
BOOK REVIEWS

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Ganga—Pollution and Health Hazard by Upendra Kumar Sinha, (Published by Inter-India Publications, D. 17, Raja Garden Extension, New Delhi 110 015), 1986, pp. 96. Price: Rs 95.

Ganga is the sacred river of the country. Very many special qualities are attributed to its water. Blind faith of the people and modern industrialization have joined hands in polluting the river Ganga and it is time we wake up to combat this pollution. As a first step, we should know the extent of pollution of the river water. This has been taken up by various agencies including the Planning Commission of India and Governments of the States through which the river is flowing. The present work forms a small part of such studies and restricted to the part of the river around the Township of Patna. The author intends to study the extent of pollution in terms of the pollution load, its dissipation and the role of geology of the location in this process.

The author carefully notes the geology of the area, the water flow in the river and the environmental and weather conditions. He elaborates on the problem of pollution, the sources, quality and load of the pollution in the area.

With this background, the author goes to pollution monitoring. He elaborates on the sampling sites, sampling methods, its frequency and describes monitoring methods. Experimental results are given in detail. The author ends up the book elaborating on the self purification properties of Ganga water.

The high pH value of Ganga water (pH 8–8.5) is said to be responsible for settling off the heavy metal pollution. The pathogenic bacteria is supposed to disappear in the river after a few days, organic matter oxidized, albuminoid nitrogen lost to the atmosphere as ammonia, BOD is reduced because of the consumption of carbon and nitrogen in photosyntheses and colloidal particles in the river adsorb certain pollutants. The author gives these explanations and claims that Ganga water has remained pure enough inspite of large pollution load.

The author, Dr Upendra Kumar Sinha, is a Geologist and this work probably is his doctoral work. The report makes an interesting reading though there are many 'not so precise' details of chemistry. The conclusions appear to be governed

by both facts of science and the great devotion to the river. If the facts of chemistry were a little more precise and the language a little better, the book would have improved immensely. However the author must be congratulated for this most needed piece of work.

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Cell Biology (ed.) B. King (Published by Hindustan Publishing Corporation (India), 60-B, Jawahar Nagar, Delhi 110 007), 1986, pp. 265, Price: Rs 135.

Modern biology has gone through a revolution over the last couple of decades resulting in a tremendous progress in our appreciation of molecular aspects of cellular activities even fringing upon such complex processes as cellular development and differentiation. With the intention of bridging the large gap between a high school student and a university student in this fast growing field of cellular and molecular biology, a series of volumes under the title 'Modern Views in Biology' is being published in association with the Institute of Biology, a professional body representing biologists, in the UK. This is the first book of the series.

'Cell Biology' has 7 chapters, contributed by different authors and the chapters range from techniques in cell biology to molecular basis of heredity and gene expression. The first chapter by B. King includes the different techniques of microscopy, cell and tissue separations, chromatography, electrophoresis, radioactivity and x-ray diffraction. Each of the technique is described with their basic principles and appropriate illustrations. After understanding the techniques and methodologies of biology, the serious student is now ready to go over to the various developments in modern cell biology. The chapter on 'Evolution of Cells' by M.A. Sleight starts with the essential characteristics of prokaryotic and eukaryotic cells and goes up to the evolution of cells and metabolic processes. The chapters on

'Enzymes' (C. J. Wynn) and 'Membranes' (G. E. Jones) deal adequately with the structure and functional aspects of these components. M. R. Hartley has contributed 2 chapters covering the 'Molecular basis of Heredity' and 'The synthesis of RNA and protein'. Starting from the molecular structure and replication of the genetic material and the central dogma, to the recent techniques of genetic engineering and recombinant DNA research, and their application, are elegantly covered in these chapters. However, the most intriguing aspect of differential or selective gene expression (tissue and organ specific expression) especially in the higher eukaryotes, which is extensively being investigated by the leading molecular biologists has not been discussed here. Perhaps the omission was intentional since an entirely clear picture has not yet emerged. The final chapter on 'Cellular Motility' by G. E. Jones touches upon the phenomena due to microfilaments, microtubules, flagella and cilia. Each chapter in this book ends up with a section on the trends in the present research in the respective area, giving an insight into the 'State of the art' to the young inquisitive minds of the student readers. The chapters are also well illustrated with excellent figures and diagrams.

Spanning the whole of biology, the 'Modern Views in Biology' series is aimed to build on the basic framework to develop modern and accessible accounts of important areas. A combination of eminent research contributors and a teacher editor has been designed to achieve this. Judging from the present volume, the series is bound to meet this goal. This is an extremely useful text book for an undergraduate/early post-graduate student of modern biology in India.

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Rothamsted Experimental Station, Report for 1985 published in June 1986. 306 pp. Price £ 12 (Postage free) obtainable from the Librarian Rothamsted Experimental Station, Harpenden, Herts. AL5 2JQ UK.

The report is in two parts published in a single volume. Part 1 describes work done during the year

and lists published papers and Part 2 contains papers by members of Rothamsted staff. Some of the important areas of research are:

Beet: Rhizomania is a disease caused by beet necrotic yellow vein virus transmitted by the common soil fungus *Polymyxa betae*. This disease is continuing to spread in Northern Europe. Efforts are being made through extensive inspection and testing to keep Britain free of this virus.

Nitrogen fixation: The crucial enzyme nitrogenase is irreversibly damaged by free oxygen. The nodules contain a barrier layer of cells that delicately regulates the rate of inward diffusion of oxygen to match the rate of its consumption and maintains a low concentration in the inner part of the nodule where nitrogenase is located. The resistance of this barrier can change rapidly in response to carbohydrate supply to regulate oxygen transport. Work is underway to understand clearly the mechanisms before symbiotic performance can be guaranteed or engineered into the root system of other crops.

Mycorrhizal symbiosis: In field conditions it is difficult to identify species of VAM that actually infect host root tissues. Now electrophoresis using polyacrylamide gels has been developed to establish banding patterns of certain isoenzymes that characterize the particular endophyte species; for the three species studied, the patterns are indeed distinctive.

Radar detection of airborne insects: A ground based radar system has been developed to detect insects flying at a height between 12.5 and 250 m; recording is computer controlled. The computer calculates the target insect's velocity, height, body weight shape and orientation and the data can be transmitted to a remote central computer. This is part of what is now being termed 'Radar Taxonomy'.

Aphids: (E) β farnesene is an alarm pheromone produced by aphids and when used with synthetic pyrethroids, contact is enhanced between the aphid and foliar applied insecticide by increasing insect movement and a higher percentage kill is obtained. Now a cycloaddition product of (E) β farnesene has been used in the field to control yellow dwarf virus of barley and the treatment has increased the yield by 12%. This is the first instance of a behaviour controlling chemical for the control of a virus disease in the field.

Dispersal of fungal spores: The spores of *Pyrenopeziza brassicae* the fungus causing light leaf spot

disease of oil seed rape were seen in the air over crop several hours after the rains ceased indicating the possibility of a different release and dispersal mechanism apart from rain splash which may be responsible for long distance transmission of the disease.

Nematology: The relationship between a nematode and its host is often highly specific and genetically and morphologically complex. Gel electrophoresis of soluble proteins and modern serological methods are being applied in particular to root knot nematodes, to cyst nematodes and the genus *Ditylenchus* to augmenting microscopical techniques for species identification by newer biochemical characterization.

Pesticides: The quantitative Structure Activity Relationships (QSAR) has provided firm basis for the successful synthesis of pyrethroids and a similar approach is being applied to another class of potential insecticides, the N-alkylamides of which pellitorine forms a naturally occurring example. Results with a strain of housefly whose resistance depends on *super-kdr* mechanism which confers very strong resistance to DDT and the pyrethroids and is considered intractable, are 2-4-fold more susceptible to the N-alkylamides than the insecticide susceptible strains.

Basipetal transport of pesticides is another area of interest. A team of researchers is at work with neutral and weakly acid chemicals with structural features necessary for their movement through phloem of *Ricinus communis* a test species the phloem of which can be easily sampled. The preliminary results indicate that good phloem transport is governed largely by the extent to which the compounds are retained within the phloem rather than recognition by specific carrier mechanisms controlling access to phloem. While many chemicals entered phloem readily and left also readily, relatively polar, neutral chemicals moved into the phloem to some extent but weak acids that are strongly accumulated in phloem by virtue of higher pH are transported best.

Five photolabile pheromones are being tested in Pakistan for mating disruption of *Earias* spp and work on the mosquito oviposition pheromone is in a fairly advanced stage.

This report is most useful for Agricultural Scientists and Agricultural Research Stations.

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NEWS

WEATHER AND EARTHQUAKE FORECASTS GO TOGETHER

The first Soviet experimental computing complex in Tajikistan for the receiving and processing of seismological and geophysical information now makes use of weather forecasts to forecast underground shocks. The methods have been developed by the Tajik Academy of Sciences' Institute of Seismology and are based on the earlier discovered phenomenon—the influence which the earthquake zone radiation produces on the atmosphere. It has been established that, when the seismic activity increases, the correlation between the pressure, temperature and some other weather characteristics is changed. The centre of the future earthquake is forecast from the time and place of the atmospheric

anomalies and from their continuity and strength of the coming shock.

The new method has helped in forecasting a recent earthquake in the Tajik settlement of Sultabad on September 10, which was of 5 magnitude on the 12-mark scale.

This sort of forecasting is important for the economy and the tapping of mineral resources in that republic, which lies in the most seismic region on Central Asia. Housing and industrial construction here relies on Seismologists' recommendations (*Soviet features*, Vol. 25, No. 155; Information Department, USSR Embassy in India, 25, Barakhamba Road, New Delhi 110 001).