on may not have caught other inventors' fancy. But nothing takes away from Pitroda's inherent inventiveness. If anything, the generally unattractive nature of his inventions only adds to the achievement.



6

In Big League

DESTINY caught up with Sam Pitroda in 1979. If he saw it he did not quite say hello to it. Wescom Switching had hit difficult times. As on so many other occasions in his life bad times were not really bad. They were badly dressed up opportunities. The business of producing a digital switch is very expensive. Unless money constantly flows in it becomes a major liability. Wescom Switching Inc. was at a stage where it had to raise funds. The company had so far managed its business on large borrowings from the Continental Bank. The inevitable happened when the bankers told the trio that they were growing too fast and borrowing too much. They had better do something about it. Clint Penny, the 60 per cent partner in the company with a net worth of 17 million dollars, had a major tax liability. He had transferred his stocks to his children. This restructuring of his assets was a taxable event under the American tax laws. He had to draw several million dollars from the company.

More importantly, in terms of the company's finances its Research and Development was also becoming expensive. That a switch was a very expensive and often time-consuming enterprise was something that Sam found out in Wescom. So five years later when he set up C-DOT he had no illusions how

long it might take to develop a prototype and bring it to the production stage.

The squeeze on the company was tightening and Penny needed more and more of what his name so appropriately meant. According to Sam that was the time when his senior partner did something fateful. "He (Penny) went on his own to Rockwell and struck a deal with it to sell Wescom." But the deal was subject to the condition that Rockwell negotiated with Sam, the ten per cent partner. It was not so much his share as his worth as the main engineering brain of the company that was behind Penny's condition. Alan Brown, who was 30 per cent partner, and Sam were surprised by Penny's decision but they did not make an issue of it. "He was the main partner. He had more say in the company's affairs than the two of us! But our consent was as important as his own." Penny had apparently told Rockwell that the deal will mature in 30 days' time, a normal period for such deals. Don Yockey, president of Rockwell's Defence and Electronics division would meet Sam to clinch the deal. Evidently, Yockey thought Sam was not such an issue.

Sam and Yockey met in Hyatt in Oak Brook, another "village" near Downers' Grove. There was a third man called Jerry who came with Yockey. There was both elan and sense of arrogance that customarily go with deals where a giant proposes to buy out a company pressed for money. The two men were dressed in business suit and arrived in a 22-foot long limousine to ensure that the meeting was not misunderstood as a social affair. Yockey began on a presumptuous note. He proposed to Sam that he wanted to buy him out. That was just a figure of speech. What Yockey meant was he wanted to buy out Sam's ten per cent stocks.

Sam said, he knew the purpose of the meeting was to buy out his stocks. The only question was for how much. "They thought I was no big deal. So I could be convinced to sell my stocks for 200,000 dollars or so." After having invested his engineering genius into the digital switch that was not the kind of money Sam was looking for.

"If you came here to insult me, you have done a good job," Sam told Yockey. The American was somewhat taken aback. The negotiations broke down leaving Sam enraged. "I did not like their attitude at all. So I told them I wouldn't sell my stocks. If they wished Rockwell could become my partners. They told me they don't do that sort of thing. I said I too did not get bought out for that kind of money." The deal fell through. Penny had put a price tag of about 27 million dollars on Wescom if Rockwell wanted it. Rockwell wanted it. Sam did not. The deal makers, Solomon Brothers, the biggest in the U.S. then, tried to pacify an angry Sam. But that did not work.

The Rockwell affair shook Sam out of his business indolence. "I was angry only for a while. Then I got into action." What followed was a most remarkable show of his instinct for making money. He felt challenged. And he decided to go for it no matter what it took. As it turned out it took a lot. It took him to San Francisco, London, Paris, Stamford, Minneapolis and back to Oak Brook.

After his meeting with Yockey Sam called up a vice president in Xerox. He mentioned about the possible deal where he would sell his stocks to them and they in turn could be partners of Rockwell on ten per cent. The next day Sam was off to San Francisco. He met Xerox people in the Bay area. They seemed inclined but suggested that he go to their headquarters in Stamford in Connecticut. Things were moving at Xerox. In the meantime, Sam was busy with lectures at seminars.

On one of his frequent trips out of Chicago, Sam was waiting for his flight to be announced in a bar at the O'Hare airport. Someone tapped him and said, "Are you Sam Pitroda?" The man said he had seen his picture in a telecom journal. "How much money are you looking for?" asked the man who introduced himself as a representative of a Saudi Arabian business tycoon. The man had some information about the deal that Wescom was looking for. "I told him 20 million dollars, more to end the conversation than anything else." Once again the unseen screenplay writer was at work. Sam forgot about the Saudi agent. Some days later, he got a call from the agent. He

said he was arranging for 20 million dollars and that Sam should travel to London where the Saudi businessman was.

"I called Clint and told him about the offer. He got all excited. We went to London." At the airport a Rolls Royce was sent for the two. A Rolls is unlikely to drive to anything less than the Mayflower Hotel. "We felt like villagers in that Rolls." They met the Saudi businessman. The details of the deal were discussed and then virtually finalised. Two associates of the Saudi man, Dr. Charles Dunn and another fellow would have a look at the company before signing a MOU. After their visit Sam heard nothing from the Saudi businessman. He became curious and decided to check out with his bankers Al-Saudi Bank in Paris. Sam went to Paris. The agent was also in the same hotel. The Bankers said that they were still assessing the deal. It transpired that the Saudi businessman was not so much interested in buying the state of the art technology as the 40 acres over which the plant was spread with 2000 employees. Sam left the Saudi offer at that and returned to Chicago.

By now he was quite possessed with the whole business of making deals. Sam was now into areas he was not familiar with. On his return from Paris, he called Honeywell. The word reached its chairman Ted Spencer. Spencer descended on Downers Grove in his 727 jet to check out. He met Clint and told him he would first finalise with Sam before making a deal. "He asked me how much I wanted. I was not hoping for more than a million or two. It was a lot of money." Sam and others were invited to Honeywell in Minneapolis. "They sent us their jet. Limousines came to receive us. There were high powered business lunches." At the end of this great show of corporate class the three partners made a deal with Honeywell. For 35 million dollars. They broke their deal with Rockwell and Saudi agent announced they had entered into one with Honeywell. It was just as well. *The Wall Street Journal* covered the deal to the consternation of Rockwell.

It seemed that finally Sam's chase was over. But was it? One night around 11 p.m. near Christmas time in 1979 his telephone rang. It was Don Beall, president of Rockwell on the

line. "What do you want?" The question hung there all night. It was answered the next morning. Don had done a lot of work that night. He had called Rockwell people in Los Angeles, Pittsburgh and Dallas. The last was the company's telecom office. Three planes landed at O'Hare the next morning.

Around 8 a.m. top executives of Rockwell and Wescom Switching accompanied by 25 attorneys; five on Wescom's side and 20 on Rockwell's, began their meeting. "We were on a surer footing this time. Rockwell guys knew we meant business. So they talked business." After a long negotiation they shook hands. The deal was clinched. Wescom Switching Inc. was sold to Rockwell International lock, stock and barrel and Sam Pitroda for over 40 million dollars. That was nearly 13 million more than what Penny has originally agreed to some time before.

Sam was to be vice-president of advanced technology and engineering in Rockwell's new switching division. "That was a top job, quite coveted," recalls Paul Pandyan, who had in 1978 "checked out" on Sam on behalf of Rockwell. Sam's share in the deal was over three million dollars. Rockwell asked them when they wanted the money. To avoid tax for that particular year Sam said he wanted for the next fiscal. Sam and family decided to take a trip to India on a vacation. Ironically, he had no money to pay for air fares. He borrowed 10,000 dollars from Penny. "After a good vacation we returned to Chicago. It was time to be paid."

The meeting to distribute cheques was to be held in Sam's attorney and friend Paul Miller's office on the 81st floor of the Sear's Tower. Sam and Paul met in 1977 and have remained abiding friends since. "The first thing I did was to do his (Sam's) employment agreement with Wescom," Miller remembered. Miller's office overlooks Chicago's fabulous downtown skyline against the backdrop of the endless Lake Michigan. From that height the world below looks quite attainable. Sam briefly looked out of the full glass window, surveyed the scene for a while and thought to himself "Now the cheque."

The cheque was for two million dollars, the balance to be

paid over a period. Sam casually put the cheque in his coat's breast pocket. "I did not feel anything extraordinary. I was a millionaire. So what?" Sam's business association with Penny and Brown was formally over that day. That was not the end of their friendship though.

As Sam came down the elevator he started planning his next move. He drove home. His parents had gone to his younger brother Pinu's house. There were just four of them. Wife Anju, son Salil, daughter Rajal and himself. The children were too young to understand but Anju knew her life would change totally. Sam relived the past 16 years in a few moments. He remembered his first dreary day in Chicago with Bhupen. He remembered the sadness Bhupen and he had felt on seeing their hostel. He also reminisced the days of small change and big plans. He thought about his apprehensions whether he would ever earn enough to do what he wanted. Sam tried to recall all that he wanted to do once he had enough money. He had enough money now. Anju tapped him out of his nostalgia and asked what she should make for dinner. "How about *khichdi* and *kadhi*? (thick soup made out of flour)," he replied: "We celebrated three million dollars with *khichdi*." Till date my family (except wife) does not know how much I made. They knew I was trying to strike a deal but that is about all."

Sam Pitroda was a self-made multi-millionaire and close to a handsomely paying job at Rockwell. For a man who had been constantly on the move since 1964 money proved to be a swamp. He was not familiar with it and took sometime negotiating it. But he did come out of it unsmudged.

His wealth was never on display. It came out in other forms. He improved his style of living just enough to be comfortable but far from vulgar. Sam Pitroda paid 600,000 dollars in tax. He was still left with a lot.

7

Family Equations

SAM Pitroda was now in a position to count his millions. For a man, who had mourned the expense of 67 cents from his total wealth of one dollar, just a few years back, three million dollars was perhaps the limits of riches. His half a million dollar a year job as vice president, advanced technology and engineering, at Rockwell International, was an icing on the cake. Never mind if the icing was disproportionately large compared to the cake. It was a case of having one's cake and eating it too. Considering there were 12 people in his house the cake was not too big. Neither was the icing.

In 1978, Sam Pitroda and family moved to a six-bed room house on the Golden Bell Court in Downers' Grove, a "village" near Chicago. This is the sort of village where Mercedes is as routine as poverty was in Tikar Ran. Sam's house overlooks a creek which freezes during winters. Children play ice hockey on it. During summers it is a sight for sore eyes. Ducks glide on its maggoty waters. Trees along the creek are so thick that you can almost pull out a plum of their shadows. From Sam's family room, which overlooks the creek, the scene is a perpetual picture postcard. The only time this postcard comes alive is when a duck pedals past on the creek or an occasional boy comes for a splash.

Life had become idyllic but somewhat unchallenging for

Sam Pitroda. The only challenge came from hostile neighbours. Despite their two Mercedeses and an obviously large house Sam Pitroda and his family were not welcome in the neighbourhood. It was disastrous that they were not quite white. Sam's wife Anju can be considered fair by Indian standards. But by American standards she was pale brown. But Sam stood out in the entire street. The issue, however, was not so much their colour as the fact that there were simply too many of them. Americans, not at all used to large joint families, found it unbearable that so many of them could stay together in a small six-bedroom house. What was worse was that they were all various shades of brown. Anju leading the band being the least brown with Sam bringing up the rear. If by an odd chance the family came out together some neighbours would mistake it for an eclipse, solar or lunar, depending on when they came out. There was nothing overt about the neighbours' hostility. The only time it became crude was when a neighbour's son set off firecrackers outside their door. Sam's genial and bird loving brother-in-law Yashesh (my look alike!) remembers having come out with a "laakdi" (cane) shouting unprintable Gujarati invectives. Why Gujarati? "I abuse best in that tongue," chuckles Yashesh. He says he did see two boys, who looked familiar, scramble away.

The display of good neighbourliness went on for about a month or so. But it stopped only after Sam called police and explained what was troubling him. "It's my house, my brothers and sister and my money. It is my responsibility to look after them. Do you want me to throw them out on the street? What does it bother anyone how many of us stay here?" The policemen understood and saw to it that the harassment stopped.

Soon enough the neighbours found out about Sam's position in Rockwell and the fact that he was a highly respected telecom engineer. That changed their attitudes considerably. In fact, there was a dramatic transformation. What brought about that was a visit by an Indian delegation. Before Sam returned to India and became a man of top connections an Indian delegation led by former minister Shivraj Patil and con-

sisting among others Dr. Najma Heptullah was on an official visit to the U.S. Sam invited them to Chicago. The delegation was given FBI escorts. Some of the federal officers reached Sam's house much earlier to check out the area. Some neighbours were witness to the activities around Sam's house. Patil and Dr. Heptullah came. There were enough trimmings of power and clout. The neighbours were impressed but did not show it.

There was nothing much to the visit. But it made one difference. Brown became very nearly white. The neighbours began to send signals: "We are friendly, we are friendly." At least two of them now started greeting Sam, even when he was not looking. Talking about the number of people in Sam's house there were 12. Apart from his family of four, there were two sisters, their husbands, his parents, his brother-in-law and children of one of his sisters. To the neighbour the number was a nuisance but to Sam it was a responsibility he ought to shoulder. His youngest sister Tina recalls with obvious fondness: "Satyanbhai took over the role of father. There were so many of us, making demands on his time and energy. But not once did he betray irritation. To me coming to him is like coming home. He is my brother and I could not ask for more."

Another sister, Jasu who stayed with him for four years, says, "My brother is one of a kind. He is extraordinary. No one can define him." It was Sam who got Jasu's husband Lalit a job. Tina's husband, Girish Makwana, finished his advanced study in medicine while staying with Sam. "He has this uncommon ability to make anyone feel at home. I have not known anyone else who is so warm, perhaps with the exception of his wife," Dr. Makwana says.

Sam's elder brother Manekbhai, who came to the U.S. in 1980 for good, describes his position in the family thus: "Satnarayan has naturally taken the role of the head of the family. In terms of hierarchy it should have come to me. But, I did not quite mind it because I never considered myself separate from my brother. Surely, it did create some conflict between us. But there was nothing that could be called serious."

Sam himself feels he overdid his bit as the "head" of the family. "It has been my nature for as long as I remember to take over in any situation. It has been frequently mistaken as domination by some of my family members. But I saw it in a very different perspective. More often than not I had the talent and resources to intervene in any problematic family situation. To me solving a domestic problem was in no way an assertion of my position, which in any case was wrongly perceived. Nevertheless, I do feel that I was very demanding on my brothers and sisters, not realising they were not my children."

For whatever reason his brothers and sisters did not choose to make it plain to Sam that he was crossing his limits. Some of them bore with him looking more at his intention and less at his conduct. But the second generation of Pitrodas, especially Hina, daughter of Manekbhai, were particularly vocal about their feelings for their high profile uncle. An unusual and a rare heart-to-heart talk between Manekbhai and Hina, which the author was privy to, created a reputation which one knew Sam must have. Her general assessment was to the effect that her uncle's relationship with his immediate family members was unequal and one in which he set the pace. She never quite used the word patronising but could be interpreted to mean that. What apparently exercised her was an aspect of Sam Pitroda not noticed by many others—his perfectly noble obsession to decide for others. "Even if he is right he ends up causing a sense of inadequacy among others." This trait was among the main factors behind his uncomfortable relationship with the Indian bureaucracy. He believes in right decision and wrong decisions. Who takes them is of no consequence to him. Somehow he has not been able to convey that to whoever has dealt with him with any degree of closeness.

Being the elder brother, Manekbhai did try to defend Sam in front of his daughter but somehow Hina managed to make her point. Perhaps she was overreacting. Or perhaps it was her sense of inadequacy that made her talk like that. Nonetheless she did throw light on a part of Sam Pitroda which not

many care to point out. The only person other than Hina who brought this in much sharper focus was Dr. Prakash Desai. He was speaking from two vantage points—one as Sam's closest friend and the other as a psychiatrist.

There was no way Sam's could have been an equal relationship with his family. He went out of his way to treat them as his intellectual equals. In the bargain he made it even more obvious that they were, in fact, not on the same level. This is purely from an intellectual standpoint, which is not always the best way to look at family relationships. In any family relationship the intellectual content is insignificant and at times not relevant at all. A family relationship is more indulgent and less exacting. Sam was caught between the two. Either he was too indulgent or too exacting with his family. At times, even both together. This led to a period of very low and perfunctory family interactions. They did not drift apart. They simply grew too conscious of one another. Their guards were always up. Generally there was much unease. Manekbhai had problems coming to terms with a brother who had outdistanced him. Sam, on the other hand, had problems trying to relate to Manekbhai with the same intensity as he had during their school days. "To me Satnarayan is still my younger brother. I cannot see him in any other way. Over the years I have tried to see him in a more general and less personal way but that he is my younger brother is still an overriding factor," Manekbhai candidly admits.

For Sam too it is as clear. "He is my elder brother. And that is the bottomline. But above the bottomline there are so many other lines. I have tried my best to retain the level of communication I had with him in my younger days. But one does not always succeed."

Manekbhai is the only person against whom Sam can be contrasted in the family. The rest are either too young and incomparable to him or too much under his influence to demand a separate judgement. "In many ways I am like my brother. It is just that I have developed on my basic skills and he has not."

There were subterranean conflicts in the Pitroda clan. They were more temperamental than anything else. They were not, for instance, on mundane property issues. Money was never a subject of discussions. There were no jealousies. The family was remarkably open about its disagreements. In principle everyone accepted a situation where Sam was the benefactor. This reflected even in simple things such as smoking. Sam's younger brother Pravin does not smoke in front of him till date. He smoked in the presence of his father Gangaram. Even now he would clean ashtrays and air out rooms when Sam visits him.

Take the case of Manekbhai's marriage. Manekbhai had so much faith in Sam that he left even the most personal decision of marriage to him. "I did not even go to see my would-be wife. Satnarayan saw her on my behalf and told me she was good. I accepted it. I have been happy with her for three decades now," Manekbhai says.

Practically the entire decade of the '80s was a period of unease which was never verbalised. Everybody knew it. But nobody chose to express it. They all knew that in the final analysis they were one family. So what if one member of the family was the patriarch? Interestingly, Sam could separate his responsibility from his image. He saw to it that each one of them settled down. He genuinely invested his time and money in them. He tried not to step on their corns. But that was not always possible. It is near impossible to fend for someone without giving that someone a feeling of inadequacy. Given Sam's forceful ways it was certainly impossible.

If there were people who could not reconcile themselves to this dispensation, there was at least one person who accepted his position realistically. Yashesh, his brother-in-law and Anju's only brother, would frequently call Sam his "god-father." "He is there and that is all that matters. It is tempting to make negative judgement about him in family terms. But I know him and can tell you that he is like a solid rock tampered by a stream of fresh water. It depends on what you care to see—the rock or stream."

It wasn't quite a case of favouritism, but Satyan did appear to be the darling of his parents. His house was the base of all familial celebrations. Brothers and sisters called on him and rarely did it happen the other way around. His brothers and sisters took it in their stride. If they thought it was too one-sided they never showed it. The reason could be that Satyan never made them feel that they were there to pay obeisance. "It doesn't make any difference where we meet as long as we meet." But even here Manekbhai's daughter sees the catch. "The point is we always met at his place," Hina says. Before she begins to acquire an unpalatable image it ought to be clarified that she merely tries to subject her uncle to a more critical analysis than normally offered. Her candour does not take away from the underlying warmth that she has for him. "I don't like to gloss over anything," she says.

Sam did not quite have image problems in his family. But his relationships could not be described as very happy. It is easy to fix the blame for this state of affairs after a superficial analysis. But a detailed look reveals all kinds of complexes on all sides. His success has definitely been an important criterion that decided how his family viewed him. For instance, Manekbhai, despite his dignified conduct in the last few years in all matters of the family, does say things that betray a sense of inexpediency in comparison with his brother. "Somehow I have not been effective. Sam (at times he calls him that) is pushy. I tend to be abrupt," he says. He cites the example of his brief stint as a sales executive at a departmental store in Chicago. Given his expertise in timber marketing Manekbhai was supposed to look after the sale of wood. He posted impressive results in the first three months. He sold more quantity than he was supposed to. Being an apprentice his quota was already more than others. Quite naturally, Manekbhai asked his employers that he be confirmed in his job and given a raise in his pay. Although his employers did not say it in so many words it was his halting and inadequate English that went against him. Manekbhai quit in a huff.

In contrast, Sam, who was also not that proficient in his English during his initial days, persevered, made mistakes and learned from them. The language was certainly an important tool to stand up to America. Manekbhai never managed enough English to meet daily situations head on. In a country where talent has to be verbalised Manekbhai found himself out of depth. Sam, on the other hand, made no apology for his language during his early days. He conveyed his talent clearly enough not to get ticked off. His language gradually became correct, precise and effective. Sam stays away from grandiloquence and uses his words more as a scientist.

This by itself was not the cause of the growing distance between Manek and Satyan. The cause lay in Titilagarh in Orissa. By the time Manekbhai decided to migrate to the U.S. in 1980 his father Gangaram had made enough name and money as a contractor. As a result Manekbhai was used to a lifestyle where, being the eldest son in the family, his word carried weight and his wish was treated as a command. Satyan was already 16 years in America. He had that much of a headstart over Manekbhai. He was well set in his American ways when his elder brother reached there aged 40. It is a peculiar age — too late to change and too early not to regret that. Manekbhai could not easily live down his relatively luxurious Indian life. In his endeavour to change his ways Manekbhai began drifting from his favourite brother. The tide turned in 1990. But more about that later.

Sam's younger brother Pravin was closer to him in his attitudes than Manekbhai. He knew he had to somehow settle down. He did. Pravin did not suffer problems of adjustment like Manekbhai because he had arrived much before his elder brother and at a much younger age. Unlike Manekbhai, Pravin did not have to give up his position as the elder member in the family. In that sense, he did not face any hierarchical withdrawal problems.

Manek, Satyan and Pinu have been the pillars of the Pitroda clan. Although not in that order and not always accepted as such by others. Eventually, Satyan emerged as the most con-

sequential Pitroda. His friends believe he eminently deserves that position and no one should grudge that.

Domestic strains never grew worse than any of the problems that Sam solved. Of course, his obsessive faith in technology as the answer to all problems did not quite help in family matters. He may not candidly admit it but he did occasionally find himself at a loss in the absence of any tangible technology to solve domestic problems. At such times he simply chose to pretend as if there were no problems. Or he restricted his interaction with his family only to those areas where they agreed. One of Sam's unspoken and unacknowledged traits has been not to make a distinction between his family life and professional life. His profession was an extension of his personal life. May be, his personal life was an extension of his profession. It depended on how one looks at it. This merger has often led Sam to situations he is ill-equipped to handle.

Sam's prestigious job at Rockwell International had all the trimmings of high pressure American jobs. Limousines would ferry him to business meetings. Flying in the corporation's jet was routine. Brother-in-law Yashesh describes it in a succinct but telling expression in Gujarati: "*Satnarayanbhai no rolo padto ho.*" The most appropriate transliteration would be: "His job oozed prestige." This may not be as effective as the original Gujarati expression. But linguistic inadequacy does not allow it to be any better.

Half a million dollars a year in salary was splendid even by the exacting American standards. Had he stayed on in that job he would have risen to positions with two to three times that pay cheque. He would have easily risen to president's level soon enough. He joined at a level where not too many Americans dream of joining. That too in a corporation of the size of Rockwell. Money was ample. Life was becoming simpler. Frequent weekend trips and modest family vacations were as much a part of Sam's life as breakfasts and executive lunches in expensive hotels. But good living never crossed the limits of decency that Sam had known since his childhood. Living it up was not one of his pastimes. Salil and Rajal were being

brought up in relative opulence. But Sam saw to it that they did not take wealth for granted. Money was never allowed to breath down their necks. The advice was 'spend if you must' as opposed to the 'you-must-spend' philosophy of many wealthy Indians in the U.S. When his children asked for water they were not served champagne.

Money has a way of making life insidiously secure. For someone who thrived on insecurity Sam Pitroda began to question the wisdom of wealth. He could make millions more and soak conscience in material indulgence and become like many other purposeless Indian Americans. There was another option—be content with what he got and try and make life easier for the people of his native land. The option he chose is history and will be dealt with thoroughly in the chapters ahead.

So far Sam seemed to lead a well-rehearsed life. It was almost as if his life was a stunningly well written screenplay. There was a certain inevitability about all the twists and turns in his life so far. Interesting things seemed to happen only to him. Take for instance, one of his visits to China. He did not happen to carry any extra pair of clothes or under-garments because he was there for a few hours. As if by design, his return to India (he was shuttling between India and U.S. then) was made impossible by the fact there were no seats available. Sam was told with a straight face by a Chinese airline official that the next flight out was after nine days. It was not very pleasant to be stuck in China. Certainly not without under-wears. He could have bought the Chinese variety but he preferred not to add to his experience of the unfamiliar.

So, Sam got into action. He decided he had to get out even if it meant a continental detour. He went to the air traffic control because an officer there was the only one who spoke English. Sam insisted that he be helped get a seat. Once again the unseen screenplay writer intervened. Yes, said the official, there is one seat on a flight to San Fransisco. Alright, Sam said, get me on it. Just in case the screenplay appeared flagging here, a twist was added. Sam did not have enough dollars.

So, he ransacked every pocket and purse on him. And lo! He found the exact fare money. He flew out of Beijing. The immigration official in San Fransisco asked him if he had any luggage. Sam showed the small executive case that he had with him. A riot of disbelief rocked the official's face. How can a man travel from India to China and back via San Fransisco on just one executive case without change of clothes? In that state of complete disbelief the official asked the one question he shouldn't have. "Don't you change your underwears." It was not so much a question as a cocktail of disbelief, reprimand, disgust and finally helplessness. Sam tried to explain that he maintained houses both in the U.S. and India and was on a short trip to China and therefore clothes and undergarments was not an issue. The official agreed in order to preempt any more shocks.

In those days Sam travelled like a zombie. He would often not remember if he was coming or going. His wife knew. When wives know they ask questions. Husbands substitute answers with cajolery. At times it works. Mostly it doesn't. Wives legitimately feel upset. Husbands get angry. The cycle goes on. Anju too asked questions. They were tentative, even circumspect but usually ones which cornered him. "Do you know Salil finds it difficult to recognise you?" she would say and Sam would get the message.

There is something about Sam's appearance that causes suspicion among law enforcing officials. To compound his looks he had this habit of rushing to a public telephone within minutes of deplaning and calling his wife, secretary and business associates. There were times when he was trailed by plainclothes officials who would get most suspicious about his phone calls, especially the Gujarati language he spoke to his wife in. Sam remembers many occasions when he was suspected to be a drug trafficker. A daschund would sniff at Sam. His passport would then be scrutinised. It used to be the American passport overflowing with entry and exit stamps of a vast number of countries, including Brazil and China. Strange, the official would think, the man has connections in

the "Commie" giant. It would take some explanation before he would be let off. It is very probable that there were question marks after his name.

The author would have taken these anecdotes with a pinch of salt but for the first hand experience he had while travelling with Sam to Chicago in December, 1990. His turn at the immigration came before the author's. By then Sam has changed his passport to Indian.

The official eyed Sam the way the lion must have eyed Androcles. The only difference was the official did not think Sam was a friend who had once saved him. So he asked questions with a coldness that discouraged the author so much he very nearly caught the next flight back home. "You have been to the United States before?" the official asked. Sam said yes. The next question was, when? He said some months before. "How long do you intend staying this time around?" he asked. Sam replied a month or so. "Yours is an Indian passport. What do you do?" the official said.

The author had half a mind to say till 1989 Sam had a reputation of being one of the five men who presided over India's destiny. Sam said he was a telecom engineer and left it at that. If the official was told that Sam held an American passport for a long time but gave it up he would have reacted with as much disbelief as his counterpart at the San Fransisco airport. After Sam the author's turn came. Routine questions were gone through. Then came important question. "What is your business here?" the official said. The author pointed towards Sam and said he was writing his biography. By simple deductive logic he found out that if the man was interesting enough to be written a biography of then he must be good. He tried to smile at Sam who was already waiting to be ambushed by another official. Sure enough a sniffer dog was seen circling Sam.

The author was cleared in a minute while it took Sam about half an hour. Among the things holding him up was three Mont Blanc pens, two of which Sam had purchased at Frankfurt airport for 200 dollars each. One was for his son

and the other for Manekbhai. The third was his old one. The customs officers were curious that anyone could carry three Mont Blancs. Sam was made to pay 20 dollars in duty. His wife was given a talking to for carrying "pans" and leaving her diamond ring in Manekbhai's suitcase. Manekbhai was in trouble because he was carrying pickles and two diamond rings, one his wife's and the other Anju's. His attempts to explain that he had taken his wife's ring for remodelling by an Indian goldsmith did not win him any sympathy. He was subjected to a thorough check up. Drama never leaves Sam. Sam joined Rockwell in 1980. By 1983, he was ready to quit. His next destination was India. Joe Culp, telecommunications president of Rockwell, said in his farewell speech, "Sam is one of the most respected scientists in the telecommunications industry. We understand his desire to dedicate his time to private business ventures, and we are pleased that he has agreed to continue assisting us on a consulting basis."

The "private business venture" was his return to India. Culp did not know it was neither private nor business. It was a venture which Sam had in mind since 1964, the year he left India.



8

Circle of Friends

THAKORE Sukhadia wears diffidence on his sleeves. He lives in a world of his own limitations. He does not come out of it too often because he does not have much to come out for. Sukhadia's tiny shop selling dairy products is located on Rajmahal road in central Vadodara where chances of tripping over urban collapse are quite high. The area is littered with the consequences of an absence of urban planning.

Sukhadia is not easily drawn into conversation. It is not because he resents it but because he is not good at holding his own against the educated. He is not 'Oh so articulate.' As a matter of fact, he leaves more to your understanding and less to his words. You may talk to him about Sam Pitroda for hours without finding out that he knows about Sam. Sukhadia knows Sam as well as any man is ever likely to know another man. The two met in Vallabh Vidyanagar in 1951. Sam was nine and Sukhadia was 11. But their friendship grew only after Sam went to Vadodara. Sam did not live too far from Sukhadia's shop. It was natural that he frequently visited the shop. He would be unfailingly offered a glass of milk and some sweets that Sukhadia's father made. "Peda", a round sweet milk cake, was Sam's favourite.

Sukhadia sums up his 40 years of friendship with Sam in his simple Gujarati: "*Ena jeva beija mitra male nahin.* (You

can't find a friend like him)." Sam is as much a product of himself as he is of his remarkably warm friends. It is impossible to tell who draws strength from whom. Rarely does one come across a group of friends who are so happy with each other and so happy about each other. The group is notable for another reason. It consists of men of incompatible temperaments. Each one of them is his own man. But still each one of them represents a collective identity when it comes to fundamental values of life.

Brief sketches of his most intimate friends would make relating to them much easier. Dr Prakash Desai, psychiatrist, chief of psychiatry department in a hospital in Chicago. He met Sam in the U.S. in 1964 fall at a movie hall on the Illinois Institute of Technology campus. They knew each other since 1958. He is Sam Pitroda's intellectual sounding board and easily the most intimate of all friends.

Dr Desai is a cerebral man. He sizes up people faster than they can say hello. He is extensively read and given to see all human situations from his psychiatric point of view. Dr Desai chooses his words with a purpose. He strips his observations about people of all linguistic frills. What he offers is not naked forthrightness but rightly dressed insights. If there is anyone who can influence an otherwise stubborn Sam Pitroda it is Desai. Many of Sam's intellectual inputs come from him.

Bhupen Trivedi, doctorate in chemistry, running his own business enterprise in Vadodara and supervising a highly commendable rural development project in a village called Jhagadia. He met Sam in 1958 on the M.S. University campus. They used to sit on the same bench. The two travelled together to Chicago. An intimate friend who can make an impact on Sam if he chooses. Dr Trivedi is a man of deceptively sharp brain. He tends to be less flamboyant in his expression than others but is very perceptive. He is very well informed in chemistry. Dr Trivedi does not labour over his words. He strokes his moustache exactly the way Sam Pitroda does. He

is not judgemental in his views, believes more in facts than opinions true to his academic training.

Madhu Mehta, a software engineer, who has known Sam both on technological and personal levels. They met on the University campus in Vadodara but got to know each other well in Chicago in 1965. Mehta worked with Sam both at GTE and Wescom Switching. His software contribution to Sam's 580 digital switch was considerable. Mehta's greatest strength, apart from his knowledge of software engineering, is to ask questions till he gets the answer he is looking for. Mehta is an inquisitive man. Through this habit he has found out many answers about Sam Pitroda. Among Sam's friends he is the only one qualified to comment on his engineering skill along with another friend Girish Mitra. Mehta's friendship with Sam is unique in so much as it involves understanding of technological issue. Mehta's judgements about Sam are more academic than personal. Having worked with him closely he knows Sam's nonconformist style of decision making, something that only Mehta can give insight into. As a professional he is very highly rated.

Girish Mitra, computer scientist, was Sam's senior at IIT by two years. They met in 1965. Mitra runs his own business enterprise in Vadodara. Theirs is a deeply personal relationship. Mitra is not given to forming judgements about people, least of all Sam. His grasp of all situations is very quick although he may not choose to demonstrate it at all times. He has kept his relationship with Sam at a very personal level where it is not always necessary to be good to each other. He is the kind of man who would express incisive opinions without appearing to be obviously capable of them. He is forthright without being harsh.

Angad Mehta is a psychologist who did some remarkable work in the black ghettos in New York. He met Sam in 1970 after he left New York for Chicago. In Vadodara he was a sort of street toughie who picked up fights at will. Angad shoots straight from the hips. He is not someone who impresses immediately. He even tends to play down his own ability.

But behind his happy go lucky and at times even facile personality lies a man of deep sensitivity and clear intellect. He can be fulsome in his praise but would never sound insincere. Of the lot he would appear the least cerebral but that is totally misleading.

Dr Divyesh Mehta, cancer specialist, runs his own hospital in Vadodara. He is very highly respected in his field. Dr Mehta met Sam in 1972 and at 41 he is the youngest of Sam's close friends. Among all of Sam's friends Dr Mehta is the most articulate. He has a way with words. He is not an excessively sociable man. He is rarely effusive unlike Angad who is constantly laughing and backslapping. Dr Mehta is very sound in his judgement of people. In a way he shares with Sam that strong trait to be helpful to India. He is able to distance himself from Sam and form judgements.

Dilip Desai, doctorate in chemistry, is also involved in his own business in Vadodara. He met Sam in 1965 in the IIT campus. They all got admitted to the institute together. He is very close to Sam but totally opposite in temperament. Dr Desai is the odd man out in the group. He is highly spiritual but at the same time a hard worker. He knows Sam very intimately but he does not make it very obvious. He has a very clear idea about his friend and does not shy away from expressing it. He has not limited his intellect to a select few areas. He has a certain sense of detachment about life and would not easily pay attention to things such as clothes. He is a man of immense intelligence but often laughs it off.

Dr Piyush Vyas, a wealthy radiologist, lives in Chicago. Dr Vyas met Sam in 1969 soon after he came to study in the U.S. The most unassuming of Sam's friends, he treats Sam with obvious respect. The way Sam helped him settle down in Chicago is something Dr Vyas remembers with overwhelming gratitude even after over 20 years. He is the least interfering of his friends. He rarely, if at all, advises Sam. Despite his closeness to him, Dr Vyas does not venture suggestions with any force. He chooses mild-mannered but effective counselling. He is the carefree type who would normally not utter

words with finality. His influence on Sam is not easy to detect. But everytime he seems at peace with himself Dr Vyas could claim some credit. It is difficult to say whose friendship Sam cherished the most. He seems intimate with each one of them. But after observing him closely and the way he behaves with all of these friends the author is convinced that Dr Prakash Desai is more equal than others. He is the only one who can talk down to Sam and get away with it. It is not that others can't. They simply don't. Dr Desai's view of Sam, very considerate otherwise, is tampered with a criticism which has more to do with Sam's mental make-up than any specific activity that he might pursue. "I won't give you a profile that may exist in one's medical record," Dr Desai, sitting in his sparsely done up office in Veterans Administration Hospital, says: "Satu (Sam) is very warm, energetic, friendly, concerned, someone to whom friendships and relationships are important. He may not show it and try to appear to be equanimous when he is hurt. But he is extremely sensitive and more susceptible to hurt than he normally seems," Dr Desai believes. "He has a tremendous capacity not to hold grudges. He can be shockingly forgiving and often to his own misery," is how the psychiatrist with a salt and pepper beard sees his friend.

Dr Desai thinks Sam's heart problem was the result of "the tremendous disappointments that he must have felt" after he came under attack from Unnikrishnan. "Satu is a great experimenter, someone who is able to kindle hope in people. He is a great salesman. That's a great strength," Dr Desai says. "The other side of the coin is that he trusts himself the most. So he tends to control people (compare it with his niece Hina's view elsewhere in this book). People who work for him may not feel they are being delegated to."

Then in an assessment which the author finds most perceptive and accurate Dr Desai adds, "Satu is ambitious. He has a kind of self regard and notions that match his skills and talent. Satu feels he is a man who has got a destiny. He is messianic. He is someone who would not bother to turn around and see if people are following him or not. Once he.

is convinced about the rightness of his action he becomes messianic. A messiah defies conventional wisdom with a peculiar kind of ruthlessness and enjoys it immensely."

Dr Desai's assessment of Sam as number one man is even more interesting. "He can be impatient, intolerant and be in too much of a hurry. He sometimes leaves people behind that he needs to take with him. Once again he is driven by his messianic zeal here." The psychiatrist feels that for the kind of challenge Sam embarked on in India (both in C-DOT and later in Technology Missions) "not only do you need to be filled with an inexhaustible supply of self-admiration but even consciously overestimate one's ability to do things." This probably explains Sam's favourite expression "If I aim for the moon I will hit the ceiling." In fact, Dr Desai thinks that Sam creates so much self-assurance among those who work with him that they too tend to believe they can do more than they thought they ever could. This was the driving force behind C-DOT.

"Satu is able to respect only those who treat him as their equal. The moment you try to bring yourself down a peg or two in order to flatter him he loses respect for you. At the same time he is sharp enough to see through those who overestimate themselves in order to earn his respect," Dr Desai says.

One of the favourite long standing arguments between Sam and Dr Desai has been on who is more important—an arm chair theorist who is all intellect and no application or an empiricist who is all practical but of limited intellect. Dr Desai himself is a believer in the power of the theorist while Sam dismisses him with unvarnished contempt. "We have enough thinkers. We need more doers." Sam is a believer in the empiricist who does things, someone who gets down to the actual work. "I used to call him a screwdriver man," Dr Desai says. "He (Sam) is a doer. He is not a philosopher. His philosophy is doing things rather than thinking them. Satu is not very distractable. There are not many people like him in India at his level."

Not all of Sam's friends offer such insights into the man's mind. I did not come across something which I could seriously call reverence for Sam among his friends. They all know him too well to revere him. Interestingly, all of them make a distinction between Sam and Satu. "We don't know Sam. We know Satu," is a common refrain among all his close friends. Dr Desai even suggested to the author to find out why he chose to use the Americanised name. "It is not such an issue with me. People call me what they find convenient."

Madhu Mehta says, "There is transition from Satyan Pitroda to Sam Pitroda. I know Satu more than Sam. People see in Sam the things that we don't see in Satu. I don't say that they are two different men but Sam certainly does have an aspect which is strictly for outsiders. I think Sam's greatest strength is that he never assumes the outcome of any of his endeavours, and puts it off if he feels it may not work the way he wants it to." Mehta says, "He can create his own circumstances to his requirement. His is boundless thinking. Satu possesses an extremely creative mind. Technical capacity is only one aspect of his style. His more fundamental talent is problem solving."

Mehta believes that Sam is "more a starter, someone who can initiate a lot of things. But he needs people to carry it on. He throws five balls at a time and has people catch them. I don't think he is obstinate. He is able to transcend day-to-day reality." Mehta's unique technical association with Sam qualifies him to assess Sam's engineering ability. "It must be understood that Satu is not just an engineer. To him engineering is a means to a much larger and more general reality. To him engineering is problem solving. Sam and I have grown up together. We were together in GTE and then Wescom. His stint at Rockwell gave him the gloss and the finesse. He had already acquired self-assurance while he was in GTE," Mehta says.

Mehta feels that to Sam technology is something through which "tremendous values can be generated." On a personal level Mehta says Sam "has no value judgements, which allows him to enlarge his circle of friends all the time."

Girish Mitra, who tends to understate, says of his friend: "Satu to Sam is a different personality. We care to know Satu. Sam is too impersonal for us. As a friend Satu's biggest strength is that he gets personal without appearing to be interfering in your affairs. Ours is a deeply personal relationship. We discuss all matters related to our families without keeping back anything."

"His greatest strength is that he knows how to market himself. Of course, this is not to take away from basic talent which is ample. His weakness is that he is a blabbermouth. He often says things for effect," Mitra observes.

Among Sam's close friends only Madhu Mehta and Girish Mitra are qualified to comment on his technical prowess. "Technologically, Satu is a visionary. He does not pay a hell of a lot of attention to details but he does have a great overview," Mitra says. On his switching patents Mitra says, "He basically tried to overcome fundamental deterrents in switching. He was not too much into circuit design." Then, striking the only jarring note on the quality of Sam's patents, Mitra describes them as "Average, nothing that is going to fundamentally change the world. But it was certainly not mediocre."

Mehta, whom Sam acknowledges as a crucial software support in his 580 DSS, describes his friend's engineering ability as "Something that is not merely engineering. Satu is not a very good software engineer. But he is brilliant as a hardware engineer. He understands software but more intuitively than in engineering terms."

Both men point out that their opinion of Sam Pitroda as a telecom engineer is not dictated by the considerations that may drive some journalists. "I cannot be fascinated by Satu the way the Indian media was. I have grown up with him and hence understand him in areas which may never become obvious to journalists," Mehta says.

"I know Satu has a reputation of being a telecom genius. He certainly is, but don't make him out to be the last word," Mitra cautions.

Interestingly, both of them qualify their remarks saying they

don't think Sam Pitroda should be judged purely as a telecom engineer who tried to indigenise switching in India or someone who headed five technology missions. Mehta and Mitra feel that Sam's utility lies more in his ability to inspire than doing things himself. Sam's own view is at variance with theirs. "I can inspire precisely because I do things myself." If there are traces of Mohandas K. Gandhi in this remark the reason will become clearer later in this book.

Dr Bhupen Trivedi came to know Sam in June, 1958. That makes him his oldest friend. The two were in a class together and even shared a bench. Dr Trivedi remembers an incident involving Sam which he thinks says a lot about the man's courage of conviction. That year Sam was contesting class representative elections. His rivals were somewhat rough in their ways. Once while Bhupen and Sam were discussing the elections some friends of his rival jumped over two benches where some girls sat. That was a deliberate provocation according to Dr Trivedi. He thought the boys were trying to tease the girls. "Satu sprang from his seat, caught hold of one of the guys and slapped him. The fury with which he slapped was to me an evidence of the man's courage of conviction."

Another incident that is etched on Dr Trivedi's mind relates to his performance in an examination. "For some reason my chemistry teacher ticked off as wrong an answer which I knew was 100 per cent right. He gave me no marks for that. I was so upset that I tore the answer paper. Later Sam asked me what the matter was and I told him why I had torn the paper. Before I could say any further Satu had slapped me. He said 'If you are right, you are right, no matter what it takes to prove that.' " Dr Trivedi believes that while dealing with the C-DOT imbroglio Sam was merely showing the courage he always had.

In Dr Trivedi's assessment "Satu puts all his caution to the wind. He is too trusting and makes friends easily. This can turn into a weakness. He calls a spade a spade as a matter of fact. He looks you in your eyes and talks. He can do that because he has nothing to hide." Sam's friends have been his

greatest sense of joy. For as long as Sam and wife Anju lived in Chicago nearly 20 friends would meet every weekend. After Sam moved to his six-bedroom house in Downers' Grove weekly meetings became far more fruitful.

There is a large basement under the wooden house which opens out to the famous creek. Before going into the goings on in the basement there is a little story about it. There was no woodwork in the basement when Sam moved in. In that state it could not be put to any meaningful use. So one day Sam and his brother Pinu decided to call on their inherited skills of carpentry. The wood was bought and saws were sharpened. Sam can hold a saw exactly the way a professional carpenter does while sharpening its teeth with a file. For some reason the two kept postponing the work on woodpanelling the basement until it was too late. Then in an inspired spell of carpentry the two brothers attacked the logs and within four days finished covering the walls with laminated panelling. The author, himself boasting passable carpentry skills, looked for uneven joints in the panelling but found none. Sam and Pinu did a thoroughly professional job.

The basement is an important part of Sam's life after 1980. By consensus it is the most reassuring part of his house. There is something very homely about the basement. After the woodwork, it became a favourite of his friends. All weekend parties were held here. The parties at Sam's house were not the sort of events where the host specified the dress, where social etiquette were fanatically adhered to and where any violations of table manners were punishable with ostracism. Far from it. Conviviality presided over such get-togethers. Informality backslapped joviality. Sam laughed the loudest. Every time he laughed he had this habit of pulling up his trousers with his elbows. There was a verifiable connection between his laughter and slipping trousers. When you laugh forcefully you inhale and exhale more than normal. Everytime he exhaled his tummy went in and trousers slipped.

Dr Desai has an anecdote about Sam's parties. Although it dates to a time when such parties had not yet begun it is a

good illustration of things to come. At a party in the mid-60s the decibel touched high enough for a neighbour to summon the police. The cops came and politely asked the guests questions what was it that was causing so much excitement. "It so happened that Satu was playing a *dholak*. In his excitement he forgot the time and built up such a crescendo that it had begun to be heard some distance away," Dr Desai remembers.

"I can't tell you how much we used to enjoy those parties. The feeling of togetherness that it generated cannot be described. It was like one big family," Anju says. "Those were the best days of my life. I cooked for all of them. Once in a while Satu did help but I enjoyed cooking for people I love so much. Satu was not answerable to anyone! He could do what he thought fit. There were no politicians to bother him. There were friends to pamper him," she says.

The friends played cards. "There used to be night-long sessions. Nobody went home till Sunday evening." It is not too common that wives of men who are such intimate friends too become close friends of one another. Dilip Desai, who was the only married Indian on the IIT campus, says, "Anjubhabhi and Pratima (his wife) had tough time accepting such loving and close friendships. They would feel their privacy was being encroached upon. But soon enough they too became abiding friends."

Pratima, a Doctorate in Academic Administration, recalls: "Being the only woman among all male friends I was the only 'Bhabhi' (sister-in-law) they had. Satubhai was the jovial type who laughed easily and made others laugh equally easily. I noticed that even then he had terrific clarity in management concept. I knew that he was destined to be big."

Raksha, Girish Mitra's wife, says, "He is the sort of man who would break all barriers easily. He was very loving. To my mind his strength is his immense capacity to give. His weakness is his frankness. He often shoots off but I don't think if he ever regrets it."

Leena, Madhu Mehta's wife, says, "I was a relatively new-

comer into the group when I met him in 1975. But Satubhai has this rare ability to make strangers feel at home. Within no time I felt as if I always knew him. That is his biggest strength—making people feel at ease.”

There was more to the basement than just gregariousness. Something far more earnest was going on too. Among the few common features between the friends was an intense love for India. “Each one of us had a sense of guilt having left it but we did not quite know what to do about it,” Mehta says. India Forum, an informal debating society on issues related to India, was formed in 1968. The Forum acquired a more substantial form as its members became clearer in their ideas about India.

India Forum and the intellectual interaction that it afforded prepared Sam for India. “Several times before he actually went Satu would say he was leaving for India in a week’s time,” Angad says. “The India Forum was instrumental in convincing Satu that his destiny lay in India,” he adds. “India Forum gave me a perspective about India which I had lost because of my long stay away from it. The India I knew and understood was the India of the sixties, which in any case I knew as an ordinary citizen whose understanding of issues was half-baked and somewhat ill-informed. For nearly one decade we had brainstorming sessions on India in the Forum. Intellectuals such as Rajni Kothari, Ashish Nandy and Dhirubhai Seth participated in our debates. I owe a great deal to the Forum in terms of updating my knowledge about India.”

Mehta remembers the days of India Forum as ‘days of collective introspection.’ “We had a sense of guilt. But more important than that was the genuine will to try and contribute to a nation which had given us so much in terms of fundamental values of life,” Mehta says. Staying away from boy scout idealism was very difficult. They were all prone to visions of juvenile Utopia. Fortunately, India Forum never quite let such useless romanticism disrupt its normally precise routine.

India Forum published 1000 copies of a booklet on India. Sam was the editor of the booklet. “Once to save seven dollars

we worked in the press for two hours. The argument that seven dollars was no big deal met with a typical Satu reply ‘It is India Forum’s money’,” Mehta said. The Forum had no pretensions of becoming a bigger debating society than it was. The idea was to get like-minded people together to debate India’s most pressing problems. Did telecom figure in those discussions? “Only on the periphery. We never quite got that specific. Telecom as a means to revolutionise the Indian society was not discussed in any detail. It was known that since it was my specialisation I would naturally like to concentrate on that if at all I returned to India.”

“India never went out of Satu although he did go out of it. I remember as early as 1966 Satu talking about how he would return to India and do something worthwhile,” recalls Dr. Piyush Vyas. Many of Sam’s American friends bear testimony to his wish to return to India. Paul Miller, his close friend and a leading attorney, says, “He has a little diary showing certain cycles that he should go through in business and then return to India. My view was that while he should return to India he should not give up his American citizenship.”

Another testimony comes from Dick Ciombore, who was director of business materials at Wescom Switching and who now works at Richmar Electronics. “Sam and I used to go on sales calls. He would frequently tell me ‘Dick I have been successful in this country because of what my heritage gave me. I want to do something to repay India.’ He would often talk about the areas he wanted to get involved in India.”

It was very easy and perhaps even safe for Sam not to expand his circle of friends beyond what he already had. But unlike many Indian Americans, who develop a very strong sense of community and become painfully inwardlooking, Sam went to the other extreme. He opened himself to all kinds of associations, friendships and acquaintances who were non-Indian Americans. Among his American friends are Clint Penny, Alan Brown, Paul Miller, Dick Ciombore, Roger McLain, Dan Fargo, Tom Parker, Mel Simon, former Senator Charles Percy, George Gardner, David Stull and countless

others with whom he struck brief association or acquaintance. Even in a most perfunctory acquaintance Sam did not fail to give a personal touch giving the person a cause to remember him for a long time.

"Sam," said Ciombore "was never too busy to recognize your needs. He would take time off for the good of everyone." Ciombore believes that Sam is an optimist. "I have never seen him being a pessimist. He has this unique ability to confront and address problems directly. His weakness is that he would expect everyone to do what he can." Ciombore's assessment of Sam as an engineer is "somewhat unengineer like." "In the sense that unlike many other engineers, who restricted themselves to their job, Sam spread himself over sales and marketing. His leadership traits were very obvious at Wescom. It was clear to me that he was no ordinary person," he says.

Tom Parker says, "In corporate politics he is very direct. He lets his chips fall where they might. In regular politics it will be disastrous. I don't think he ever cares about money. In my 18-year-old association I have never heard Sam talk money with any degree of passion."

Mel Simon, Sam's friend since 1979 and accountant, narrates how he got to know that he had become famous in India. "I was in London once and waiting in a queue for a show. There was an Indian in front of me. I asked him if he knew Sam Pitroda. The Indian said everyone knew Sam Pitroda. Sam, he added, was inspiring the young generation in India."

In Simon's judgement what makes Sam click is "challenge." "He likes to be challenged and to be able to do something to help others. From the people I have talked to I find that he is very highly regarded both as an engineer and as a leader of men," Simon says.

George Gardner, a portfolio manager and financial expert, says of Sam, "I was aware that Sam had the brainpower and the potential to build great things." Gardner thinks "Sam is a very advanced human being, one of the most advanced species that I have ever known." Paul Miller, a top attorney,

says, "He is one of the most talented organizers. He is a great motivator and a very good engineer. He is an unusual man. I don't know of too many like him. Sam is enormously intelligent and has immense capacity for hard work. But the only problem is he is too trusting." What strikes Dan Fargo, former editor and owner of the prestigious *Telephony* magazine, the most about Sam is "his intense interest in mankind's good and the breadth of his mind. His is a grand vision which covers human beings of all denominations. His sense of enterprise has also impressed me a great deal."

The author asked two questions of everyone he interviewed. One was to rate Sam as an engineer, manager and friend on a scale of 10 and the other about how honest they thought he was. The answers were startling for their unanimity. The question of Sam's integrity arose after former minister K.P. Unnikrishnan attempted to indirectly accuse Sam of having made millions of dollars by misusing his official position in the Indian Government.

The following are the replies the author got.

Manek Pitroda: "If someone tells me that one of us two brothers is dishonest then I would readily say it must be me. Satnarayan's integrity is so overpowering that he often ends up sacrificing legitimate gains. I don't remember any instance of him having ever lied."

Dr Prakash Desai: "It is explicit, exquisite and inexhaustible. I would not question his integrity in any kind or way at all."

Dick Ciombore: "No question about it." On a scale of ten he puts Sam at a perfect 10 as an engineer, between 7 and 8 as a manager and 10 as a friend.

Tom Parker: "He has no use for dishonesty. Besides, I don't think he understands it." Engineer—9 (I don't know any 10s), Manager—7 (he trusts too many people), Friend—10.

Bharat Thakker: "I have a very high opinion of his integrity." Engineer—10, Manager—10, Friend—10.

Neeraj Gupta (an engineer at Bell Lab, Illinois): "Seems totally honest to me." Engineer—10, Manager—10, Role model—10.

Mel Simon: "I would not associate myself with someone whose personal integrity was not pure. He would never stoop to make money. He had a very comfortable life here. His motivation came from the heart and not the wallet." Engineer—not qualified to say, Manager—9, Friend—10.

Alan Brown: "Where is the question, Sir? He could have made much more honest money had he stayed on here." Engineer—12, Manager—8 1/2 to 9 (too nice to people), Friend—11.

George Gardner: "Sam has complete personal integrity. Those who attack his integrity are barking up the wrong tree." Engineer—10 (I am told he is very very good), Manager—9, Friend—10

Paul Miller: "There is no question in my mind that he was devoted to India and not seeking any economic reward. I don't know of any of his dealing which is not absolutely above board." Engineer—very high (unable to give a number), Manager—9, Friend—10.

Roger McLain: "You could not find a more honest man." Engineer—10, Friend—10, Manager—7.

Dan Fargo: "How can anyone ever doubt it?" Engineer—9.9 if not 10, Manager—8 or 9, Friend—10.

Paul Pandyan: "Beyond question." Engineer—9, Manager—7, Friend—10.

David Dieter: "Why even raise a question about it?" Engineer—10, Manager—10 (If it is a project, otherwise less), Friend—9.

Venkat Rajendran (C-DOT): "I had tears in my eyes when he was first accused. I sincerely believe that Sam is honest, completely." Engineer—9.8, Manager—10, Friend—9.

Renu Baweja (Former Secretary): "Unbelievably honest. He would not even spend 50 paise of office money for a postal stamp. He had given money especially to buy stamps. He never claimed any entertainment bills from C-DOT. Sam is honest beyond words." Manager—10, Friend—10.

Dr N. Ravi (Officer on Special Duty Telecom Commission):

"I never doubted his integrity." Engineer—9, Manager—8, Friend—10.

Madhu Mehta: "He is spotless. Satu does not understand dishonesty. His style of working may be unconventional but his integrity is unquestionable. I think he is fanatically honest." Engineer—9, Manager—10, Friend—Let us not quantify that, it's too much.

Girish Mitra: "Satu is essentially a very simple man. He is not impressed by money. To him honesty is a matter of routine like all his intimate friends. You have to be honest." Engineer—8, Manager—10, Friend—He is too close for that.

Dr Bhupen Trivedi: "Satu is more honest than you can ever imagine. There are a few things that he is possessive about; one is his honesty. He is not honest because he can pontificate. He is honest because that's the way he is made." Engineer—10, Manager—10, Friend—Goes far beyond the scale.

Dilip Desai: "Satu can never be dishonest because he will not be able to live with himself otherwise. He can be honest to a fault." Engineer—10, Manager—9, Friend—Too dear for any number.

Angad Mehta: "The question is of no consequence. I will never subject Satu to such scrutiny. He is honest. He does not know anything else." Engineer—10 (That's my impression after talking to many people), Manager—9, Friend—A gem.

Dr Divyesh Mehta: "Satu's single biggest strength is his transparent honesty. He is so obviously honest." Engineer—should not judge him because I don't know much but would put him close to perfect, Manager—9, Friend—Let us not restrict it to such scales.

Dr Piyush Vyas: "I swear by his honesty." Engineer—10, Manager—9, Friend—Let me just say that he is unique.

Thakore Patel: "Anyone who raises any doubt about him does not know Sam. I think his integrity is beyond question." Engineer—I am told it's very high, Manager—10, Friend—10.

Surjeet Patel: "He is honest to the point of being harmful to himself." Friend—Great.

Dr Dilip Patel: "I have not the least doubt that there is any

question about it. If he cut corners in C-DOT it was entirely for India." Engineer—10, Manager—10, Friend—Noble.

Dr M.V. Pitke: "There is no debate on it. His integrity is impeccable. I would give him a perfect 10." Engineer—9.5, Friend—9.9, Manager—7.

Quite evidently, moderation is not so common among Sam's friends when it comes to describing his virtues. Even if one makes concession for personal feelings that may have coloured the above judgements it still appears quite clear that there is simply no one among those who know Sam intimately who would even for the sake of argument believe he is dishonest.

The question of C-DOT's procurement through his company Martek, which was the cause of his integrity getting sullied, has been dealt with extensively elsewhere in this book. But my interviews were so overwhelmingly in support of Sam's integrity that several times I had to ask my subjects for reiteration. Some of them were somewhat offended by the fact that I had some doubt about their assertion. But the only way I could have avoided feeling overwhelmed myself was by retaining my healthy scepticism. Despite that the judgement comes tearing through that Sam Pitroda's honesty is so total that it seems absurd at times.

During the course of my interviews and the incredible unanimity that I found in the views on his integrity I began to wonder if it was not personal honesty that was keeping such a diverse group of people together for the past two and a half decades. I tried to reason, if only to satisfy my cynicism, that perhaps in such long standing friendships people acquire a magnanimity that often makes them overlook things like dishonesty. But I found that there was something very quietly vehement about the way people described Sam's integrity. If I were to put the above judgements in one telling line I would say Sam Pitroda is honest. Period.

Except for some intimate friends none of the people quoted directly here, and many others on the basis of whose opinions the author reached a certain judgement, is burdened with a

sense of duty towards Sam. The author has good reason to believe that their opinions are independent and free from any influences that an abiding friendship may have on them. Not one of them appeared to be straining to defend something they thought to be indefensible. What lends their assessment credibility in the author's eye is that none of them has anything to gain, either materially or in terms of gratitude, by showering such encomiums on Sam Pitroda. Even if one concedes that a lack of any apparent gain does not automatically make such unqualified praise more credible, it is still very significant that so many individuals, who speak from the advantage of long years of association, should be willing to express such a committed view of one man.

The author has considered the predictable argument that since they are all his friends and associates they are unlikely to say things other than complimentary about him. This would normally be an uncontested argument. But given the facts of the situation that is central to this whole debate about Sam Pitroda's integrity this unanimous view carries conviction. The facts have been highlighted elsewhere in the book.

To come back to the other features of Sam's friends something has to be said about the warmth they have for one another. It is so real and so forcefully articulated that at times one wonders whether it is at all true. Consider, for instance, a typical scene from the numerous weekend encounters. Conviviality is the starting point of any such get-together. That is the least one can say about the mood.

It is a Saturday morning and just the beginning of the weekend. Anju is flashing an ear to ear grin at the prospect of the two days ahead. Sam is humming something that could be a mixture of many songs. There are more plates than normal on the table for breakfast. Dr Prakash Desai is expected any time. Bhavesh Das, a friend for over 20 years who has always stayed next to Sam's house, is already there. He is munching away typical Gujarati snacks. He cracks a couple of mild jokes with Anju. She laughs more than the jokes deserve. She is

happy and feels generous. Some backslapping takes place between Sam and Bhavesh.

While this is going on Prakash enters. More familiarity and more humour. Prakash plucks a wafer between his fingers and says, "*Kain navun banavo* (Make something new)." Prakash asks Sam something without being specific in his reference to the context. Sam understands it and says it may take a little more time.

The two friends can pick up conversation from the point they left 15 years ago. That is what all great friendships are all about. You can travel back and forth on decades without noticing any time lapse.

The weekend has just begun to warm up when Angad walks in. Angad and Prakash who keep sniping at each other in a friendly fashion, start laughing the moment they see each other. They have remembered a joke they had shared a week before. In an hour's time the wooden house is creaking at the joints. The atmosphere is full of vitality and vigour.

Everyone is there with his wife. Bhupen, Girish, Madhu, Dilip, Divyesh, Rajiv Desai (not mentioned earlier), Piyush and Thakore. It is a cocktail of familiarity, joviality, earnestness, humour, music, food, liquor and all encompassing sense of camaraderie. This marauding happiness lasted two days.

If you can imagine nearly 15 years of such happiness every week, then you can imagine what Sam Pitroda must have felt while deciding to leave all that and go to India where he knew nobody and where he had to prove himself against heavier odds before his mission became worthwhile.



PART TWO



CALL OF INDIA

Churnings of Patriotism

SAM Pitroda never suffered the ignominy of being thrown out of a first class rail coach. That was because he travelled by air. There are not too many instances of men having been chucked out of a jet mid-air because of their pigmentation. A free fall from 25,000 feet may be fatal but it does not cause as much humiliation as the thud of a man hitting the railway platform does. In any case modern day racism has become much more subtle. An air hostess may serve you canned orange juice when you ask for white wine if you happen to be black or brown. Sam Pitroda asks for white wine and he gets it. That does not disqualify him from being a Gandhian.

There is nothing immediately common between Pitroda and Gandhi. As a matter of fact self-righteous Gandhians are bound to take offence at the very attempt to make any comparison between the two. Ask Sam what happened during his convocation address to the Indian Institute of Management (IIM) students in Calcutta. Those were the days when Sam was basking in the glory of political clout. He was a much sought-after man. During the course of his address Sam began telling the students what he had learnt from Gandhi. "Gandhi was an information man. His entire success was because of

his splendid communication skills. I have learned three things from Gandhi. Truth and absolute truth in business—don't fudge your figures. They will catch up with you; self-reliance—learn to do things yourself, try to be independent and sacrifice—at some point in life you must decide to give back." It was fine up to this point. Then he entered the danger zone. "If you practise these three things you are Gandhian. You may still drink Scotch and wear a jeans," Sam said and some hacks in the Press row noted it down. The next day some newspapers carried the story under headlines to the effect "Pitroda says you can drink whiskey and still be Gandhian."

By that one remark Pitroda had committed a sacrilege of unforgivable proportion in the Gandhians' eyes. Predictably, there was an uproar. Scores of Gandhians asked the then Prime Minister Rajiv Gandhi (no relation of the Mahatma) that Sam should be made to apologise. Some Gandhians even went to him to extract an apology. Never mind if they were all doing something patently unGandhian—attacking a man's freedom of expression. Sam Pitroda refused to apologise. Not only was he unrepentant he was even combative. "Gandhi himself would have appreciated the message in it. The point I was trying to make was drinking liquor and wearing jeans are extraneous to the essential philosophy of Gandhi. On the other hand, you wear khadi, spin the wheel, tell lies, drink liquor, indulge in corrupt practices and still want to describe yourself as a Gandhian?"

Gandhi has been a great influence on Pitroda contrary to what might appear. In 1983 Sam and his 20 friends went to see Sir Richard Attenborough's *Gandhi* in Chicago. There was expectation among the friends. For many of them it was a pilgrimage. Particularly for Sam Pitroda. The jing bang trooped out of the cinema hall some three hours later. All of them were crying. Many eyes were bloodshot. "I was virtually sobbing. I was shaken up. One always knew about Gandhi's greatness but the visuals moved me. I said to myself that Gandhi was the greatest communicator of all times."

Sam himself has never openly or by implication admitted

that he has fashioned himself on Gandhi. Not so much in details of mudane life as the philosophy of the man. Of all his friends only Bharat Thakker, a quality control specialist at the prestigious Bell Labs, Illinois, speaks of Gandhi and Pitroda together. "His love for India is much more than Gandhi's. I think Satu is a modern day Gandhi," Thakker says oblivious of the consternation his observation might cause. Just in case his observation is lost on you, he adds, "Even Satu's material sacrifice is more than Gandhi's."

Another person who used Gandhi to drive home a point is his wife Anju. "Everyone talks about Gandhiji. No one bothers about Kasturba, the woman who bore it all in silence and dignity." Anju said this in comparison with her own position during the high-profile days of her husband and later when the going got tough. The film came at a time when Sam Pitroda was contemplating shifting to India. "I must admit that the film made my decision easier. Gandhi has been my only hero." The film set off churnings of patriotism in Sam more than ever before.

Satyanarayan Gangaram Pitroda leaving for the U.S. was not very different from Mohandas Karamchand Gandhi sailing for South Africa. Both were out to chart an unknown course. Both were the first in their families to travel abroad. Both left in pursuit of careers, which they radically altered. Both depended upon the power of communication. Both motivated and inspired people. Of course there was a major difference between the scales on which they operated. Both believed in technology as a means to achieve better life standards but not at the cost of the human content. Gandhi's 'Charkha' was replaced by Pitroda's 'Chip'. In an interview with *Sunday Herald* on October 2, 1988, Gandhi's 119th birth anniversary, Sam spoke about how the Gandhian way was relevant in the 21st century. "I for one see a great correlation between the charkha and the chip. While the charkha symbolises our history the chip represents the 40 years since we attained independence. That transition from the charkha to the chip is undoubtedly creating a certain amount of confusion in the

Indian environment, but it is necessary step towards a new diversified work culture. While the charkha represents our past, the chip shows the way to the future with innumerable similarities."

"Gandhi was not against science. He knew that science must be used for the masses. But while Gandhi's views were clear about the masses they were not so about the application of science."

What Sam did not say in that interview, he told me. "The charkha was the ultimate symbol of the industrial pragmatism of the time. The chip has the same status now. Although it cannot be compared with the charkha in terms of its sheer scientific ingenuity, it is the nearest I can think of as a comparison."

The only time Pitroda saw Gandhi in the political context was after the 1991 general elections were announced. "I have seen so much of political rot that I am convinced that Gandhi was right when he said some 40 years ago that the Congress should have been disbanded. It is now a party he would not want to recognise."

If there was any indecision in Pitroda's mind about returning to India, Attenborough's *Gandhi* removed it. Gandhi's unrelenting courage in South Africa and later, of course, in India was a source of tremendous inspiration for him. It called for sacrifice which Pitroda and his family could have gladly done without. Anju was apprehensive but not altogether disinclined because she too liked India. She had no inkling of what lay ahead—the dizzying ups and the humiliating downs of New Delhi. So she agreed to go along with her husband's wish. The children were too young to express any opinion of their own, and Anju too devoted. Pretty much like Gandhi, Pitroda's wish prevailed.

His family's emotional hardships have been dealt with elsewhere in the book. But it is relevant to draw some parallels between the way Gandhi treated his family and Pitroda treated his. There is a general impression that Gandhi's personal greatness was built upon little joys of his family. This impression may not be entirely correct but it is not entirely incorrect

either. It is recorded history that his sons did feel somewhat compromised because of Gandhi's moral obstinacy. In Pitroda's case things never went that far. However, there are enough hints to make the point that Pitroda's success was built on his family's little joys.

All moral leaders, of varying scales, have chosen to make an example out of their immediate families, and Sam Pitroda is no exception. This is not as true of his children as it is of his wife. But more about that in the chapters ahead. The comparison between Gandhi and Pitroda may strike the reader as invidious and as something that ridiculously overestimates the latter. That is not the intention at all. The intention is to see how the Gandhian philosophy's impact in a modern and totally non-political sense is seen on someone. Like many other out of the ordinary leaders the Indian civilisation has produced, Gandhi has been deified and hence effectively made unattainable. Gandhi is now a political ritual which is of as much practical consequence as pouring milk on the 'Shiv Ling'. Seen in this light Pitroda can certainly be called a modern and effective manifestation of the Gandhian philosophy. The comparison is in so much as it recognises Pitroda as an important example of how Gandhism can be made effective on a mundane non-political level. This argument will be supported in details in the chapter on the five Technology Missions.

As a leader of the masses there is no comparison whatsoever between Pitroda and Gandhi. Sam is not the sort who can move the masses. He does not have the monumental patience that Gandhi had to exercise in dealing with exasperating mass situations. But more importantly, there is no one monolithic enemy against whom he can arouse the people. Gandhi had the English, alien and autocratic. Pitroda has mundane hardships such as drinking water and illiteracy. They are neither enemy in the classical sense nor alien. They are of our own doing.

In any case, Pitroda did not rise from the people. He started at the top and stayed there. His contact with the man on the

street was minimal and perhaps non-existent. For the kind of high-tech struggle he was waging he could not have involved multitudes. It was too specialised a job for that. So the comparison between Gandhi and Pitroda is improper in its scale. Sure, he was inspired by Gandhi. But then millions have been inspired by Gandhi. On the virtue of that they can be compared with Gandhi. At best Pitroda is a non-political outfall of the Gandhian philosophy. He tried to interpret and practise Gandhi's methodology in an area where nobody had imagined it could be tried.

There is a story about Pitroda's first ever meetings with peons and janitors at the Sanchar Bhavan after he became the Chairman of the Telecom Commission. Pitroda was upset that the building was not properly cleaned. The floors were dirty and smeared with the refuse of pan-chewing employees. He would notice things such as unscrubbed floor and dirty walls and point them out. In a severely feudal hierarchy peons and janitors don't even at their optimistic best hope of meeting the Chairman one to one. If by an odd chance the Chairman wishes to see them they take it for granted that it must be for a reprimand.

The meeting was called. There was nervousness among the lowest category workers. Many of them had visions of summary dismissals. At the appointed time peons and janitors began to gingerly enter the Board room. Diffidence and fear of authority have a way of ruining a man's bearing. Feudalism is so deep-rooted in India that even now those doing the so-called lowly jobs don't sit in the presence of those who are their bosses. The peons and janitors did not sit down. As a matter of fact some of them literally stuck to the walls in an attempt not to encroach upon the august space of the Chairman's office.

"I had not seen anything like this before. I did not know man could be sickeningly reverential of authority." Sam Pitroda cleared his throat and half of them very likely expected to hear a harangue. "First of all I want all of you to come here and sit down." The words must have struck as absurd

to many of them. With some labour they mustered enough courage to look at the Chairman quizzically. "Yes, I want all of you to sit down around me."

They all sat down, most of them on the edge of their chairs. Reverence is conveyed through various body postures. Some people bend just a wee bit at the nape and keep their hands clasped behind. Some others, those who are audacious enough to actually sit in front of their superiors, do so at the edge of their chairs. The deeper you go into a chair the less respectful and more familiar you are supposed to be. There is an advantage in sitting on the edge. It is easier to get up in case the boss gets up suddenly.

So the people in the Chairman's office were already battling disbelief when something comforting came. "I see that the building is not cleaned properly. The floors are not well scrubbed and there are smudges on the glass panes." The men and women thought at long last the Chairman was being normal with them—pulling them up. But that was not the case. "I want to know your problems. I know you are all capable of good work. There must be something that is not letting you work to your full capacity." By then far too many unexpected and unimaginable things had happened in the room for them not to react.

The peons and janitors explained their little problems. They said they did not have lockers to keep things and difficulties like that. Pitroda said that would be arranged. He then told them that some of them would be taken to a five star hotel to see how it is constantly scrubbed and mopped and polished. "We don't have to be a five star hotel to remain clean." The meeting was called to an end after they all had tea.

In normal circumstances this would be a perfectly routine occurrence. There is nothing noble or virtuous about Pitroda's conduct. But in New Delhi it hardly ever happens that the man at the top has the kind of consideration for those at the bottom.

Pitroda also has a problem with guards saluting him. Bhupen Trivedi remembers: "Once we had gone somewhere together.

Those were early days. Satu got down from his car and was about to enter a building when a guard gave him an impeccable salute. Satu was taken aback. He went to the guard, kept his hands on his shoulders and said, '*Bhaiya, humko salaam mat karo. Kisi ko bhi mat karo.*' (Brother, don't salute me, don't salute anyone). The guard was so overwhelmed he almost hugged Satu."

In normal circumstances Sam's conduct would be perfectly routine and would not be anything virtuous. But in New Delhi it hardly ever happens that people on top positions condescend to converse with those at the bottom on an equal footing. And certainly not in the Indian bureaucracy where a typical bureaucrat would not so much as switch on a fan. He would either wait for his flunkey to do it, if he has not done that already, or simply press the buzzer to summon someone to do it for him.

The attitude of Pitroda's is visible in whatever he does. In that sense Pitroda's is an important manifestation of the Gandhian way of doing things. He does not stand out because the national stage is cluttered with "Gandhians" in politics.



10

Return of the Native

HALF a million dollars in salary is enough to cause decadence. If you have three million more in your bank account then decadence is virtually guaranteed. It wasn't just a lack of challenge that bothered Sam Pitroda. The fear of degenerating into intellectual sloth was real. He was desperately looking for something radical, which certainly could not be found in his opulent executive's office at Rockwell International.

The weekend Indian Forum meetings in his basement had prepared Sam for the step he was about to take. He did not know what he was headed for but something in the air told him it was going to be big.

Sometime in June 1980, a court verdict against the telecom giant, American Telephone & Telegraph Company, shook up the entire industry. AT & T had an almost total monopoly on the long-distance telephone service. At least 40 telephone companies were exercised over this state of affairs. They could not enter the lucrative market as long as AT & T's monopoly was not dismantled. MCI Communications Corporation, a Washington-based company, had filed a private anti-trust suit against AT & T. A federal judge gave a ruling that single-handedly revolutionised the American telecom market. MCI contended that AT & T had illegally prevented it from entering

the market for private long-distance telephone service. Judge John Grady awarded a whopping \$1.8 billion in damages to MCI, the amount believed to be the largest ever awarded in an anti-trust suit. Although the amount was not very substantial for AT & T, whose net revenue for 1979 fiscal was \$46.2 billion, the verdict's implications were clear to all in the industry. The market could open up to a large number of companies.

Pitroda had no direct stake in this but any development of this scale was as important to him as anybody else. He noted it but did not go beyond that. He had got his mind set on India. So much so that he began monitoring every little development in telecom and related field in his native land. From a newspaper advertisement announcing a five-year tax holiday in the Santa Cruz Electronics Export Promotion Zone (SEEPZ) in Bombay to the proposal for the solar-powered multi-linked radio telephones in 15 villages in the Mirzapur district of Uttar Pradesh Sam kept an eye on everything.

"I had to know everything that was happening in telecom and electronics in India before I decided where and how I got involved. It was one thing to talk about India in the Forum and quite another going there." Sam's biggest handicap was he did not know how things worked in India. He had been in the U.S. throughout his professional life when he had to deal with decision makers, be it in the establishment or in business, in the American way. He had not seen New Delhi ever. He did not know the Parliament House from Rashtrapati Bhavan. He did not understand the difference between a Cabinet Minister and a Minister of State. For that matter not even between a Secretary and a Joint Secretary. Dealing with the government was the last thing on Pitroda's mind.

For quite sometime he was unable to decide how to go about reaching India. One way, of course, was to take the next flight to New Delhi. But that was going to India and not reaching there. "We wrecked our brains on what I could do. My friends and I discussed a whole gamut of things."

Then, as it happens with most adventures, it suddenly found

an embarkation point. A *Times of India* clipping reached Pitroda sometime in 1981. The report spoke of Prime Minister Indira Gandhi's decision to set up a commission to look into telecom modernisation. The commission was to be headed by H.C. Sarin, a former civil servant. Pitroda was quick to spot an opening in this. He wrote a letter to Sarin explaining his work in digital switching and offering to discuss wide-ranging ideas to modernise the telecom set-up in India.

A chance meeting that Pitroda had in 1980 or earlier with a businessman with powerful contacts in New Delhi must be mentioned at this point. Damodar Bharatiya, a Bombay-based executive with political friends in Delhi, met Sam in Chicago. "At that time his wish to do something for India was still not as overpowering as it went on to become by 1981. Although there are many Pitrodas in my album I thought he was different," Bharatiya remembered.

By 1980 Sam and Damodar were known to each other for long enough. Damodar often stayed with Sam's family. Sarin received Sam's letter. He suggested that Sam come to Delhi and try and see Mrs Gandhi. "Sarin thought Pitroda was an Italian," Bharatiya chuckled.

In June 1981, Sam landed in Delhi. He was only 38. "While commuting from Chicago to O'Hare (airport) I had this fear that in the next 24 hours I would be landing in a totally different world, with different values, different work ethics and different standards." The first sounds, smells and sights of Delhi were memorable and not entirely for agreeable reasons. "Loads of people were waiting at the airport. They stepped over each other. There were long queues at the customs. Delays in baggage clearance seemed normal. I knew I had entered a developing system. What was in front of me was so complex, bureaucratic, feudal and hierarchical that I started wondering whether I could cope with it."

The taxi that brought him to the Taj Hotel on Mansingh Road was full of the stench of human habitation. The driver practically lived in there. Fortunately for Pitroda the driver's undergarments were not on display. He was politely ushered

into his room. He had a shower and a change of clothes. Now what? He noticed that the telephone instrument was a French make. That's fine, but what does he do with the telephone! He did not know whom to call. So he called Chicago to say he had reached safe and sound.

It is a strange feeling to be a stranger in one's own country. Pitroda tried striking up a conversation with the staff at the reception to find out elementary details about Delhi's topography. He went to the coffee shop and ordered some snacks. He looked around to see if there were any familiar faces. There was none. The only familiar face he saw was in his toilet mirror or the one in the elevator. He saw Mrs Gandhi's photos in newspapers and magazines at the hotel bookshop. He bought some journals in order to catch up on India. He went back to the room waiting for the phone to ring. It did not. It was the first taste of Delhi.

Pitroda was trying to find ways to fix up an appointment with Mrs Gandhi. He did not know where to start and whom to call. He did try calling the Prime Minister's Office directly but failed to connect. Even if he had connected he would have failed to obtain an appointment. One needed more than just a telephone connection to reach her. Meeting Indira Gandhi was a routine that left many exasperated. It was an education for Pitroda, as it gave him some idea how things worked or did not work.

His first visit did not produce anything. Many more visits that followed and cost him tens of thousands of dollars would also not produce anything. "In retrospect, I wonder how I managed to be so patient," Sam wondered. During one of his many visits Pitroda was both amused and horrified to find out that all of Mrs Gandhi's phones went dead after a spell of heavy rains. The telephone lines, it seems, were not properly insulated. That was a chilling commentary on the state of New Delhi Telephones.

Sometime in the middle of 1981 Pitroda managed to fix up an appointment with Mrs Gandhi. He came down specially for that but the meeting was cancelled for reasons which were

not very clear. At least three more times his appointments with her were cancelled for unspecified reasons. Pitroda was looking for an hour-long meeting which was simply out of the question then.

"I knew access would be a problem but I did not think it would be such a major problem. I had to make my presentation to the Prime Minister in case I wanted to gain an entry at a level which I considered effective. Telecommunications to me was something of national importance and needed attention from no less a person than the prime minister."

Every time Pitroda went back to Chicago without meeting Mrs Gandhi, his resolve to make an entry became strengthened. "During these visits I also got to see for the first time the working of the Indian system. One had only heard about it, and most of it bad."

It was important for him to absorb whatever he could because he was planning to live in New Delhi at least for some years. He noticed the old black telephone instruments, the dialling of which often left one's index finger in severe pain. He also noted the fact that there were not too many electronic exchanges. He could discern that from the dial tone. Pitroda was struck by the small number of public telephones in a city of New Delhi's size. And many of those which existed were either non-functional or had a broken dial or a twisted mouthpiece. Coins would either go right through the system or get stuck in the slot. Public booths never had telephone directories. The booths themselves were filthy. It must have been quite an experience for someone who was used to AT & T's telephone service.

"I did not have to look for work in case I returned to India. It was right there in front of me," commented Sam. After two or three visits, Pitroda had observed enough to draw up a plan for himself. "Till then I was only vaguely aware of the notorious telephone systems in India. I realised that Indian telecom needed a complete overhaul."

While he was in the U.S. Sam read up whatever material he could lay his hands on about India's telecommunications.

He did not want to just land up and waste Mrs Gandhi's time in generalities. His presentation had to be sharply focused and had to have elements which appealed to a political leadership. Even as late as 1981 telephones were still considered the toy of the elite. Holding a handset was still a problem for many Indians. Many of them held it upside down.

Tom Parker, a close friend in the business for many years, said, "He was aware that telephone networks in India were run according to the British system which meant they came under postal service. Seniority was everything and it decided promotion and not performance. He certainly knew the extent of the job he proposed to do."

"I worked out the details, but generally speaking I wanted to make telecom recognised as one of the main sectors of the economy." Pitroda didn't know what he had bargained for. A total outsider with no connections to speak of in New Delhi wanted to make an hour-long presentation to Indira Gandhi. Not only that he even presumed that the Indian Government would share his vision of telecom and recognise its importance to the extent he wanted. That was one aspect. The other was that he actually believed that he would be asked to play an important role in a sector where cadre comes before anything else. In a way, Pitroda was ignorant of the obstacles that lay ahead. This was just as well, because eventually it turned out to be to his own benefit.

To Pitroda there were two broad issues: technology and services. India began her foreign collaboration in 1950 with Strowger exchanges. This was followed by Penta Conta Cross Bar exchanges in 1965. Both these exchanges were blocking electro-mechanical systems. Their efficiency was inherently limited and could not ultimately handle high-density call traffic. "I got the impression that India imported technology from a county which released some aid. The result was that it was patchwork of systems. When you have different types of switches the outcome is what Indians experienced. The other point that struck me was that services were not up to the

mark. They got away with it because the public had no other choice."

Then in 1981, the Sarin Committee recommended that India should go in for digital switching, which is non-blocking and several times more efficient than the electromechanical type. Till that time, the concept of developing digital switches indigenously was still largely in the realm of the unspeakable. Of course, the Telecom Research Centre (TRC) had developed a lab-scale electronic switching system (ESS), but the effort was modest and nowhere near the scale Pitroda had visualised. The Sarin Committee had also pointed out the absence of a research and development facility to design such exchanges. That was perfect for Pitroda. Once again, the unseen scriptwriter was at work.

The Sarin Committee recommendations were a godsend for Pitroda. It was almost as if the opportunity was tailor-made for him. The only hassle was to meet the Prime Minister. Once again destiny intervened. Haribhai Chhaya, Pitroda's father-in-law, helped him establish contact with Jaidipsinh Baria, the erstwhile ruler of a small principality in Gujarat and a Congress Party MP, Baria, in turn, arranged for Pitroda to meet Arun Nehru and Arun Singh, both Rajiv Gandhi's close friends. Both the Aruns were equally helpful in getting Pitroda to reach Rajiv and then eventually to his mother.

Pitroda designed his presentation which sounded technically wise and politically appealing. He put the telephone in the perspective of nation-building, something that caught Mrs Gandhi's fancy.



11

The Grand Vision

SAM Pitroda's presentation to Indira Gandhi was remarkable for two things—his clear thinking and the presumption behind it. The clarity of thinking was no big deal by his standards because he never got lost in bylanes while travelling on the highway. It was a natural gift. Its presumption was to totally transform India's telecommunication as a primary objective and almost simultaneously bring it to the forefront of world telecom. It is somewhat like an illiterate man who learns how to read and write and aspires to teach others simultaneously. If you can imagine that you can imagine what Pitroda had in mind. It was perhaps too ambitious for a country whose telephone density was the fourth lowest in the world.

Pitroda split issues into four parts—national issues, service issues, developmental issues and operational issues (large scale). He then talked about typical communication services, which meant a whole gamut of design, installation, network operation, maintenance, business systems integration, operating companies, rural communication, money orders, switching networks, telegrams, facsimile, mailgram and telex. From here he jumped to world figures*. There were 4.5 billion people in 125 countries with 450 million telephones. Of these 20 were

*1979 figures.

developed countries with 800 million people and 397 million telephones. The socialist bloc consisted of 1.4 billion people in ten countries with 25 million phones. The 95 developing countries were populated by 2.3 billion people using 28 million phones.

The figures at once gave an idea of the overwhelming imbalance against the developing world. As of January 1979, the breakup of telephones in the three worlds was North America (190 million), Europe (138 million), Japan (53 million) and socialist second world about 25 million. Asia had 13 million phones, Latin America (9.4 million), Australia, New Zealand and Hawaii (8.2 million) and the others (10.6 million). At that time the U.S. topped the table of telephone density with nearly 90 per cent and Nigeria was at the bottom at about 0.15 per cent. India was 0.3 per cent, slightly higher than Pakistan and Indonesia.

The presentation then narrowed down to India. India's profile at that time was 700 million people, 80 per cent living in 550,000 villages, the rest in four major urban areas, 20 industrialised cities and 3,200 towns. Its telecom profile was over 2.4 million telephones in service, of which 1.8 million, or 75 per cent, were main telephones. Extensions and PBXs were about 600,000 or 24 per cent and business telephones were about 350,000 or 14 per cent. Public telephones were 11,732 and telephone density about 0.3 per cent. There were 247,000 telephone employees. Among the observations that Sam made were that only 0.5 per cent of the world's telephones were in India, seven per cent of the urban population accounted for 55 per cent of telephones and demand could not be met by "planned expansion."

He referred to the centralised organisation structure, lack of capabilities to address the massive problem, imported equipment of traditional type, poor service and lack of technological leadership to implement complex large scale programmes. The last was an area he had in mind for himself. After dealing with key organisational issues, the presentation talked of basic new technologies. They were digital switching or electronic

switching system for performance stored programme control (SPC) for flexibility and large scale integration (LSI) for cost. He then went into the specifics of their advantages.

Sam addressed the issues of resources and management and then offered three alternatives.

- ★ Status quo—Do nothing, let it deteriorate.
- ★ Follow present development plan:
 - addresses today's problem partially
 - cannot meet demand by 1990's
 - Always play catch up
 - Affects economy, government, people
- ★ Prepare new, accelerated development plan. It requires:
 - Total commitment and support from the government
 - Total authority to implement
 - New people, products and programmes.

It does not take much to recognise that the last alternative was a forerunner to the Centre for Development of Telematics (C-DOT) and Telecom Commission, both of which he pioneered.

Pitroda made several points on how to improve the performance of the existing network.

- ★ Take a detailed audit of the existing network.
- ★ Automate Data Base—Nationwide.
- ★ Train additional maintenance staff.
- ★ Stock more spares.
- ★ Nominate commission of local citizens to monitor improvements in all major cities and metropolitan areas.
- ★ Encourage user education.
- ★ Deload network wherever possible.
- ★ Improve operator assistance.
- ★ Fix all public telephones.
- ★ Monitor telecom employees' working conditions.
- ★ No major new enhancements or expansion for 120 days during network clean-up.

The presentation anticipated that plain old telephone equipment will become scarce as developed countries switch over to more sophisticated systems. As a result, developing coun-

tries will need other sources for their pot needs. Among the requirements to adapt to the changing times, Pitroda spoke of reorganisation of the telecom group, introducing a highly technical management team, new products such as electronic telephone with LSI, community telephone, digital transmission and digital switching, massive training programme and new ESS factories to produce at least one million lines a year from 1986.

In his implementation plan he talked about setting up large scale manufacturing to meet local and export market. In new resources he emphasised the need to create a core group of 300 people in R & D and 50 for manufacturing operation. His new products included telephones, digital transmission and digital electronic switching systems, all to be designed simultaneously for nationwide production. All these, he said, should have commonality of hardware, software, packaging, manufacturing and testing.

Among the new organisation he suggested was an Indian telecom corporation which will be entrusted with the job of delivering the country's communication needs. He envisaged that this corporation should have the right to issue bonds, stocks and notes needed for massive capitalization. He also talked about an Indian communications commission to oversee policies and tariff structure. He visualised manufacturing facilities and operating companies all over India divided in four zones.

His Objectives

Start indigenous development programme to modernize telecommunications in India.

Increase accessibility, improve reliability and develop rural communication.

Strategy: self-reliance, capital sensitive and labour intensive.

To put the world scenario in perspective Pitroda said worldwide telecom equipment market need was about 40 billion dollars and growing at about 15 per cent a year. Of this, switching accounted for 40 per cent. That is where Pitroda

wanted India to emerge as the leader among the developing countries by 1990.

Then he commented on India's telecom technology. He felt the overall planning, which was based on Western model, was flawed as its borrowed technology could not handle high traffic and long holding time in India. There was a lack of standards and purchases were made on the basis of who funded a project. If France gave money India bought French equipment. If Britain gave money India bought British equipment. In the bargain it created a "Patchwork System" which did not work. He thought there was weak technical management and there was a lack of overall national network and numbering plan. He also listed a whole lot of telecom problems, right from poor voice quality to long waiting lists.

So thorough was his presentation that by the time he wrapped it up there was nobody who had any doubts. The view was total and comprehensive. The approach was business-like. The result was far beyond his expectations. Rajiv seemed quite taken up with most of what he was talking about. Venkataraman was particularly interested in the bit about saving foreign exchange. Mrs Gandhi, though she did not say it directly, instantly recognised that the man made sense. The fact that she sat for one hour was in itself an admission of her deep interest.

The presentation was also a statement of his intentions in India. "I think Rajiv quite clearly saw what I was driving at. He could not possibly have said 'Come and do what you want,' but there were enough indications that if he had his way he would push most of what I had said.

During the next three years Pitroda shuttled between Chicago and New Delhi. Everytime he came to India he made it a point to meet Rajiv to keep him informed of all that he had been doing. He must have met Rajiv ten times between 1981 and 1984. Those frequent meetings went a long way in establishing his credibility initially. In 1982, when Mrs Gandhi went on a state visit to the U.S. Rajiv accompanied her.

Pitroda and his friend Dr Prakash Desai went to meet Rajiv

in New York. "Rajiv called us into his bedroom. He sat on his bed and asked us to take the sofas. Although it was a minor gesture I interpreted it as an important signal. He straightaway established himself as a modern, humble man."

Till 1984 nothing extraordinary had happened. Pitroda had already spent close to quarter of a million dollars on his visits to India. It did not matter to him at all because "I was bent upon doing something for India." Then in an event which shook up India, Indira Gandhi was assassinated in October, 1984. Rajiv rose to power. Sam Pitroda did not miss that opportunity.



12

Birthpangs of C-DOT

SAM Pitroda's audacity created it. The Indian genius sustained it. Centre for Development of Telematics, known by its trendy acronym C-DOT, is as much a story of Pitroda's uncommon ability to motivate as the young Indian engineer's capacity to deliver. It is a splendid example of what political will can achieve. It is a sordid case of what political meanness can dismantle. It is a dream that very nearly turned a nightmare. What began as one man's conscience cleansing became a nation's conviction. C-DOT does not happen every day, because it exacts a price few can pay.

Sitting in his opulently laid out executive office at Rockwell International, Pitroda often questioned the wisdom of his life at the 12-billion dollar corporation. The executive jet, the executive pay, the executive secretary, the executive limousine, the executive breakfast and the executive lunch don't add up to much if the executive feels an absence of purpose. Even if he is paid upwards of half a million dollars a year. Pitroda had to do something adventurous.

C-DOT was conceived the evening he made his presentation to Indira Gandhi. Even in that embryonic stage it had recognisable and distinct features. What he had in mind was a research and development society assigned to design a family of telephone exchanges. As a concept it was simple enough

and anything but adventurous let alone audacious. But the extent of its ambition became clearer against the backdrop of what was happening internationally.

Venkataram, Chief General Manager of the Mahanagar Telephone Nigam Ltd. (Metropolitan Telephone Corporation Ltd.), Bombay, who attended an earlier presentation made by Pitroda in 1980 was quite candid. "When he started his presentation India was at the bottom of the world market. By the time he finished it India was a world leader and exporting electronic switches. No one, including I, had ever imaged before that this was possible."

Venkataram's view was largely accurate except that there was indeed some effort on to produce the electronic switching system indigenously. At least on the laboratory scale. The Telecom Research Centre (TRC) of the Department of Telecommunication reported a breakthrough towards the end of 1974. Calls were put through an ESS at the TRC lab. Later the exchange was tried commercially at a telephone exchange in New Delhi. G.B. Meemamsi, then working for TRC, was involved in the project. Meemamsi took the Indian ESS to the international switching symposium at Kyoto in Japan in 1976. That is where he met Sam Pitroda, the man with whom he would strike up a lasting bond eight years later.

By 1977 telecom multinationals were lustily eyeing India's huge and unexploited market. Armed with fat public relations budget these MNCs unleashed slickly produced brochures selling their products. The MNCs' move caused serious dilemma in the minds of those who presided over India's telecommunications.

"Eventually a global tender for the import of technology was floated. However, as a consolation to the more-than-a-decade of pioneering R & D effort, an R & D collaboration agreement was included as part of this tender. It was an open secret that the R & D agreement would be the least weighing factor in deciding the collaborator compared to the cost of technology transfer, establishment of the factory and cost of direct import

of equipment," Meemamsi wrote in an article in *The Times of India*.

"However before the global tenders were evaluated, the Government, on the recommendation of the Sarin Committee on telecommunication, decided to go in only for digital technology. Then came the Government-to-Government offer from France which finally resulted in acceptance of CIT-Alcatel's E-10B ESS, ignoring the offers received against the tender linked with World Bank credit," he said.

"While the indigenous development was going through its lowest ebb at the Department of Telecommunications (DOT) the Department of Electronics took up the proposal made by Sam Pitroda for the indigenous development of a digital switching system," Meemamsi wrote.

When Pitroda first mentioned to Rajiv Gandhi what he proposed to do in switching the latter said, "If you can deliver that you would have fulfilled your pledge to do something for this country."

C-DOT's importance, both in conceptual and real terms, has to be understood in the international perspective. Some thirteen companies make switches in the world. None of the so-called developing or third world countries makes electronic exchanges. The total world switches market is estimated to be about 40 billion dollars, which represents some 40 per cent of the total telecom market. It is a staggering temptation. Pitroda believed that despite these 13 companies there was room for India to gain entry if it decided to tap its enormous engineering talent.

The case of the American Telephone and Telegraph (AT & T) Company, reputedly one of the ten largest corporations in the world (before it was broken into smaller companies it was the world's largest corporation with assets of 100 billion dollars), illustrates the point very effectively. In 1981 AT & T had just introduced its 5E switches. They were developed after spending a million dollars a day by AT & T's R & D wing Bell Labs, whose budget runs into over two billion dollars. In 1981 the electronic switch was in the realm of fantasy in India.

As the testimony of a top telecom manager suggested there was simply no one in India who thought the country had the engineering capacity to produce this complex system. So quite naturally, when Pitroda raised the possibility during his presentation it was mostly lost on those who attended it. Rajiv personally grasped the implications, but he did not appear to be effusive about the idea. Nothing happened for nearly three years. Then sometime in the beginning of 1984 things started happening. The Government decided to try Pitroda out.

The first question before the Indian Government was not the credibility of Pitroda's ideas but the credibility of the man himself. It had to make sure that he was not a fly-by-night smooth-talker. So the Department of Electronics (DOE) decided to send a team of experts to check Pitroda out in the U.S. The team consisted of Dr. P.P. Gupta, G.B. Meemamsi, Mukesh Mathur and Dr. M.V. Pitke. "I understood the Indian Government's apprehensions. In fact, I welcomed the idea of a team examining my claims and my credibility. I grant that I don't look too reassuring."

They spent eleven days with Pitroda brainstorming him. It was a most thorough scrutiny of the man right from his engineering claims (he had said he had about 50 telecom-related patents) to his businesses. The five men would assemble in Pitroda's basement and discuss every single detail. Pitroda also took the Indian team to GTE and AT & T where top executives were apparently all praise for him.

Because of some complications Pitroda had to pay 1200 dollars to Hyatt where the team stayed. He got the money back after 13 months. Finally, they thought Pitroda was reliable.

Dr M.V. Pitke, specialising in magnetic memory at the Tata Institute of Fundamental Research, a front-ranking scientific institute of India located at Bombay, was working on switching system for the defence department. He was assisted by the Department of Electronics. Once he and Dr P.P. Gupta of DOE happened to travel together on a plane. Dr Pitke, who had worked overseas and had known Sam since 1974, men-

tioned him to Dr Gupta. "I think C-DOT was in the making for sometime. Had it not been for the DOE it would not have happened," Dr Pitke said.

Dr Pitke was aware of Sam's high professional standing and his "pioneering contribution" in low-cost, microprocessor controlled digital switch. "C-DOT came into being because of Sam Pitroda" Dr Pitke said.

Having established his credibility, access in New Delhi became relatively easy for Pitroda. After three years of relentless attempts he was close to achieving his first success. The government decided to set up a R & D society to work electronic switches. Before C-DOT was formally announced, Dr Sanjeevi Rao, then a junior minister in-charge of electronics, asked Pitroda at a meeting: "What do you really want?" Pitroda replied, "Nothing, I expect just one rupee a year in salary."

There is an amusing story behind how the name C-DOT came up. Rajiv Gandhi, who was not yet Prime Minister, had asked Pitroda to think of a name for the society. Among the first names that Pitroda suggested was something like society for development of electronic switches. Rajiv did not think much of it. "Why should we," he asked, "restrict the society to just switches, why not transmission and fiber optic etc?" That rang the bell in Pitroda's mind.

Someone came up with a name whose abbreviation would be AARTI, his daughter's name. Mercifully that too was rejected. "Rajiv knew it had to have an international sounding name."

"Then I began thinking about the various inputs that would go into making the society. It had to be called a centre. Instead of restricting it to just switches I thought of telematics. The name that emerged was National Centre for Development of Telematics." The prefix national was gradually dropped.

C-DOT was announced on April 26, 1984. V.N. Gadgil, then Minister of State for Communications and Dr M.S. Sanjeevi Rao, Deputy Minister of Electronics, jointly addressed a news conference in the Capital to make the announcement. C-DOT was described as a registered scientific society "vested with

total authority and flexibility outside Government norms, to ensure dynamic operations."

Pitroda, used to working at his own breakneck speed in an organisation devoid of hierarchy, had insisted on those words "Total authority and flexibility outside Government norms." He explained the reasons thus: "I did not want to get bogged in useless files. We were entering an area of intense competition. We could not go by the norms."

On August 9 the same year Indira Gandhi told the Lok Sabha, India's House of the People, that a centre to develop digital telecom switching was being set up to provide modern means of communication in the country. She said the centre was being set up at a cost of Rs 36 crore (Rs 360 million).

Obsessed with working to an impossible schedule Pitroda declared "Give me 36 months and 36 crore (360 million rupees) and we will produce our own electronic switches," a remark which would trouble him a great deal later.

Pitroda had studied the Bhabha model and the Sarabhai model, one used in setting up India's nuclear programme and the other its space programme. They were named after two eminent scientists Dr Homi Bhabha and Dr Vikram Sarabhai who pioneered these programmes. "I wanted C-DOT to be totally performance-oriented, a research society where administrative decisions were not an excuse for slow work. I wanted an organisation that was not straitjacketed by bureaucracy."

Meemamsi of the Telecom Research Centre, Dr Pitke of the Tata Institute of Fundamental Research and Mathur, Joint Secretary of the Department of Electronics were named directors of the C-DOT Board. Pitroda was appointed its adviser in July. In case there were still any doubts left about his intentions Sam decided to charge an honorarium of one rupee a year. His lawyer friend Paul Miller believes that Sam was inspired by the "One dollar a year" men who surrounded President Roosevelt.

"It was important for me to send out a signal that I was not in India to make money. To some it may have seemed gimmicky but mostly people viewed my one rupee a year salary positively."

C-DOT was set up on August 25, 1984; Pitroda was finally on way to doing something for India. "We were beginning from scratch. There was no supporting infrastructure for a venture like this one." Modern management techniques, which emphasised performance against patronage, had to be employed in running the society. First of all an awareness had to be created that C-DOT was not going to be a file pusher's paradise. Its objectives were far too complex for that. "We did not want engineers to be reduced to clerks. I made a distinction that an engineer will do engineering and will not get involved in administration." Procedures were virtually eliminated in order not to obstruct the research design work. "We were in a very complex discipline. Wasting time over procedures was not our goal."

From day one Pitroda made it known to everyone at C-DOT that he was available all the time and that there was no need to waste time in hierarchical salutations. He also spoke of the complexity of the task but followed it up with words which were strongly motivating. "I told them they were there because I knew they could do it. I told them that the world was watching them and perhaps even waiting for them to stumble. But their talent and their ability to do out of the ordinary work would see them through. I also told them that what they were embarking on was something only a handful of countries had done. I finally told them if they could not deliver nobody could."

Venkat Rajendran, an electronics engineer, who was among the first half a dozen people to join, said: "I think 50 to 60 per cent of our confidence that we could do it was because of him (Pitroda). He had the ability to spot talent like I have seen in very few people." By Rajendran's own admission the enormity of the scale on which they were about to operate was not known to the engineers.

Rajendran remembered his first meeting with Pitroda, which was not very impressive. Somehow he was not fully convinced about Pitroda's intentions. In that meeting I asked him a blunt question: "What's in it for you?" Rajendran recalled. "Sam's reply was: 'Nothing. I have made it in my life.' Somehow we

were not able to relate to that kind of attitude," Rajendran said.

C-DOT's office was in a rundown government-owned five star hotel. They were given some rooms. Pitroda, who had still not moved to India, kept his clothes in one of the rooms. There were times when he went straight to his office from the international airport, had a shower and began work. "Jet lag would not let me sleep. So I would start working at 3 a.m. Indian time. By the time others came around 8.30 I would have finished my work. Then I would start interacting with the engineers and other staff."

The first few months were spent in setting up the infrastructure, recruiting engineers and appointing secretaries. Simultaneously Pitroda held marathon technical sessions with the core group. These sessions often went on for 14 hours. "Even before we thought in terms of producing a switch it was very important that there was perfect coordination among us. In this discipline it is as crucial to invent as to share information. If information is not shared properly the project could go haywire."

Sometime in February, 1985 C-DOT advertised for Pitroda's personal secretary. Renu Baweja, working for a private company, applied. "During my interview, Sam wasn't even there. Meemamsi hired me," she remembered. Her initial job was to make a weekly report on the goings on. "Most of the senior men were used to male secretaries. So many of them felt offended by my questions. But Sam persisted and said no matter what their reaction I had to do it," she said. "Once Meemamsi asked me if I could type a note. I said no. Sam came to know of it and he quickly said it was an asset. The less you know of procedures the better, he said."

On the one hand Pitroda was busy demolishing bureaucratic mind-set and on the other he was involved in drawing a comprehensive document on project administration. "It is recognised that without proper management environment, where team work is emphasised with egalitarian management structures as opposed to hierarchical, a large project of this

magnitude with time-bound commitment cannot be accomplished," the document's introduction said.

"It is also recognised that to expedite the development programme aimed at designing a family of digital switching in 36 months with 36 crores (Rs 360 million), each group member needs clear definition of responsibilities and authorities," it said. The document spoke of design, manufacture and support as being the three main objectives of the project. It said the task was to design the product in three years and manufacture it after that.

The objectives were: develop sophisticated telematics technology indigenously, digitize India's telephone network to improve overall service and prepare for the integrated service digital networks (ISDN) for the future. The goals were: increase telephone accessibility, improve overall reliability and develop rural communication. The typical configurations were: 128 lines (Line Concentrator), 512 lines (Rural Exchange-Rax) 2048 lines (Rural/Integrated Local and Trunk [ILT] Exchange), 16,000 lines (Main Exchange (MAX) Trunk Automatic Exchange (TAX) and 40,000 lines (Main [Metropolitan] Exchange/Tax).

The kind of management environment that the document spoke of included:

- ★ Entrepreneurial oriented drive—dedication, responsibility, integrity and vision (Drive)
- ★ Management by objectives (MBO)
- ★ Well defined responsibility and authority
- ★ Team management—working together
- ★ Management by exceptions
- ★ Problem solving initiative and attitude
- ★ People sensitive—problems and performance
- ★ Time sensitive—deliver when promised
- ★ Quality sensitive—do it right
- ★ Cost sensitive—financial controls and cost efficiency
- ★ Monitor key variables
 - Time, Task, People, Programme Evaluation and Review Techniques (PERT), milestones.
- ★ Rely on formal systems and controls

Daily personal list of things to do
 Weekly management/review meeting and reports
 Monthly report/review etc.

The 63-page document was exhaustive and covered every aspect of the project. It was crucial that a document like that was produced. C-DOT was designed to compete with multinational giants in terms of product and its quality if not the investment. As early as 1969 Pitroda was convinced that the world's telephone network would be predominantly digital by 1995. He had then thought that if India did not go for its own digital switching facility it would be condemned to use whatever multinationals dished out and at whatever cost. "I don't believe that a country of over 800 million people cannot produce 300 engineers who can design and develop a digital switch." Bureaucratic mindset was not the only problem Pitroda was confronted with. There were temperamental problems as well. Engineers from the southern states of India habitually drank coffee while those from elsewhere preferred tea. There used to be serious disagreements on what should be served at official sessions. "Engineers from the south came and said that they objected to tea being served while those from other states told me they did not want coffee." It may seem like a ridiculously petty issue but it was a serious manifestation of the attitudinal chasm between the engineers.

Since C-DOT offices were located in what were once hotel rooms there were no separate male, female lavatories. Each room had an attached bath and toilet and men and women among the staff had to share it. Even this turned out to be a source of disagreement. "Finally I told them it made no difference who had used the toilet before you as long as it was left clean."

Sam Pitroda's biggest challenge however lay in creating a work culture which was dictated entirely by performance. Orientation towards result was something most of them were not used to. Either they were too new to the discipline to feel comfortable or too old to accept change. An awareness had to be there that what C-DOT was involved in was no routine R & D

job. It dealt with an expertise that the chosen few had in the world and did not wish to share it. As a matter of fact some of them were even hostile because they did not quite like the idea of a Third World country, whose most modern face in their view was that of a snake charmer, entering into a complex but highly lucrative business without any outside help. Not too many young engineers knew the enormity of what they were engaged in. Perhaps that was an advantage because a consciousness about how daunting the task was may have made them give up even before they started.

C-DOT was not just an R & D society. It was the test of a nation. It was a gruelling engineering ritual that would have decided how capable the Indian engineer was. It was an effort whose success lay in that it was attempted at all. In many ways C-DOT was doomed to succeed. Pitroda has been known to say that he been more interested in the process of development as opposed to the product. On one level C-DOT was meant to design a family of electronic switches of many configurations. That was its primary and obvious objective. But on another and more important level, it was to inspire an entire generation of Indian scientists to perform at levels they were not always known to in India. C-DOT was not just telematics. It was an exercise in national self-assurance. Just as the space and nuclear programmes had earlier given India cause to be proud of, C-DOT was a reassertion of that pride and thumbing the nose at those who were derisive about the country's scientific talent.

Pitroda had his strategy worked out well in advance on how to turn a bunch of immensely talented but somewhat diffident engineers into the torch-bearers of a world class institution. He knew it would demand constant pep talk. He also knew that targets had to be far more ambitious than what they ever thought they could achieve. "If you aim for the moon, you might hit the ceiling." But he had to make it sure that they did not shoot a pigeon and killed instead a crow. The logic behind fixing a deadline of three years to deliver the various prototype switches was to make them work to an impossible schedule.

Pitroda believed it could be done in three years but he did not think it would be.

C-DOT demanded a talent which was a judicious mix of engineering genius, inventive management, sophisticated public relations, juggling expertise and overweening self-confidence. Pitroda had all the five attributes and constantly switched from one to the other. "At the back of my mind I knew what problems would crop up, problems that would make meeting the deadline virtually impossible. But I could not possibly tell my engineers that. That would have slowed them down."

Pitroda broke down the development programme in four major phases: system definition, design (hardware and software), prototype feasibility and construction and manufacturing interface. "During the system definition phase product specification would be finalised and hardware and software activities would be defined. During the design phase these activities would be further defined to estimate overall hardware and software efforts. At this time each designer would be assigned a specific task to be performed. The task and the timing would be consistent with the master PERT programme. The design phase includes circuit definition, circuit design, printed circuit layouts, testing, software and evaluation. The prototype is constructed in the third phase of development. After this phase of development the manufacturing interface required to produce a large number of systems begins," the project administration document said.

Visualization of an implementation of a project of this complexity and magnitude is an art known to a handful of people in the world. Once started it is easy to find faults. The challenge is to dream and distribute work in manageable packets to various teams with clarity for design development and final integration.

The time table was:

System definition phase—6 months

Design phase

a. hardware design—15 months

- b. software design—18 months
- Prototype field trial fabrication—6 months
- Manufacturing interface—8 months.

The project document was even more detailed. "The idea was to deal with each and every aspect meticulously so that when the time came we were not found wanting."

C-DOT had begun to throb with rare enthusiasm among engineers. Sam Pitroda chatted with them, cajoled them, cheered them, goaded them but never lost patience with them. Frenzy was the only expression that summed up the goings on. He flew in and flew out since he was still not an Indian national. "When Sam was not around things looked bereft," Renu Baweja remembered. Rajendran said Sam was so much a part of everybody's system that everytime he went out something seemed strangely empty. In six months time Pitroda had begun to grow on people. It was the kind of affinity that exists between an orchestra and its conductor. "Each one of us felt ten times more capable than we thought we were," Rajendran, till then used to working in typically bureaucratized scientific institutions, said.

"He would say things like technology is not a problem. The problem is human," Rajendran said. According to him, one of the reasons why Pitroda was becoming so popular among engineers was because he had tremendous amount of faith in Indian people.

During the first three years C-DOT had 425 people with an average age of 25 years. Of these 215 people worked in New Delhi on software, systems, documentation, training, administration and finance. The rest 210 people worked at Bangalore on hardware, vendor development and productionisation. The average age of 25 is a crucial point in any judgement on C-DOT.

Among the unspoken purposes of C-DOT was to catch young engineers and give them a sense of participation in nation building. To most bright young engineers who were ready to migrate to the United States and elsewhere, C-DOT wanted to be an irresistible temptation. "I wanted to create an

institution which would afford these young engineers an opportunity to grow as much, and perhaps even more, as they would in the U.S." Pitroda's open bias for young people often upset some of his older colleagues. But he was looking for people who were not set in their ways, were open to life and were ready to go wild with him. The advantage of youth is its freedom. Pitroda wanted to capitalise on that freedom.

His emphasis on youth created for himself a flattering constituency among the young Indians, a glimpse of which the author had while interviewing some students of St Xavier's College in Bombay on Pitroda and C-DOT. On a closer scrutiny it became quite apparent that his focus on youth was also strategic. Having lived outside India for nearly 25 years Pitroda had no expertise in dealing with established interests at various levels and in many fields. Somewhere along the line there was an apprehension in his mind about not being accepted in India. So he aimed himself at those young Indians, who too had no expertise in dealing with established interests and had a sense of not being accepted. The two made an ideal combination. In any conversation Pitroda was bound to make some reference to youth. He had been so convinced about the power of youth that he often ignored age.

The first year at C-DOT was mostly spent in rolling the ball. Since it was being created from scratch, every single area—administrative, scientific and even personal—had to be looked at in detail. The project administration report was prepared in March 1985, some eight months after the society was formed. An aspect of C-DOT that has often not been appreciated is that from nothing when it began to the time it was committed to deliver, the amount of work that went in was phenomenal by any yardstick. Neither Pitroda nor the young engineers involved had any compelling need to attempt something like this. Personal ambition was just a small factor in it. It could be reasonably said that Pitroda was driven by personal ambition but that was only upto a point. Individual glory was as much possible when he started as individual ignominy. It was not as if immortality was assured to him or anyone who worked for it.

At the end of the first year, there was the realisation among some people at least that C-DOT, although doing well all constraints considered, may not be able to meet the deadline. There is a major difference between visualising something and actually getting down to doing it. Unanticipated problems always crop up. There were many views on the wisdom of stressing the theme of "36 months—36 crores" by Pitroda. The most prominent was that he got carried away and overestimated, not so much himself but others. Another view was that it was more of a gimmick than anything else. Some believed that there was a basic flaw in the way the whole project was conceived. But there was almost no one who considered the possibility that C-DOT was not so much a promise as a device to exact a performance not generally thought possible. Aiming at the moon and hitting the ceiling.



13

Test of a Nation

THE gung-ho spirit that permeated C-DOT offices in New Delhi and Bangalore had to be constantly replenished. There was only one man who could do it—Sam Pitroda. This was acknowledged even by some of his bitterest critics. Engineers would constantly run to him for troubleshooting and managers would seek him out to sort out knotty propositions.

"It was almost as if Sam was C-DOT's soul," Renu Baweja said. "His presence itself solved many problems. That he was there in office was enough for many of us." His influence on the organisation was becoming so total that some were worried that it might become a one-man show. Dr Pitke saw it as a harbinger of troubles. "C-DOT's management was becoming very powerful. I realised that it was not good for the organisation. It affected team work," he felt.

But that was not such a major problem for an organisation that was still growing. Pitroda was quite conscious of his disproportionate influence. "I had to make it sure that it did not crash at the take-off stage." Although he never directly said it, C-DOT was a question of his personal prestige. It was the first test of an ability he knew he had but could not fully utilise earlier. It was an ability to spot talent, assemble the right people and create out of them an institution where individuals mattered little. He wanted to create an institution of interna-

tional stature and one that would vindicate his immense faith in the young Indian.

Pitroda would have given as much of his time, talent and energy even if he did not consider C-DOT the test of a lifetime. But the fact that he did, lent his effort even more earnestness. During his five years with C-DOT he was possessed with an all-consuming wish to do something memorable and something that would have a bearing on history. He did not admit to so much. "I certainly wanted to do something outstanding but essentially it was nothing more than problem solving. Of course I was operating on a scale I have never done before but I did not feel daunted by it. I was certainly not driven by considerations of history."

One of the early problems was related to technology transfer. Being an American citizen he was governed by certain restrictions in transferring switching technology. He did not want to do anything that would bring federal officials visiting him in Chicago. He surmounted this hurdle by obtaining copies of a collection of his articles on digital switching published in various journals in the U.S. Since they were published material they did not attract regulatory attention.

The 62-page collection which contained material used for training purposes by some organisations in the U.S. was written between 1976 and 1979. Many of them related to his telecom patents. "The effort involved in preparing this collection is more than justified if the literature provides some basic background and understanding of telecommunications, switching and digital technology to young engineers entering the burgeoning field of digital switching systems," Pitroda wrote in the introduction. The collection had seven pieces. From defining switching concepts to a visualisation of what he then thought the future held in store the collection was a remarkable document. The idea was to familiarise Indian engineers with complex concepts without violating any technology transfer regulations of the U.S. The compilation was meant for private circulation.

The decision to arrange for such a compilation was indica-

tive of the extent to which the man was willing to go to fulfil a dream that he had dreamt for India. In addition Pitroda was constantly drawing on the expertise of his many friends in telecom in the U.S. without so much as even offering them to pay. Did Rajiv Gandhi know about it? "I never bothered Rajiv with details. We had discussed very generally what C-DOT would need to do. Once having done that I thought it was not proper to burden the Prime Minister with how we were going about it. He never asked for details. I never gave them. He knew if I had promised something I would do my best to deliver."

The absence of precedents in the kind of venture that C-DOT had embarked on had both advantages and disadvantages. One of the disadvantages was that inevitably it faced the danger of being subjected to an ill informed scrutiny in case it eventually failed to deliver. One of the advantages was that it could get away with a lot considering that not too many knew what it took to produce a family of switches. As it turned out that one disadvantage did indeed dog C-DOT for over one year.

When C-DOT began work no one except a few engineers had a clue about the magnitude of what was being attempted. Not many people realised what exactly C-DOT was to accomplish. One problem was that it was engaged in an area which exceedingly few understood and even less tried. It did not have the kind of sex appeal that say, for example, the space programme or the nuclear programme had. Both had identifiable and even romantic images—one had a rocket searing through the skies and the other a spectacular plumage that a nuclear explosion causes. In the latter case there was realisation of its devastating potential but still it did create a sense of awe. In the case of C-DOT it had nothing that was identifiable. From outside a switch looked like a steel cupboard of the sort that many households in India have. What was contained inside it was so much beyond common grasp that it never attracted popular attention. Another fundamental advantage

that the other two programmes had and C-DOT did not was that they both symbolised man's quest to conquer.

What aggravated C-DOT's comparative disadvantage was an almost total ignorance about the importance of telecommunications in nation-building. The few who knew it were not aggressive enough to push it to a place on the national agenda where it ranked with other survival issues. An electronic switching system was not something India as a nation particularly missed. All these were important features in shaping people's perception of the venture and the country's attitude towards it.

What sort of problems troubled Pitroda during the early days of C-DOT? "From utterly ridiculous arguments like whether to serve coffee or tea at meetings to very serious issues like creating a system that was sturdy enough to withstand Indian conditions. It is quite likely that one had a bearing on the other. You must understand that I was working in a totally unexplored environment. The pressure to deliver, both my own and from others, was simply too much. I was aware that many were watching me and probably waiting for me to fail."

His colleague Dr Pitke had this to say: "C-DOT had no choice but to succeed. There was nothing like relative success. The pressures were there but one did not feel them initially because of the enthusiasm to work on something new."

C-DOT's objectives were to design and eventually make productionisable prototypes for:

- ★ 128 port PBX (Private Automatic Branch Exchange)
- ★ 128 port RAX (Rural Automatic Exchange)
- ★ 512/1500 line medium size Main Automatic Exchange (MAX)
- ★ 8000 port/20,000 line large size MAX
- ★ 16,000 port/40,000 line extra large size MAX.

The last, in fact, was the main objective. Among the frills was the promise of "A RAX a day." "Till C-DOT came into being India did not concern itself with this fundamental aspect of telecom at all. Somehow there was resignation to using foreign technology. C-DOT had planned for a quantum

leap—from nothing to so much." Sam summed up his task thus: "I knew that the only way something like C-DOT would work was by allowing complete creative freedom to engineers. This is not to say that everybody was allowed to invent. What I mean is that engineers were not bound down by procedures and unnecessary discipline. They were all very young and did not naturally conform to norms. I put that to the most productive use possible."

Venkat Rajendran recalled, "Engineers often worked for 12 hours without a break. Sam had created in them a sense of mission." During the three years from March 1985, when the project administration report was formulated, its guidelines were followed quite strictly. One category dealt with "How to succeed at C-DOT." It was typical of the man to think the way it was reflected under this head. It said:

1. Begin with a bias toward action.
 - ★ Do it as opposed to discussing it
 - ★ Deliver product as opposed to process
2. Understand that people are responsible for productivity
 - ★ Inform others.
 - ★ Respect different viewpoints
 - ★ Work as a team
 - ★ Be flexible
3. Encourage autonomy and drive at all levels.
 - ★ Practice creativity and take risks
4. Stay close to needs.
 - ★ Product specifications
 - ★ Time tables
 - ★ Specific assignments
 - ★ Task/subtasks
5. Keep the forms simple and staff lean.
 - ★ Simplify procedures
 - ★ Do not hire unnecessary staff
 - ★ Keep yourself and others busy
6. Focus on quality.
 - ★ Quality in every aspect of your work and environment.

7. Manage your time.
 - ★ Make a daily list of things to do
 - ★ Assign priorities and plan ahead
 - ★ Evaluate your performance at least once a month
8. Believe in yourself and the project.

Most of these seemed like perfectly common management techniques. But the difference was that they were being used quite seriously at C-DOT. Sam himself used all of them and often cited them to be the reason behind his success in the U.S. In some ways C-DOT was a throwback to Pitroda's years at Wescom Switching or even earlier at GTE. The only difference was the scale. What he did during those years was done on a much smaller scale. C-DOT was on a much bigger scale and had more dimensions. But both called for a certain approach which was a combination of pride, presumptuousness, ingenuity and talent. Before he began working on C-DOT Pitroda had no idea about the quality of engineers in India. He had only heard about them but had no first hand experience dealing with them.

"My whole approach at C-DOT was to presume that we could do it. How can you ever do a job which you think you cannot? So I would constantly tell my engineers that there was no point in entertaining doubts. Some thought I was being overconfident but you cannot start on an ambitious project with an unambitious target."

With someone like Sam at the top engineers at C-DOT never ran out of motivation. "I remember so many times when a depressed engineer, worried about a certain problem, would come to Sam, spend ten minutes with him and go back charged up all over again," Renu Baweja remembered. Sujata Sharma, who took over as his secretary after Baweja left, also worked at C-DOT earlier. "He radiated so much energy and enthusiasm that it was impossible for most around him not to be affected by it and raring to go. I think he gave us all a sense of confidence in our own abilities. The amazing thing was he participated in everything from a costume party to a serious engineering debate with equal ease."

"His presence," explained Dr Pitke, was important not only in terms of his engineering talent. It was important in a general, all encompassing sense." Bharat Thakkar, his old friend who worked at AT & T's Bell Labs in Illinois, viewed it all from a distance. "His high self-esteem sees him through the most difficult of situations. I think C-DOT could be possible mainly because of his self-esteem. Everything else comes later. He did it because he thought he could do it. He thought he could do it because of his self-esteem," Thakkar reasoned.

It was not enough to have a high self-esteem. It has to be backed by fastidious planning. Take for instance the way product specifications were laid down.

Product Specifications

GENERAL:

Application: Rural, urban and metropolitan exchanges.

Capacity: 128 to 40,000 lines

Technology: Digital Electronic Switching System (ESS)

PCM/32 channel/2.848 megabits CEPT

Stored programme control

Distributed processing

Distributed switching

High level language software

Non-blocking matrix/erland traffic

Automatic maintenance and diagnostics

Features: Plain ordinary telephone service

Universal numbering plan

Elaborate routing algorithms

Elaborate features

Simplified man/machine maintenance interface

Flexibility: Flexibility for various system sizes and applications

Modular expansion without system outages

Commonality of features and facilities in hardware, software maintenance administration, documentation, packaging, training etc.

Maintenance & Reliability: Traditional high standards of telephony

- Down time of one hour in 20 years
- Not more than 5 outages in 20 years
- Meantime to repair—12 minutes
- Duplicated control-fault isolation and fault detection
- Centralised maintenance
- Remote access
- Power: 50 volt DC with DC to DC converters
- Convection cooling
- Packaging: Modular and functional
- Standard PCB, frames and racks
- Installation: Factory tested equipment frames
- All connectorised for easy installation
- System Life: Service life of 25 to 30 years
- Design life of ten years
- First product revision for technology update after 5 years in service
- Cost: Equipment manufacturing cost not to exceed 100 dollars per line at 60% capacity
- Manufacturing cost to include components, testing, assembly, manufacturing, labour and manufacturing overheads.
- Produceability: Emphasize developing country environment conditions :
 - Labour intensiveness
 - Capital sensitivity
 - Small inexpensive test setups.
- Product support: Documentation (specifications, design, development, product engineering change order, maintenance, installation etc.)
- Training
- Seminars
- Library
- Remote access and centralisation of Operation and Maintenance Centre
- Distributed spare part availability
- Management Information System (MIS) for product support
- Field service

- Personnel profile
- Hardware/software configuration control
- Field installation etc

SYSTEMS:

- Network: Non-blocking
- Erland per inlet
- PCM 32 Channel 2.048 megabit
- Modular for expansion
- Distributed switching oriented
- Control: SPC Distributed control—HLL—Software
- M 68,000—16 bit and 6502—8 bit microprocessors
- Redundant control complex for high reliability and availability
- Input interface: 8 lines per card and 8 trunks per card
- Per channel code—from SCL
- Distributed power and ring supply
- Loop back facility for testing
- 32 channel direct digital interface
- Service circuits: Dial pulse generators and receivers
- DTMF dialling potential
- MF signalling
- Duplicated tone supplies
- CCITT R2 signalling
- CCITT number 7 signalling for national network
- Power supply & grounding: 50 volt DC battery plant with converters for +5, -5, +12, -12 etc.
- Floating backplane ground
- DC power filters per cabinet
- Power distributed through individual fuses on fuse panel
- Packaging: Double-sided printed circuits cards (25 cm × 30 cm) preferred
- 4 layer cards with power and ground inside only for special cases such as processor and memory to reduce noise
- 30 mm card spacing for proper heat dissipation
- 36 to 40 cards per frame

Standard cabinet six feet high, three feet wide and two feet deep (convert to Matrix*)
 Backplane PCB for card mounting
 Totally connectorised system
 Transmission: Typical 32 channel PCM transmission plan through selectable digital pads for line, trunk and service circuits
 Maintenance & Administration: Local/remote TTY-VDU access
 Flexible recent change command for shifts and changes
 Man/machine interface in English
 Environment: Office building accommodation
 Normally airconditioned environment
 Typical ambient over 95 degrees F
 High humidity

With such meticulous project administration report to guide them and someone like Pitroda to inspire them, C-DOT engineers began working towards history. "We all seemed possessed by one thing—work. Wanting to perform was a major incentive," Venkat Rajendran said.

"You must remember that C-DOT picked rookies, Sam's job was to make them feel confident of performing an enormous task. The best thing about him was that he did it without breathing down their necks," said Dr Nagarajan Ravi, a specialist in engineering management system who spent six years at the Bell Labs and joined Pitroda in 1987. In Dr Ravi's assessment C-DOT was very different from "other such organisations which are spill-overs of the bureaucracy."

For the next two years C-DOT worked at breakneck speed. There was no respite for engineers. "As months went by I began to realise that my faith in the young Indian engineers was fully justified. These were the people who were ready to leave India at the first available opportunity. I could see that their involvement was growing to levels I had visualised."

* Engineers made the cabinet larger than this and in the bargain created design problems. Sam was very particular it should be 6×3×2. It was remade according to Sam's specifications.

By 1986 C-DOT was becoming a subject of newspaper folklore. The Indian press wrote about it with obvious fondness and optimism. The articles on C-DOT were often gushing and mostly generous and charitable. They saw in C-DOT hope for India's generally hopeless research and development. In those days I worked in Bombay for a news syndicate. Four journalists, including yours truly, had set up what was pretentiously called Syndicated Press. Mostly we syndicated our collective cynicism. Once in a while we did get commissioned for stories. One such assignment came from the Calcutta-based daily *The Telegraph*. It came to me simply because I happened to answer the call from their correspondent in Bombay. Had it not been for that assignment I would never have found out the extent of interest that C-DOT and Sam Pitroda had created among young Indian students.

I chose St Xavier's College for no other reason than that I was looking for trivia lovers. The college was littered with them. I tripped over many. I chose the students I wanted to interview entirely out of aesthetics. Flippancy was my natural reaction to any assignment. This one was no exception. C-DOT and Sam Pitroda, my God, what names! That was the most earnest I could become. But as answers started falling on my indifferent ears I began to wake up to something refreshingly out of the ordinary. By the time I finished the interviews I wanted to know all about C-DOT and Pitroda. Quite extraordinarily, the replies were without the thoughtlessness that is so typical of that age. There was clear recognition of what C-DOT was and what it was engaged in. They also told me what they thought of Pitroda. "He is the answer to our inefficiency," was one of the replies.

"I knew that C-DOT was being watched by young students. But I had no idea about the extent of their interest. One of my primary objectives was to create a sense of pride among students by using some of them at C-DOT to produce marvellous results." Through 1986 and 1987 C-DOT engineers worked relentlessly. The 36-month clock was ticking by.

"I was conscious from the beginning that it was a difficult

deadline. But you must remember that C-DOT was not just any other research and development job. It was conceptualised with more than just the idea of designing switches. It was conceived to inspire a generation which was losing faith."

October 1, 1987 was the judgement day for C-DOT, Sam Pitroda, the engineers and all those who thought it would deliver what it promised. "A Report to the Nation by C-DOT" was prepared for presentation to Prime Minister Rajiv Gandhi. "At present C-DOT has a total of 425 people with an average age of 25 years. In Delhi, there are 215 people working on software, systems, documentation, training, administration and finance. In Bangalore there are 210 people working on hardware, vendor development and productionisation," the report said about the infrastructure. "In an effort to optimise human productivity we have developed new work environment, new work culture and new work standards which reflect an egalitarian approach as opposed to the traditional hierarchical management," it said. "We believe that the key to the successful programme implementation lies in our administrative approach to mobilise and motivate dedicated young engineers with Drive, Dedication, Responsibility, Initiative, Vision and Enthusiasm," the report said.

It passingly touched the difficult areas. "Technological choices were very complex. On the one hand we needed the most advanced state-of-the-art technical solutions and on the other, we had to develop the basic infrastructure locally for professional grade components, ancillary industries and productionisation. Similarly, in the beginning we needed only basic plain old telephone services, but for the future, we have to migrate from our product line to Integrated Services Digital Network (ISDN). However, the key challenge was to develop a product family using Indian talent which could be produced, with as much local talent as possible, but never losing sight of international price and standards," it said.

In the report C-DOT claimed the following achievements:

PBX

- ★ 128 port PBX for business applications has been

developed and productionised.

- ★ 48 manufacturers from Private/Public and Joint sector have been licenced for C-DOT PBX technology. Out of these, 20 have made prototypes with complete production.
- ★ 15 are already in production. Over 2000 lines are already working in the field.
- ★ PBX feature enhancements and expansion are being designed to address larger market needs.
- ★ PBX was introduced first in 1985 to get early feedback on vendor development and productionisation concepts for MAX.

RAX

- ★ 128 port RAX suitable for rural application which does not require airconditioning was developed and has been working at Kittur, Karnataka since July, 1986. Subsequently one more RAX was installed in Madhya Pradesh.
- ★ And now seven manufacturers have been licenced for C-DOT RAX.
- ★ A factory has been set up at Bangalore in collaboration with Indian Telephone Industries (ITI, state-run company) to manufacture C-DOT products commencing with RAX.
- ★ Rax was introduced after the PBX to verify various network/signalling interfaces for MAX.

MAX (512 port)

- ★ The 512 port main exchange which consists of four 128 port modules with additional processing and switching network capabilities contains approximately 90 per cent of the hardware and software required of the large 16,000 port system. At present ten prototypes of 512 port MAX with complete hardware and software are working at laboratories. These are used to test various call processing, administration and maintenance software features and functions. One 512 port MAX was installed in Delhi in June, 1987 and is undergoing final field evaluation. This system will be offered to the Department of Telecommunication during this month to

cut over into commercial service. This exchange is suitable for a majority of small towns, suburban and distributed switching applications in urban areas.

MAX (16,000 port)

★ Contrary to the general belief, detailed design for the 16,000 port main exchange started in January, 1985. It essentially consists of multiple 512 port MAX modules (upto 32) connected through a simple Central Switch Module. This exchange is suitable for high traffic needs for urban and metropolitan areas. The skeletonised versions of two 16,000 port systems with complete software are in operation today in Delhi and Bangalore. A prototype of this, with 2000 ports equipped, was installed in Ulsoor, Bangalore in August, 1987. We are currently performing field tests and plan to cut over with 7,000 ports in service around December, 1987.

The report dealt with productionisation, vendor development and future plans. At the end of its first deadline how much did C-DOT deliver? "I would put our success rate well above 80 per cent. The shortfall of 20 was not because we were not capable but because of the sheer complexity of the project and unanticipated problems that go with it."

Dr Pitke replied in more or less the same fashion. "I would call it unqualified success. It was so far so good. C-DOT seemed to be going in the right direction." Rajendran thought C-DOT more than lived upto its promise."

The effects of Pitroda's disproportionate influence on the organisation's psyche were apparent to some of his colleagues. Both Venkat Rajendran and Dr Pitke independently pointed them out. While Rajendran did not dwell on it, Dr Pitke was more detailed in his analysis of this weakness. Sometime at the end of 1987 and beginning of 1988 Rajendran became aware of Pitroda's overwhelming influence. "At one point I had to tell him that we have reached a stage where we don't need you. He said he recognised that fact. But somehow he found it very difficult to keep himself away."

Dr Pitke felt Pitroda had developed a sense of possessiveness

about C-DOT. "I think C-DOT's management became too powerful. What added to it was that Sam was insecure. I got the feeling that he felt comfortable with friends. He collected a lot of sycophants around him who gave him the wrong advice. A point came when he began rewarding informers and not performers. His influence on C-DOT was much more than what was good for the organisation. I think he also failed to create a second level of leadership," Dr Pitke said. He was willing to grant that Pitroda may have been misled. According to Dr Pitke, C-DOT's slide began with the combination of four factors: Sam's involvement in Technology Missions, formation of the Telecom Commission, transfer of C-DOT from the Department of Electronics to the Department of Telecommunications and merger with Telecom Research Centre (TRC).

Pitroda did not agree. "I may have overdone the motivating bit but I don't think I dominated C-DOT. My influence was more than anybody else's because my involvement was more. Don't forget, for me C-DOT was a matter of personal reputation. This is not to say that I did not recognise that my presence was proving counter-productive at times. I thought an organisation like C-DOT required constant pep talk and I was in a position to do that. So I did it."

Be that as it may, the fact was that C-DOT seemed to be losing the pace of its first three years. But there was nothing extraordinary about that. In any R & D body the levels of energy and enthusiasm progressively go down with time. They go down relatively speaking. In truth they merely come down to the more realistic levels. During the first three years C-DOT worked at levels which were not normal. The fix had to wear off with time. Even Pitroda could not guarantee a permanent high.

During the two years between 1988 and 1989 C-DOT functioned at 70 per cent of its original pace and efficiency. The main reason was that it had entered an area where whatever had to go wrong was going wrong. "I don't know why so much is being made out about the losing momentum. It happens in the best of R & D facilities. Only those who were not

exposed to international R & D efforts were disheartened. I knew exactly what was going on. That is why I am not making any apology for a delay in delivering what we promised."

Pitroda's claim about delays being a commonplace was supported by verifiable facts. All major switch makers—be it AT & T, Ericsson, or CIT Alcatel—had faced dramatic cost escalations and delivery delays. My conversations with a large number of experts revealed that what Pitroda was saying was not only true but perhaps he was understating it. In their reckoning what C-DOT and Pitroda were doing was extraordinary and bold. What struck many was that he used novices in the field to produce a family of world class switches. In comparison most multinational telecom giants, which were also engaged in a similar pursuit, employed the brightest of world engineers. Any comparison between C-DOT and MNCs in terms of infrastructure and resources was necessarily invidious. As illustrated elsewhere, on an international scale, C-DOT was spending a fraction of what MNCs were investing on their switching programme. The only area where C-DOT matched MNCs was in their ambition. What is often forgotten while assessing C-DOT is that it was a pigeon trapped among cats.

It could overcome all these shortcomings through sheer grit and ingenuity. What it did not obviously equip itself for was a potential threat from India's mean politics. There is nothing to show that Pitroda had planned for an eventuality arising out of India's rapidly shifting political sands. Either he did not think that Rajiv Gandhi's Congress Party could lose power sometime or, if it did, he thought it would not be too long before it returned at the helm. The third possibility could be that he made the mistake of believing that C-DOT was above politics and hence faced no threat from it. There was no way he could have calculated that C-DOT would accomplish what it set out to while the Congress Party was very much in power.

Even if one grants that Indian politics was generous enough to rise above pettiness and spare C-DOT, the factor of the perception that Pitroda was a Rajiv and Congress sympathiser was very real. During the three years from 1987 Pitroda came

to be irretrievably identified with Gandhi and hence the Congress Party. Not only did he not make any apology for his personal friendship with Rajiv but he did not even challenge the notions that he was, as a matter of fact, biased in favour of Gandhi's party. My conversations with his close friends established that Pitroda, in an uncharacteristic show of misjudgement, did not seriously consider the possibility of Rajiv losing power.

Apparently, Pitroda's failure in this particular area was caused by a combination of factors. The most important among them being that he genuinely and rightly believed that C-DOT was a great national effort. Any government, whatever be its political complexion, would be compelled to keep it going, if not out of sagacity, then out of a selfish wish to guard one's reputation. Another factor has to do with Pitroda's virtually non-existent understanding of the mechanics of Indian politics. He simply did not consider the ruthless logic that forces politicians to behave in a manner they did with C-DOT. The third factor was his gambling instinct. At the back of his mind he knew that it would not always be hunky dory. But he still took that chance to see how much he could win.

By 1989 it was becoming reasonably clear that Rajiv Gandhi could lose on the issue of the Bofors gun scam. Even Pitroda realised it. Anyone in his position, especially after having been branded as one of Rajiv's men, would have started looking for options. But he did not. His belief that C-DOT was of great national consequence was so firm that he did not even academically consider the dangers it might run into under a non-Congress government.

"There was nothing political about C-DOT. Good telecommunications meant good telecommunications for all. V.P. Singh needed to use the telephone as much as Rajiv. C-DOT may have happened during and because of Rajiv Gandhi but it was by no means something political." Somehow he did not see that it was not C-DOT so much as he himself whose political inclination made all the difference. But he had an answer for that too: "It would be foolish to link C-DOT with

my political inclination. It was a job I had to do, no matter who was in power. I don't see what the issue is."

My interviews did not give me the impression that anyone else at C-DOT had seriously thought about this aspect either. Maybe it was a collective misjudgement that attributed so much refinement to Indian politics as to expect it to make a distinction between individuals and institutions. Pitroda was quite vehement in asserting that he had nothing to do with politics. "I recognised that something like C-DOT could not have taken place without support from the highest office in the country. It is incidental that Rajiv happened to be in that office and we happened to get along so well."

Technically C-DOT was already two years too late in its delivery by the time the 1989 election was fought and lost by the Congress. It is true that no one expected vindictiveness of the kind that was to be displayed by a member of the new Janata Dal government of Vishwanath Pratap Singh. "By that time C-DOT had acquired enough stature of its own and had no reason to be anxious about any political change." Notwithstanding the delays, C-DOT's report card looked quite impressive at the beginning of 1990.

- ★ Some 36 manufacturers were involved in the manufacture of 128 port PBX and over 1000 such systems were already working in the country.
- ★ 128 port RAX was also manufactured by 36 companies and over 100 such systems were in operation.
- ★ The medium size MAX (512 ports/1500 lines) was cleared by the Department of Telecommunications for large scale production.
- ★ The large size MAX (8,000 ports/20,000 lines) was waiting for production clearance.
- ★ The extra large MAX (16,000/40,000 lines), which was the main objective of the C-DOT exercise, was only a question of putting together using the same technology.
- ★ An ancillary base to indigenise telecom industry had been created with 170 component vendors and 60 manufacturers.

In technological terms C-DOT was not too far from achieving its primary objective of producing the extra large telephone exchange. Even without it what it accomplished was truly remarkable. It was not altogether unlikely that it would have delivered the large exchange by the end of 1990. That would have meant a complete success for Pitroda and his band of gutsy engineers. More than the success of having produced this highly complex machine entirely on indigenous effort it was the spillover effects it was bound to have on the country's scientific community that was crucial. That C-DOT was involved in designing what has often been described as the most complex mechanism made by man was just a detail. The confidence and self-assurance it sought to unleash was an unquantifiable gain which could have rejuvenated India's stagnating applied science like nothing before. C-DOT was not an elitist science. Its impact would comprehensively change the modern Indian nation.

That is the angle from which I chose to view and assess Pitroda and C-DOT. It was of little relevance to me that he got involved with the Congress Party. It made no difference if he arrogantly shrugged off unproductive norms and employed methods which ran contrary to the accepted practice. In fact, there is good reason to believe that had he respected norms he would have ended up like any government departmental head who is powerful but often nonproductive.

When the government of Prime Minister V.P. Singh took office, it was expected like any other government before it, to clean the stable of whom it thought were Rajiv's men. Among them Pitroda was the plum target. By any reckoning odds were heavily against him. Singh knew Pitroda well and had enough knowledge about the extent of friendship between the two men. But as it turned out, Singh was also perceptive and sensible enough to recognise that there was no one who knew the telecom job better than Pitroda. While many of Rajiv's favourites in the administration were juggled by Singh's government, for some extraordinary reason Pitroda remained untouched. The normal practice following any government

change is that some key men offer to resign. This is not for any other reason than affording the new administration to choose people of its liking. But in some cases it could also be because particular persons became too closely identified with the outgoing government. Pitroda fell in the second category. But he did not offer to resign.

His reason for staying on was: "The job that I am doing needs doing irrespective of who forms the government. I deal with an area which needed highly specialised knowledge. I did not resign because I thought even under the new government I could continue my efforts to improve telecommunications. Besides, I had no interaction with V.P. Singh during his days with Rajiv to know that he would not carry out any compulsive transfer in my case." Pitroda's confidence which might have seemed unfounded at that time was to be vindicated.

One announcement Pitroda awaited with a lot of interest was who would be the new Communications Minister. When K.P. Unnikrishnan, a journalist turned politician of gargantuan proportions from the south western coastal state of Kerala, was named for the job Pitroda was not able to react in any distinct manner. "For one I did not know of him earlier. It did not create in me any particular impression. I was open to him as I would be open to anyone I did not know."

I could not ascertain whether engineers at C-DOT feared the consequences of the change of leadership. But there were perceptions among some C-DOT people that Pitroda's proximity to Rajiv Gandhi could be used to get at the organisation. A fact which few recognised was that at the time of the change of government C-DOT was at its most vulnerable. This was because those who had doubted and derided it at the very inception were already making snide references to the delays in delivering the main exchange. It was not quite a whispering campaign but something akin to it. Perhaps the idea seemed to create in the new minister's mind serious misgivings about C-DOT in general and Sam Pitroda in particular. It was a fact that C-DOT was a major thorn by the MNCs' side and Pitroda, with his almost fanatic insistence on indigenous switching, was

the biggest obstacle to their entry into India's huge telecom market. There was enough reason for MNCs to see both out of their way. "I am surprised no one has taken a shot at me as yet."

In the strictest sense Unnikrishnan could not be called Pitroda's nemesis because Pitroda did nothing that would call for retributive justice. The two men were as unlikely adversaries as Pitroda and Rajiv were friends. There was something in Unnikrishnan's demeanour that conveyed that he would not get along with Pitroda. Even at the risk of being accused of passing hindsight as an extra sensory ability I must say that the day Unnikrishnan was named Communications Minister I told myself 'Pitroda has had it.'

