# Time for introspection

***Speaking about progress in the past 50 years in India would lead to more despair than delight. The only ray of hope in the much maligned Indian system in this period has been the growth in science and technology sector. India is in the forefront of space research, software development, parallel processing, super conductivity, solid state chemistry and several other prime research areas. But this has achieved very little in terms of national development. There is an immediate need to realise the importance of team work, discipline and patriotism to resurrect the country to all its glory.***

■ G.P. Vinayababu

## Chronology of events and achievements in S&T in the past 50 years

| | |
|---|---|
| 1948 | Yellappagrada Subbarow and his team discovered and developed Tetracycline - a life saving drug |
| 1955 | First computer was installed in Calcutta |
| 1956 | First nuclear reactor Apsara - setup |
| 1964 | First indigenous computer, ISIJU developed |
| 1968 | Indian doctor Dr. M.C. Modi creates world record by performing 833 eye operations in 14 hours in Tirupati |
| 1974 | First nuclear implosion in Pokhran on May 18, at a depth of 107m produced a crater of 47m x 10m |
| 1979 | Discovery of seminal plasmin (proteins) in seminal fluid of bull - a potent antimicrobial agent |
| 1975 | First Indian satellite - Aryabhata launched into space |
| 1981 | Apple - First geostationary communication satellite launched (June 19) |
| 1984 | Sqn. Ldr. Rakesh Sharma went to space becoming the first Indian to do so (April) |
| 1986 | First test tube baby, Baby Harsha was born by IVF (August 6th) |
| 1989 | First super computer Cray XMP - 14 installed |
| 1990 | First indigenous chip, GIST (Graphic & Intelligence based Technology) developed |
| 1993 | 13th Indian expedition to Antartica to conduct scientific research |
| 1996 | Indigenously designed polar satellite launch vehicle PSLV-D3 launched (March) |
| 1996 | LCA - indegenously developed Light Combat Aircraft cleared for production |

India has been a forerunner in scientific inventions and discoveries from times immemorial. Some of the scientific developments of the Vedic era in the fields of medicine, mathematics, chemistry and astronomy are relevant even to this day. Hundreds of years of slavery under various foreign invaders didn't prevent India from producing scientists par excellence. When we finally got freedom from the clutches of the British rulers in 1947, our national leaders had to face an imposing task of rebuilding a whole nation whose development had been stunted by foreign rulers. It was a challenge for the Indian scientific establishment to bring India Inc. on track.

In the 50 years after independence, India has witnessed tremendous growth in the scientific arena and in turn a considerable national growth. But the progress in science and technology by India which boasts of one of the most intelligent brains in the world, hasn been anything but spectacular. There has definitely been a progress in terms of population of the country which automatically has ensured that there is a growth in the infrastructure, though not proportionately.

India, which had only 18 Universities and 700 Colleges in 1947, now boasts of more than 200 Universities and 8000 Colleges- an increase of more than 10 times. In a span of 50 years, a chain of nearly 200 national laboratories and an equal number of R&D units in the central sector have been set up. There has been a proportionate increase even in the scientific/technical education sector which produces more than 2 lakh S&T personnel every year.

In terms of technical manpower, India is placed at the third position among the world countries. But in terms of development, India finds itself at a dismal 134th position. This obviously means that Indian technical education sector excels only in quantity and not in quality. The best brains in the country are migrating to America to serve the growth of American science. Innumerable graduates who are unemployed are disillusioned at the state

## Education:General enrolment pattern

| | | Percentage |
|---|---|---|
| Humanities and social sciences | - | 40.4 |
| Commerce | - | 19.6 |
| Science | - | 21.9 |
| Law | - | 5.3 |
| Engineering technology | - | 4.9 |
| Education | - | 2.3 |
| Medicine | - | 3.4 |
| Agri. and Vet. Sciences | - | 1.4 |
| Others | - | 0.8 |
| **Total** | - | **100** |

## ISRO's Space Mission

| Satellite | Mission | Mission life |
|---|---|---|
| Aryabhata | Scientific & Experimental | 1 year |
| Bhaskara I | Experimental earth observation | 1 year |
| Bhaskara II | Experimental earth observation | 1 year |
| IRS-1A | Operational remote sensing | 3 years |
| IRS-1B | Land use/land cover mapping | 3 years |
| IRS-1E | Crop acreage & field | 6 months |
| IRS-P2 | Drought monitoring | 1 year |
| IRS-P3 | Ground water targeting | 1 year |
| IRS-1C | Forest mapping & fisheries devp. | 3 years |
| Anuradha | Study on ionisation states of low energy heavy ions in solar comic rays | 7 days |
| RS-1 | Scientific & technological | 1 year |
| RS-D1 | Scientific & technological | 1 year |
| RS-D2 | Scientific & technological | 1 year |
| SROSS-1 | Scientific & technological | 1 year |
| SROSS-2 | Scientific & technological | 1 year |
| SROSS-C | Scientific & technological | 1 year |
| SROSS-C2 | Scientific & technological | 1 year |
| Apple | Experimental communication | 2 years |
| INSAT-1A | Meterology | 7 years |
| INSAT-1B | Telecommunications | 7 years |
| INSAT-1C | TV broadcasting | 7 years |
| INSAT-1D | Radio networking | 7 years |
| INSAT-2A | Disaster warning | 7 years |
| INSAT-2B | Search & rescue | 7 years |
| INSAT-2C | Mobile communication | 10 years |

*Source : ISRO*

## Indian Population

| | | |
|---|---|---|
| 1941-51 | - | 361.1 million |
| 1951-61 | - | 439.2 million |
| 1961-71 | - | 548.2 million |
| 1971-81 | - | 683.3 million |
| 1981-91 | - | 846.3 million |
| 1991-2001 * | - | 1003.1 million |

** Standing committe projection - 1989*

### Higher education system in India

| | 1994 | 1947 |
|---|---|---|
| No. of universities | 219 | 18 |
| No. of colleges | 8000 | 700 |

*Source: University News*

## Percentage breakup of qualified professionals

| | | |
|---|---|---|
| Graduates | - | 30.4% |
| Post graduates | - | 31.0% |
| Diploma holders | - | 10.1% |
| Doctorate degree | - | 18.2% |
| Other qualifications | - | 10.3% |
| **Total** | - | **100%** |

*Source: Embassy of India, Bonn*

of affairs in the country.This problem should be addressed immediately before it assumes uncontrollable proportions. Instead of allowing engineering colleges to be set up in every nook and corner of the country, only a selected deserving few should be granted permission to operate engineering colleges.

If India has excelled in any one field, in the past 50 years, it is in space research. Now India is one of the very few countries in the world which have advanced in space technology. We have the capability to build indigenously and launch satellites into orbit in space. The fact that India was able to continue its work on rocket construction even as the erstwhile USSR went back on its promise to supply cryogenics, is an indicator of India's preparedness in space technology.

The other area in which India has done a commendable job is in defence. Its nuclear capabilities are well known. India's advancement in missile technology of late has been a cause of

### S & T infrastructure in India - 1997

| | | |
|---|---|---|
| National laboratories | - | 200 |
| R&D institutions (central sector) | - | 200 |
| R&D units (industrial sector) | - | 1300 |
| Universities | - | 162 |
| Institutions deemed as universities | - | 32 |
| Institutions of national importance | - | 10 |

great concern to the U S.

By far, the best growth in the recent past has been the growth in software industry. There has been a tremendous growth in the software sector with the number of companies rising from a mere seven about five years ago to more than 130 today. And since 1991, the information technology industry has been averaging a 25 per cent growth rate. Indian software professionals are most sought after in the world market today.

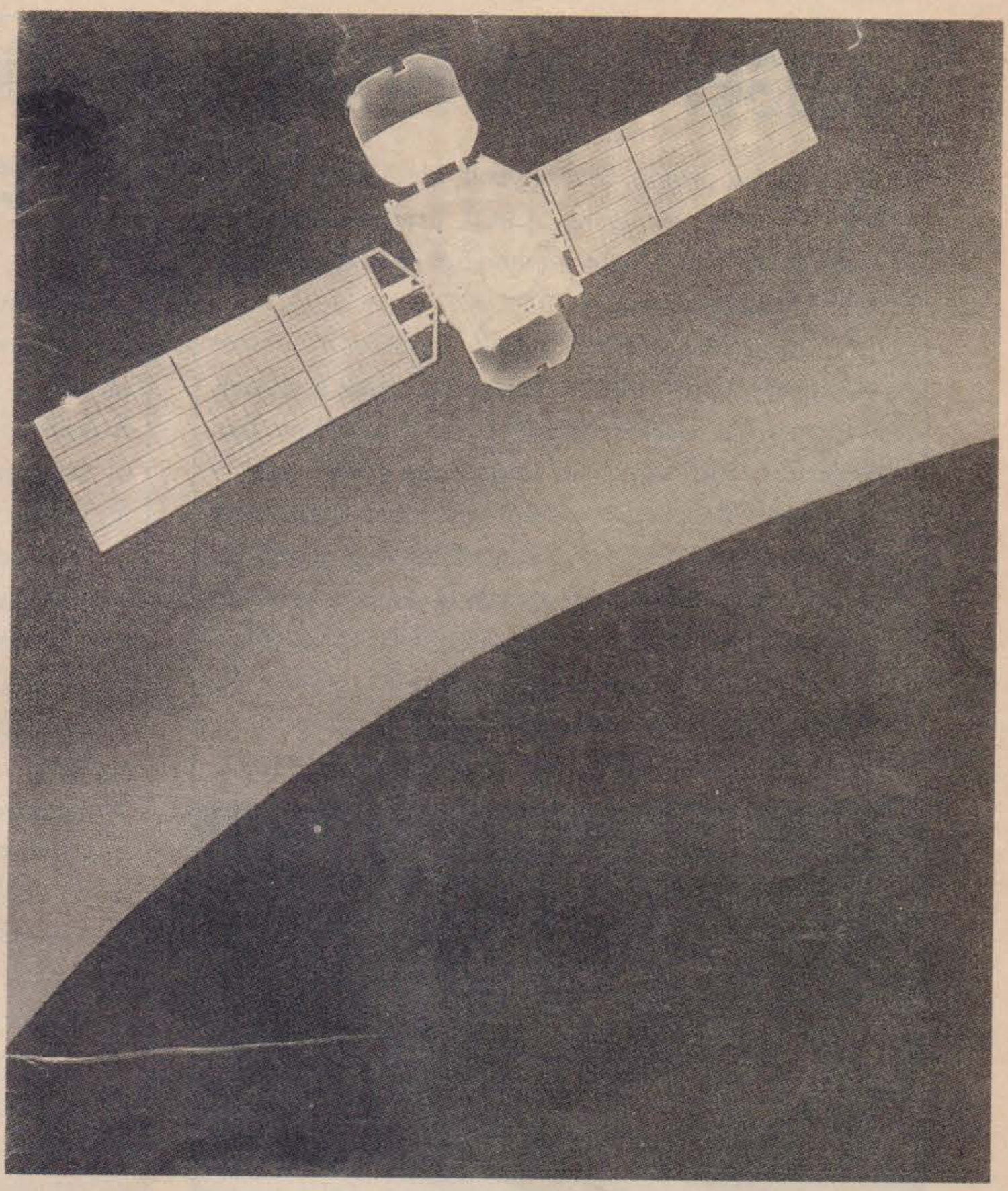
Why is it that India with all its riches, hasn't been able to live up to its potential? Why is it that India, with one of the largest technical personnel in the world, is at the rock bottom of the development chart?

The reasons are obvious. Corruption is ruling the roost in the country which is the root cause of all problems. The Indian system lacks discipline and people lack a sense of achievement. There are enough reasons to believe that it is only the corrupt system which is our nemesis, as the very same Indians who do nothing in India come out with flying colours in countries like the US. The high levels of illiteracy and unchecked growth of population have also contributed to India's sorry state.

It isn't proper to call the system corrupt and hide behind it to justify all our failures. It is the responsibility of each and every one of us to make the system better and thus the country progressive.

Indians on the occasion of 50th year of independence should rededicate themselves to the cause of building this nation which our ancestors have fought hard to restore back to us.

The growth in the software field should be a guiding force for other sectors to proceed with renewed vigour into the 21st century.



## The Internet in India

India's general public was given access to the Internet on August 15, 1995. Prior to this date, only exporters and people working in government institutions had access. Videsh Sanchar Nigam Limited (VSNL), India's public sector monopoly for international communications, is currently the only provider of Internet services.

VSNL uses multiple 64 kbps high-speed links which will soon be updated to 2 Mbps. Using speed data links between Delhi, Bombay, Calcutta and Madras, VSNL has been able to set up a countrywide network and is expanding into Bangalore and Pune.

Users can access the network by dialing in through a personal telephone line, a leased line or the I-net. The I-net allows users in other cities to connect to the network for a fee [which is paid to the national telecommunications provider - the Department of Telecommunications (DOT)].

Dialers may access the Internet for a maximum of 250 hours per year and are confined to 512 KB of disk space.