Indian science slows down–III: While we sleep

Tucked away in the pages of the *Science and Engineering Indicators*[1] (an excellent review of this appeared in *Current Science* recently[2]), is evidence that while the number of Ph Ds in engineering produced by our country has actually taken a tumble (from a peak of 629 in 1991 to 298 in 1998), the corresponding numbers in many Asian countries have gone up dramatically.

We have still not been able to work out how many of the very large number of engineering graduates we are producing should go on to do a Ph D, if we are to maintain a position among the advanced technological nations of the world.

Table 1. Doctoral engineering degrees earned in selected Asian countries: 1975–99

	Number of degrees				
Year	China	Japan	South Korea	Taiwan	India
1975		986	20	8	136
1976		1079	20	8	174
1977		1043	14	3	223
1978		1168	20	3	134
1979		1195	29	8	176
1980		1186	42	10	193
1981		1236	60	15	282
1982		1255	87	15	380
1983		1290	97	14	511
1984		1291	120	31	510
1985	68	1404	197	59	509
1986	89	1493	273	83	554
1987	127	1547	270	98	603
1988	476	1717	346	98	594
1989	726	1774	415	120	586
1990	715	1967	439	165	607
1991	767	2029	466	209	629
1992	823	2094	552	264	451
1993	1069	2362	659	287	323
1994	1389	2610	786	312	329
1995	1659	2791	938	373	335
1996	2195	3297	1042	435	374
1997	2643	3411	1157	433	298
1998	2900	3580	1393	477	298
1999	3269			482	

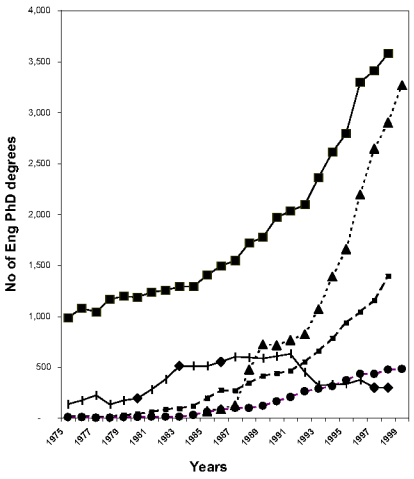

Table 1 and Figure 1, which are based on data appearing in reference 1, show these trends.

1. *Science and Engineering Indicators*, National Science Board, National Science Foundation. Arlington, VA, USA. (http://www.nsf.gov/sbe/srs/seind02/start.htm)
2. Arunachalam, S., *Curr. Sci.*, 2002, **83**, 652–653.

GANGAN PRATHAP

E-12, NAL Campus,
Bangalore 560 017, India
e-mail: gp@cmmacs.ernet.in

Towards a global perspective on globalization

In the years immediately after the Second World War, the concept of nationhood was considered sacrosanct. Internationalism recognized and respected national boundaries, aspirations and priorities. It sought to build bridges among nations and to do so went out of the way to discover, even invent, and enhance commonalities. Globalization on the other hand, is a process of denationalization, of capital flow, ownership, production and consumption as well as of laws and politics. It seeks to devalue national borders and erode sovereignties. It introduces homogenization in superficial areas such as entertainment, food, dress and even slang, but deeper down tends to encourage sub-nationalism and accentuate differences between 'us' and 'them'. Any feeling of fellowship, *noblesse oblige* or colonial guilt that informed the days of internationalism has since been swept aside by the tidal wave of globalization.

The term Third World was coined in 1952 by the French demographer Alfred Sauvy to denote the economically underdeveloped countries. The capitalist, industrialized countries constituted the First World, whereas the Soviet communist block represented the Second World. The coinage was inspired by the expression third estate which denoted the commoners of France before and during the French revolution as opposed to the priests (first estate) and nobles (second estate).

With the collapse of the Soviet Union, the Second World has disappeared, even though the term Third World continues to retain its original meaning. We may still

divide the globe into three worlds using the industrial revolution as a marker, with the Third World retaining its original composition. The Third World comprises countries whose societies have essentially remained untouched by the industrial revolution. The Second World consists of countries which have been transformed through industrial revolution, industrialization or by association, but have retained memories and sensitivities from the pre-industrial times. The First World, comprising a solitary country, USA, is a social product of post-industrialization era representing a total break from earlier times. The Second World represents, numerically as well as culturally, an arithmetic mean between the First World and the Third World. Because of its historical contacts with the Third World, it has been familiar with the latter's mindset. The First World on the other hand has consciously fashioned itself by reacting to the Europe it left behind. This is reflected for instance, in the definition of what constitutes novelty, in the First World.

Just as the first, physico-chemical, Industrial Revolution went hand in hand with European colonial expansion, the second, biotechnological revolution is being attended on by globalization. Whereas the Industrial Revolution was an entirely self-contained European enterprise, the biotechnological revolution needs the Third World with its stock of biodiversity and the attendant traditional knowledge on food and health care. The Third World countries today are a confused lot, just as Indian nationalists were before Mahatma Gandhi came on the scene. Should they expediently ask for petty profits for information supplied or should they oppose the regime itself on principle?

When patent laws at international level were first introduced, they dealt with tangible things, applied to a small part of the world, and had the benefit of actual practice over four centuries at local levels. In contrast, intellectual property laws pertaining to biotechnology and impinging on such civilizationally basic areas as food and health are being framed at the outset itself, when there is neither any ethical framework to interpret them nor benefit of actual practice to fall back upon.

Today when we talk of globally applicable laws, no national laws can serve as a role model. This is so because so far laws have been made to safeguard national or local interests. Global laws require fresh thinking. When the world was Euro-centric, it was easy to define what was new. If Europe did not know of it, it did not exist before. In 1738 William Champion was granted a patent in his capacity as 'the first European to produce metallic zinc', even though the process was known to have been brought from Asia. However 100 years previously, in 1608, when Hans Lippershey applied for a patent on telescope, he was turned down on the ground 'that it is evident that several others have knowledge of the invention'. By the same logic, if the knowledge is available anywhere in the world today, it should not be possible to patent it.

Notwithstanding its broad sweep and power, globalization suffers from a serious handicap. It is bereft of any serious theoretical underpinning. There is no philosophical basis for it beyond current economic interests. Enforcement of globalization seems to be its own legitimation. Even colonialism in its day was provided with an ideology no matter how abominable it may look now. The foremost task today is to put heads together in developing a cross-cultural civilizational perspective on various basic issues.

RAJESH KOCHHAR

National Institute of Science, Technology and Development Studies,
Pusa Gate, K.S. Krishnan Marg,
New Delhi 110 012, India
e-mail: rkk@nistads.res.in

Can information technology be another useful tool to diagnose and understand schizophrenia?

Schizophrenia is a severe mental disorder that leads to imperfect thought processes, socialization and cognitive difficulties. The patient cannot discriminate between fantasy and reality. Approximately 0.85% of the population is affected with schizophrenia, the overall lifetime prevalence is 1–1.5%, and the cost to handle schizophrenia is more than 33 billion dollars worldwide[1]. While applying this statistics in a country like India, it is not untrue that the number of patients could be very large and the cost to tackle the disorder very high. Moreover, in India, due to lack of proper awareness, interaction between psychiatric patients and doctors is not as much as it is expected. Therefore, the available epidemiological data on schizophrenic patient-population in India could be only the tip of the iceberg; the actual volume of the affected population is probably awesome.

The National Center for Research Resources (NCRR) under the supervision of the National Institutes of Health (NIH) offers a scheme to facilitate and encourage interactive biological research, especially on human-brain disorders using information technology (IT). This organization uses high-speed-supercomputers, linked among the US universities to develop a collaborative approach. Highly flexible artificial neural network is being tried in a sophisticated way to handle and understand the complex data structures related to the disorder, and schizophrenia is no exception. It is also relevant to mention that NCRR has already spent about $ 20 million!

India, on the other hand, is not fit enough economically to handle brain research in the above manner. Linking universities and interested professionals needs an updated infrastructure, yet to be available in India. Therefore, at least single institution-based use of IT with its flexible stem research could be done in India too to help the overall 'psychiatric-health' in the following ways:

(1) Patient-search could be possible by using 'tele-medicine' and 'tele-counselling'. A database of schizophrenics could be created.