In this issue

Healing the healers' distress

The state of medical research in India has been a matter of grave concern to many, not the least amongst them being the medical researchers themselves. M. S. Valiathan made an erudite analysis of the role of medical research at the discussion meeting organized by the Indian National Science Academy and the Indian Academy of Sciences on the essential role of fundamental research (see *Curr. Sci.*, **59**, 64). Examining the history of medical research in India, Valiathan traces (**page 125**) how, from the vigorous, pragmatic experimental approach of Sushruta and Charaka, it deteriorated to stagnation. He then forcefully makes the following points:

1. Building on the sands of imported knowledge is an invitation to disaster, as ruin is the only destination of a nation that lives on borrowed knowledge.
2. Medical research cannot strike roots and become a creative force in this country unless it flourishes in our medical colleges.

These remind one of the cry of another eminent man of science who felt that separation of the research function and the teaching function cannot but spell disaster and that one cannot truly isolate the fundamental aspects of science from its applications.

Valiathan goes on to suggest a few simple remedial measures. India has about 120 medical colleges, which produce over 12,000 medical graduates a year. These colleges *must* become the nursery for a new generation of medical scientists and be converted into the home of investigative medicine. The first step would be to choose carefully about 25 of these colleges across the country and grant to them fully funded research departments with well-equipped labs and full-time staff (who will also teach) with appropriate terms of appointment. The next step would be to choose at least 50 talented medical students every year and expose them to basic sciences and research methodology simultaneously with their medical courses, and launch them on a research career. The third step would be to offer appointments to the best of these in the newly established research departments.

One does wish that those at the helm of medical education and medical research planning heed these wise counsels. One cannot but agree with Valiathan that the success or collapse of hospital service for our enormous population will depend in no small measure on a self-generating base of research and development in medical science and technology.

A silver lining

Last year the radio astronomy group of the Tata Institute of Fundamental Research celebrated its silver jubilee. The group owes its origin to the vision of Homi Bhabha, who responded enthusiastically to the desire of a group of Indian radio astronomers abroad to come back to India and initiate work in this field. There were of course earlier attempts, in the fifties, to start research in this field—one at the Indian Institute of Science, with the help of S. Bhagavantam, and another at the National Physical Laboratory, with the help of K. S. Krishnan. Unfortunately, while some work was done, neither went far, although the latter became the seed for research in radio wave propagation and ionospheric research.

N. V. G. Sarma reviews (**page 176**) the brochure brought out by the Radio Astronomy Centre in Ootacamund. Under the leadership of Govind Swarup an impressive parabolic radio telescope was built in 1969 on the slopes of the Ooty hills (see cover photograph). The centre has earned justifiable renown. But what singles out Govind Swarup and his leadership is the manner in which he has promoted radio astronomy in India and extended a friendly hand to anyone interested in this field. It is a matter of great satisfaction to Indian science that radio astronomy has spread to many places and is a field in which India does quality science.

Swarup is now leading a project that must stir the imagination of any Indian. When completed, the giant metre-wave radio telescope (GMRT) will be the biggest of its kind in the world.

A wholesome insect science?

T. N. Ananthakrishnan writter (page **138**) about 'integrated entomology'. Unfortunately there seems to be a slow but sure separation taking place and even some antipathy raising its ugly head between the classical schools of biology and the more modern schools. Ananthakrishnan adduces many reasons to show that only by combining the strength that India has built up in classical biology and systematic ecology with the modern approaches involving biochemistry, genetics and molecular biology can real progress be made in the important field of entomology.

Climate change

Warming to a global effort

The atmosphere of our planet is one of the most complex systems for a scientist to research on. Modelling the atmosphere has become fashionable, and probably is the only method available for climate studies, provided of course one knows what experimental parameters to put into the models. The experimental data are so unsatisfactory that it is difficult to make reliable predictions. However, one thing seems quite clear to many—the excessive burning of fossil fuels necessitated by technological advances would lead to a global warming. If this does happen it cannot but trigger major changes in the patterns of climate in different parts of the world.

In an article (**page 134**) on the International Geosphere–Biosphere Programme (IGBP) R. R. Daniel points out the need for a multidisciplinary study of the Earth as an ecosystem. Both short-term effects (over periods of a decade or two) and long-term ones (over centuries) have to be considered. The relative importance and priorities of the two are matters of great concern to IGBP. Daniel feels strongly that developing countries like India should actively participate in IGBP, because a study of the earth's tropics is an important part of IGBP and the data that the programme will generate will especially benefit developing countries.

The scenario for India

Global warming may bring about two effects—(i) thermal expansion of the oceans and (ii) melting of snow and ice at high altitudes and latitudes. Their relative contributions to sea-level rise are uncertain. Sea-level rise during the last hundred years is estimated to be 10–15 cm, for a global warming of a mere 0.4°C. The estimates made of sea-level rise in the next century vary considerably depending on the experimental parameters put into the climate model. The values vary from 23–116 cm rise by 2050 to 52–346 cm rise by 2100. S. R. Shetye *et al.* of the National Institute of Oceanography in Goa examine (**page 152**) the effect this sea-level rise would have on the coastal regions of the Indian mainland and the islands offshore. The Lakshadweep archipelago would be the one to be most affected. There is also the possibility that the slopes of the eastern coast of the mainland may suffer from increased storm-surge damage. Regions below 12°N are also likely to experience much coastal erosion. These findings argue strongly in favour of Daniel's plea that Indian scientists must take an interest in the environment and the IGBP.