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Neem: A resurgence of interest

The neem tree has long been revered in India for its medicinal and insecticidal properties. Extracts of neem have been used for every ailment from jaundice to leprosy and even for warding off evil spirits. There is an inevitable feeling of *dejá vu* when one sees the sudden surge of interest in the neem tree and its constituents in the West. A recent write-up in the February 28 issue of *Science* (1992, **255**, 1070) suggests that the 'hottest development' in the field of agricultural pest control 'is coming not from gene splicers' high tech labs but from a lowly tree, called neem, that grows widely in Africa and Asia'. The toxicity of synthetic insecticides has fuelled the search for biopesticides. The obvious advantages of natural products have led to a worldwide thrust at developing neem products, leading indeed to what has been termed, 'neemania'. The most potent of the substances from neem which interferes with insect molting, reproduction and digestion is an extremely complex terpenoid, azadirachtin. While this molecule has attracted the best of organic chemists to the task of chemical synthesis, at present the only source is neem oil. The major advantage of azadirachtin is that it appears to act as an antagonist of the insect hormone ecdysone and may therefore have only limited toxicity in higher animals, including man.

Interestingly, much of the early work on the chemistry of neem constituents was done in India as recounted by Govindachari (**page 117**). Beginning with the isolation of nimbin by Siddiqui in 1942 (a paper which was published in this journal half a century ago), the author traces the development of natural product chemistry based on neem. The complexity of the structure elucidation of azadirachtin is brought out by the fact that twelve years elapsed between Nakanishi's original proposal in 1975 to the crystallographic characterization in 1987. There is little doubt that many more complex molecules remain hidden in the diverse extracts of neem. The article also focuses on the varied biological uses of neem and emphasizes the need for greater Indian effort in exploiting this precious national resource.

Biotechnology regulatory policy for biomedical products

New technological achievements have led to the development of many products to improve health and well being. Nowhere is this more evident than in biotechnology whose powerful tools have created myriad biomedical products including medical devices, drugs, and vaccines.

The United States continues to be the premier country in biotechnology. Currently, total biotechnology product sales exceed $ 3 billion per year. By virtue of its legislative authority and regulatory responsibility, the United States Food and Drug Administration (FDA), in its role as product reviewer, functions as the 'gatekeeper' for the entry of products into the market-place. In addition for premarket approval of the products, FDA inspects manufacturing facilities and takes corrective action to remove products from the trade when they are unsafe or ineffective. The FDA has approved more than 400 devices, drugs and vaccines based on rDNA or monoclonal-antibody techniques.

Through a recent administrative ruling, the US government has formally extended its existing policy with regard to regulation of biomedical products to products made by biotechnological processes. Thus, FDA has had its regulatory philosophy reconfirmed, viz. that no additional or new regulatory requirements for such products are necessary. The ruling endorses the proposition that the mere fact of their manufacture by a biotechnological process does not imbue products with any special risk with regard to their intended use. This science-based philosophy, and the regulatory regime flowing therefrom, has been advocated quite forcefully by Hans Kornberg, the Chairman of the Advisory Committee on Genetic Modification, United Kingdom Health and Safety Commission, who puts the basic proposition quite starkly thus: 'The safety of a foodstuff, or pesticide, or other product, is determined by its physical and chemical properties, which is independent of the procedures used in introducing them: the only valid test is—is the product safe for its intended use.' This formulation (and counter- and 'in-between' propositions to it, based on European and Indian perceptions) was debated at a conference on 'Biotechnology—East and West', held under the auspices of the ICSU Scientific Committee for Biotechnology (COBIOTECH) at Bratislava, Czech and Slovak Federal Republic over 3–5 November 1991.

The article by Kiki Bambakidis-Hellman (**page 123**) is a textual elaboration of a presentation made at the above conference by the author. The article provides the US perspective to an issue on which the last word has not been spoken or written.

Martin F. Glaessner and the first soft-bellied animals on earth

On **page 148** we have the review of the excellent publication brought out by the Geological Society of

India (GSI) honouring Martin F. Glaessner (1906–1989), who has been described as 'the father of modern micropalaeotology'. An Austrian by birth, he emigrated to Australia and worked there for more than half a century. Glaessner had many Indian connections but the most poetical one is the statement he made when elected Honorary Fellow of GSI.

> Although recent work has changed our attitude to the concept of Gondwana ··· the ocean which we now believe to have been shared by India and Australia through great lengths of geological time represents ··· an inseparable bond between our countries.

He is well known for many things—his classic *The Principles of Micropalaeontology*, his insights into the relationship between microfossils and petroleum, his researches into tectonics, etc. But a contribution for which he will be remembered is his espousal and propagation of the idea that the Ediacara fauna were the earliest known animals on earth which evolved during the Precambrian period. Fossils of the Ediacara fauna (first discovered by Sprigg in the Ediacara Hills, South Australia) have later been found all over the globe. This is attributed to the fact that during the Precambrian period the present day continents were a part of single supercontinent. These soft-bellied creatures came into being about 700–570 million years ago after the late Precambrian glaciation. The supercontinent was then very near the equator and the climate was presumably more equable. Many of the Ediacara fauna had unusually flattened bodies (some only 6 mm thick and more than a metre in diameter) which seem to be best suited for the uptake of the depleted nutrients in the shallow seawater and the efficient absorption of light by photosynthetic algae. Only a negligible fraction of the animals of this period have any counterparts living today. The Ediacaran fauna are perhaps the earliest experiments of nature evolving animals on earth. The Cambrian explosion followed when numerous and diverse animals came. The exact causes of this explosion when the supercontinent broke up are not known; whether they are due to global environmental changes (like abundance of marine food becoming available) or due to the changes in the genetic programme itself.

Modern animals, including human beings, seem to be, in a sense, direct descendants of these Precambrian and Cambrian experiments.