monitored food industry in the West. A survey conducted by the Public Health Laboratory Service in 1994, revealed one in three chilled chickens sold at British supermarkets contained *Salmonella* and two-fifths contained *Campylobacter*. In 1997 notified cases with *Campylobacter* exceeded 50,000 and *Salmonella* cases approached 40,000. Recently the US authorities had to recall 19 million pounds of ground beef – used for preparing hamburgers – fearing contamination with the deadly *E. coli* after 19 people fell ill. The story of the mad-cow disease, which forced Britain to destroy hundred thousand cattle, was still haunting the British farmers, when an epidemic of foot and mouth disease led to slaughter of 4 million animals[2].

It is surprising to note that a few years ago in a highly developed country like the USA, a failure in a large municipal water supply system resulted in infecting more than 400,000 people in Milwaukee with *Cryptosporidium parvum* within a few days. These examples only indicate that the experience world over, including the highly developed countries, shows that the threats posed by infectious diseases should never be lost sight of. These call for eternal vigilance and an alert health care system to promptly deal with these.

The current outbreak of severe Acute Respiratory Syndrome (SARS) which has already spread worldwide, at least to more than 20 countries from China to Canada and Hongkong to Australia, reminds us of some other features which make such infections so dangerous. The phenomenal increase in international travel, more than 500 million people cross the international borders on commercial flights every year, provide an easy route for spread of infections across the globe. This is what led Joshua Lederberg[3] to warn that, 'The microbe that felled one child in a distant continent yesterday can reach yours today and seed a global pandemic tomorrow.' The second feature of the emerging infections is the ease with which microbes can mutate to acquire renewed pathogenesis as was recently experienced in India in case of *Cholera vibrio 0139*. The inherent capability of microorganisms to develop antibiotic resistance is already a matter of global concern. The widely prevalent pernicious habit of prescribing antibiotics, even when not indicated, their use to promote animal growth or as aerosols for fruit trees, use of inadequate or incomplete therapy even when indicated all contribute to the increasing prevalence of multidrug-resistant organisms, keeping ahead of the development of newer, more powerful and costlier antibiotics. The current epidemic of SARS once again brings this dilemma to the fore. We still do not know if antibiotics or even antivirals have a role to control or modify this infection. It must also be pointed out that notwithstanding all the recent advances in molecular biology, genetics and biotechnology, and billion of dollars spent in research and development, as of today there are only a few really effective antiviral drugs. Once a new infection is identified, it takes years, if not decades, before an effective prophylactic vaccine can be developed. Even to develop a diagnostic test with desirable sensitivity and specificity takes several years. In spite of repeated warnings by the medical profession the country lacks an effective disease surveillance system to detect and institute control measures promptly. This only adds to the advantage for the invading organisms and unmitigated misery for the people. This certainly justifies the prophesy by René J. Dubos, 'Human destiny is bound to remain a gamble, because at some unpredictable time and in some unforeseen manner, Nature will strike back'.

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2. Coghlan, A., *New Sci.*, 19 January 2002, p. 8.
3. Harrison, P. F. and Lederberg, J. (eds), *Antimicrobial Resistance: Issues and Options*, National Academic Press, Washington DC, 1998.
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NEWS

Visas to the United States: Return of the Preying Mantis

Despite rhetoric and anodyne from the US ambassador to India and other high-ranking diplomats about the 'burgeoning US–India relationship', after a period of relaxation the United States has re-implemented a programme of visa review for Indians that 'renders ineligible any [Indian national] who a consular officer knows or has reasonable ground to believe is seeking entry to engage solely, principally, or incidentally in any activity to violate or evade any law prohibiting the export from the United States of goods, technology, or sensitive information'. US consular officers now apply this ground of ineligibility particularly to Indians who are going to engage in an activity involving one of the scientific or technical fields on a Technology Alert List (see below). Such activity includes *graduate-level studies*, *teaching*, *conducting research*, *participating in exchange programmes*, *receiving training or employment, or engaging in commercial transactions*.

The Mantis Programme was evolved by the United States as one response to concern over the 'illegal transfer of [US] controlled technology'. Initially, the visa-screening process was accomplished using post-check name-check procedures known as SPLEX, CHINEX and VIETEX and focused on nationalities from the former Warsaw pact, China and Vietnam.

In January 1998 (i.e. pre-Pokhran), the VISAS MANTIS programme was extended to other countries such as India 'due to law enforcement/intelligence community concern that US-produced goods and information are vulnerable to theft on a worldwide basis'. Consulates now flag visa cases using the VISAS MANTIS indi-

cator, a pre-check name-check procedure. The primary security objectives of the MANTIS programme are:

'(1) To assist in the stemming of the proliferation of weapons of mass destruction and missile delivery systems; (2) To assist in the restraint of the development of destabilizing conventional military capabilities in certain regions of the world; (3) To assist in the prevention of the transfer of arms and sensitive dual-use items to terrorist states; and (4) To assist in the maintenance of US advantages in certain militarily critical technologies'.

The above Mantis-programme objectives are operated on a (to-be-revised) Technology Alert List (TAL), which reads:

a. Advanced ceramics: Technologies related to the production of tanks, military vehicles, and weapons systems.
b. Advanced computer/microelectronic technology: Technologies associated with superconductivity, supercomputing, microcomputer compensated crystal oscillators.
c. Aircraft and missile propulsion and vehicular systems: Technologies associated with liquid and solid-rocket propulsion systems, missile propulsion, rocket staging/separation mechanisms, aerospace thermal and high-performance structures.
d. Chemical and biotechnology engineering: Technologies associated with the development or production of biological and toxin agents, pathogenics, biological weapons research.
e. Conventional munitions: Technologies associated with warhead and large caliber projectiles, fusing and arming systems.
f. High-performance metals and alloys: Technologies associated with military applications.
g. Information security: Technologies associated with cryptographic systems to ensure secrecy of communications.
h. Lasers and directed energy systems: Technologies associated with laser-guided bombs, ranging devices, countering missiles.
i. Marine technology: Technology associated with submarines and deep submersible vessels, marine propulsion systems designed for undersea use and navigation, radar, acoustic/nonacoustic detection.
j. Materials technology: Technologies related to the production of composite materials for structural functions in aircraft, spacecraft, undersea vehicles and missiles.
k. Missile/missile technology: Technologies associated with air vehicles and unmanned missile systems.
l. Navigation and guidance control: Technologies associated with the delivery and accuracy of unguided and guided weapons, such as tracking and homing devices, internal navigation systems, vehicle and flight control systems.
m. Nuclear technology: Technologies associated with the production and use of nuclear material for military applications.
n. Remote imaging and reconnaissance: Technologies associated with military reconnaissance efforts, such as drones, remotely piloted or unmanned vehicles, imagery systems, high resolution cameras.
o. Robotics: Technologies associated with artificial intelligence, computer-controlled machine tools.
p. Sensors: Technology associated with marine acoustics, missile launch calibration, night vision devices, high-speed photographic equipment.

US consular officers have been asked to 'bear in mind that while the TAL is a valuable tool for recognizing possible illegal technology transfer, it is not an exclusive mechanism for identifying such cases'. Where the consular officer has reason to believe that an applicant may fall within the suspect zone despite the applicant having no direct connection with a scientific or technical field included on the TAL, the officer must submit such cases for security advisory opinions to the US State Department using the 'VISAS DONKEY MANTIS' code indicator.

Visa-issuing US consulates are required compulsorily to use the VISAS MANTIS procedure to process non-immigrant visa cases. But there is a fast-track VISAS EAGLE MANTIS procedure for nationals of the People's Republic of China, and of Russia applying for visas in those countries. But there is no such fast-track for Indians applying for US visas in India. So much for the 'burgeoning relationship!'

Slow pace of engineering education reforms

Projected demand for scientists and engineers: Are we clueless as much as dataless?

India is concerned about adequacy of its numbers of scientists and engineers, just as is being felt right across the globe. Elsewhere, strategies in policies and programmes are being reinvestigated constantly and measures taken to balance supply and demand. This requires a piggyback on some kind of science and engineering indicators that are dynamically evolving at a regular frequency. In India, however, present statistics which are relied upon are those in the form of outdated Government indicators such as the 1995–96 data of the Department of Science and Technology, published in 1999, or from borrowed foreign data that are mostly inadequate in nuances of 'India specific indicators'. There is presently no Government independent statistics available off the shelf for science and technology with a 'made in India' label.

Now in 2003, a move is on for changing this scenario, according to M. S. Valiathan, President of the Indian National Science Academy (INSA), New Delhi. INSA has begun an initiative for bringing out at the end of 2004, an India Science Report, a kind of ready-reckoner on science and technology statistics[1]. This would help inject the right momentum for altering business models suitable for the contemporary and competitive environment that we live in today, with updates of the expected report planned at regular intervals.