

In this issue

Pinning down pulsars

Discovered observationally about twenty years ago, neutron stars are the most exotic among the dozens of varieties making up the hundred billion or so stars that populate our galaxy. One of the many things that set them apart is that their existence was first predicted theoretically about half a century ago. It was surmised that supernovae—the spectacular explosions that mark the death of stars much more massive than the Sun—would leave behind a collapsed core in the form of neutrons packed into a tiny radius of about 10 km. But the prediction created relatively little activity among astronomers until the accidental discovery in late 1967 of their highly periodic pulses of radio emission picked up by a large radio telescope array. Since then, the study of these stars has been an active and important branch of both observational and theoretical astrophysics.

Among the many extreme physical properties—bordering on science fiction—predicted for such stars and which now find observational support are densities of $\sim 10^{15} \text{ g cm}^{-3}$, a surface gravity two hundred billion times that on earth, rotation periods of a fraction of a second, a superconducting and superfluid interior, and a magnetic field of the order of 10^{12} gauss. The understanding of the nature, origin and evolution of such intense magnetic fields has posed a major challenge over the last two decades and has deep implications for the different manifestations of neutron stars in their emissions in the radio, optical, X-ray, and gamma-ray regions of the spectrum. The first research article in this issue (page 31), a collaborative effort between Indian and Soviet scientists, attempts to explain many of the observed properties of these magnetic fields as a logical consequence of the quantum-mechanical behaviour of the highly condensed matter in the interiors of these stars. We may have here yet another example of the intimate relationship that can exist between microscopic and macroscopic physics. The new hypothesis advanced here, if correct, promises to be an important step in the understanding of these most enigmatic of all stars.

Food for thought

C. Gopalan, in a lecture at the International Congress of Nutrition 1989 in Seoul (reprinted in this issue, page 18), warned of several dangers that may

befall us unless remedial measures are taken soon. Gopalan is a world authority on issues pertaining to human nutrition. He was director (1961–73) of the reputed National Institute of Nutrition, Hyderabad, and director-general (1973–79) of the Indian Council of Medical Research. Gopalan now heads the Nutrition Foundation of India. He is truly a missionary for nutrition.

The problem of undernutrition (both India's and global) is not really a shortage of food in the world but the vanishing purchasing power of vast sections of people. The number of hungry people in the world is growing steadily. The world helplessly sees the paradox of food surpluses reaching record levels when vast pockets of growing hunger continue to exist. It is estimated that 34% of the world's population, i.e. 730 millions, are afflicted with chronic hunger, of which 64% live in South Asia and 23% in Africa. Gopalan chides those who argue that most people in the underdeveloped countries are not really hungry but have become 'culturally adapted' to low food intake and forcefully reminds us that there can be no such 'arguments' about death. He goes on to quote some shocking data on infant and child mortality. While supporting the well-deserved focus on Africa, Gopalan reminds us (quoting a UNICEF report) that in the last two years more children have died in India and Pakistan than in all of Africa, more in Bangladesh than in Ethiopia.

A decline of florid forms of undernutrition is predicted. Many countries still unable to overcome poverty have at least taken steps to institute 'death-control' strategies. But if they stop short with these measures there will be much erosion of the quality of human resources because of increasing proportion of substandard survivors. Developing countries will face peculiar problems of diseases associated with affluence as well as problems of ageing societies.

While modern biotechnology offers immense possibilities of improving global nutrition, the privatization of biotechnology and the emergence of transnational corporations and the formation of pernicious university-industrial complexes could greatly harm developing countries. It is strange that industrial countries are seeking patent protection of plant and genetic varieties that they are developing out of plant and genetic resources originally appropriated free of cost and compensation from developing countries under the euphemistic umbrella of 'common heritage'. India and other

developing countries must take note of the warnings given by Gopalan.

The bat connection

Bats have gained importance as hosts that support the multiplication of arthropod-borne viruses (arboviruses). Many species of vertebrates are hosts to arthropod vectors of viruses, and are able to circulate in their blood sufficient quantities of the viruses to be able to infect large numbers of competent vectors. Bats, by virtue of their mobility and the spectrum of ectoparasites and different species of mosquitoes that feed upon them, are potential amplifiers or reservoirs of arboviruses. Many arboviruses have in fact been isolated from bats (page 26). There is some evidence that bats may be involved in Japanese encephalitis and Kyasanur forest disease, two important arboviral diseases in India.

Himalayan furore

The Viswa Jit Gupta case has received much publicity in India and outside. There have been a spate of accusations in international journals that Viswa Jit Gupta, of Panjab University, Chandigarh, has indulged in the practice of using the same palaeontological specimens two or three times as basis for reports from areas far distant from each other and has thus polluted the Himalayan palaeontology database.

B. P. Radhakrishna, editor of the *Journal of the Geological Society of India*, discussed the problem in an editorial (reprinted in this issue, page 13). There can be no doubt that journals have many lessons to learn from this episode. There is also the larger problem of finding proper ways of dealing with fraud in science and with accusations of fraud.

S&T in India

There is a worrying feeling that Indian scientists are not sufficiently aware of scientific activity throughout the country. Beginning this issue, *Current Science* will therefore publish articles about the scientific activity in some of our universities, institutes and industries. The first article (page 14) is about the Sree Chitra Tirunal Institute for Medical Sciences and Technology in Trivandrum—an institute that has departed from the normal pattern in that it represents the intermingling of medical science and technology.