In this issue

Recognizing Limaye's molecule

P. Balaram writes in 'Research news' (**page 398**) about exciting work on molecular self-assembly and molecular recognition, by Ishikawa and collaborators at Kyushu University, and Cram and collaborators at the University of California respectively. What seems to be of special interest to us is that one of the important starting materials in the construction of Cram's 'cavitands' is a substituted resorcinol first made in Pune by D. B. Limaye in 1936. More surprising is that Donald Cram (Nobel Prize in Chemistry 1987) quotes, in his 1990 paper, the work of Limaye and I. Ghate published in India in 1936 in a journal called *Rasayanam*. This citation gives hope to some of us editors of Indian journals that papers published in our journals are quoted by scientists of repute. One even wonders whether this does not belie the excuse, often given, that even good work published in Indian journals is never cited and is as good as buried. It would be interesting to know whether Cram made a special effort to dig out this reference or it was available to him easily.

The present writer had occasion to meet Dattatreya Balakrishna Limaye nearly four decades ago. One could not but be impressed with the fire and enthusiasm that he exuded; and this was when he had reached the biblical span of three score and ten years! It is remarkable that so much art, literature and science came out of small colleges started and inspired by great nationalist leaders like Gopalakrishna Gokhale, Balgangadhar Tilak and others. One wonders what motivated these pioneers. Was it because, to them, science was a vocation and not a profession? Was nationalism (which is so very unfashionable these days) an important constituent that spurred these pioneers not only on to doing excellent work but also to establishing institutions where scientists of great dedication were grown?

Physicians as epidemiologists

Many of us are worried about the problem of our doctors, scientists and engineers going away to foreign lands after receiving excellent training in India (see *Current Science*, 1990, **59**, 196). This of course should be a matter of great concern to us nationally. However, it is also necessary to think sometimes of the talented persons who do remain in India, a few because they cannot emigrate, but most because India is their homeland. The optimal utilization of the untapped talents of many who remain should also be considered a matter of some importance. A case in point is to use the services of medical doctors all over the country for research purposes.

A. S. Nanivadekar describes (**page 405**) how these practising physicians could contribute effectively to epidemiological studies, i.e. the study of diseases in populations as opposed to that in individual patients. Medical practitioners all over the country see patients from varied segments of the population and strata of society. Each doctor has perforce to deal with a large number of patients and hence can look at large 'samples' and study diseases with respect to many parameters, say with respect to geographical areas, financial circumstances, etc. Doctors in private practice in India usually have integrated themselves well with the population and have personal contact not only with the patients but also their families. Therefore they can gather data not normally available to others. It is a matter of great satisfaction that most of these doctors are willing to undertake such studies. All that is required is a basic briefing in research methodology and the systematic recording of relevant data. The major support that has to be provided is of a managerial type. So much valuable data can be collected by this method that they could form the basis for many health-care decisions. Nanivadekar gives examples of useful data that can be collected. For example, in the case of intestinal worm infections, it has been possible to estimate prevalence. Nationally about 16% of the cases are due to roundworms, 14% due to threadworms, 7% due to hookworms, and 3.7% due to whipworms. It is also possible to compile area-wise prevalence.

It is remarkable how much important information these practising doctors can obtain. Nanivadekar believes that 'formation of in-practice research groups interested in a common problem could also help discover unforeseen opportunities'.

Chargeable fish scales?

A large variety of fishes display beautiful silvery sides. It is the scales, which consist of collagen and organic and bony materials, that provide the silvery effect. The nature and purpose of these remarkable scales, so beautiful to look at, are matters of great interest. One may ask why fish have these exquisite reflecting surfaces, which would only advertise their presence in the water. Will this not be detrimental to survival? But careful investigations have in fact proved that the opalescent scales play the opposite role — to render the fish inconspicuous when viewed from above or from the sides. The scales have in them arrays of stacks of crystals of guanine and 6-hydroxypurine oriented at different angles to the surface. Such stacks, with a specific periodicity, would Bragg-reflect light of one colour only in one direction, the colour depending on the thickness of each stack and the cytoplasmic layer between the stacks. To make the reflections white (multichromatic) the fish cunningly changes the thickness of the cytoplasmic layer, thus changing the periodicity. There are a hundred other ruses the fish uses to make itself almost invisible. In fact the only direction in which the fish is visible and hence vulnerable is from below. It would seem that fish discovered millions of years ago methods of using every principle of optics that modern optical scientists know. All this remarkable optical engineering by the random process of natural selection! K. B. R. Varma reports (**page 420**) other interesting properties of fish scales. Scales of the common Indian fish *Catla catla* have high dielectric constant, are pyroelectric at 300 K, and show a well-defined dielectric hysteresis loop between 300 and 360 K. According to Varma, the hysteresis could arise from piezo-pyroelectric effects due to the oriented collagen molecules.