Advanced Mycology (A text Book) by A. K. Sarbhoy, (Today & Tommorows Printers & Publishers Ltd, 24B 5, Deshbandu Gupta Road, New Delhi 110 005) *pp. 324, price Rs. 125,-*

The text book on Advanced Mycology is divided into thirty three chapters. There are four chapters on Classification. Historical Introduction to Mycology, Importance of International Code of Botanical Nomenclature and one chapter on Use of Fungal Culture Collection and Herbarium. The remaining chapters deal with the taxonomy of fungi up to the level of families, in some cases up to genera with life cycles of some fungal species considered typical representatives of the families and one (chapter 32) furnishes a brief account of Lichens.

In general the aspects of Mycology covered by the author appear to be those meant for graduate students of Pathology at the I.A.R.I. and some of the Agricultural Colleges in India.

A cursory reading of the contents of the book gives an impression that the book is not well edited. It has many spelling and grammatical mistakes. Adequate attention to punctuation and lucidity of expression is wanting. These deficiencies could have been avoided by good editing and by critical proof reading and they are far too many to be enumerated here. There are references made in the text which are not cited in the bibliography (*e.g.* Ko *et al.* 1978 page 60; Buller, 1915 page 10 etc.). There are some genera named without author (pages 197 and 198). It would be better to indicate what the subject index is expected to include. While most of the orders are mentioned, names of many families are omitted.

There is a suggestion that examples of genera and species of fungi considered important in India were specifically included, however, coffee rust caused by *Hemileia vastatrix* is omitted. Name of Exobasidiales is there on page 218, but no details thereafter. There is no mention of *Exobasidium vexans* on tea.

The class Trichomycetes is very briefly treated without even mentioning additional reading that could be done by those interested in this group (Manier and Lichwardt 1968).

The plates and figures furnished with the exception of some are far from satisfactory. Photographs expected to show disease symptoms are given in black and white as well as in colour. Unfortunately, both fail to serve the purpose (pages 80–82). In some places, ordinary photographs are mentioned as photomicrographs (pages 128, 197), figures or plates are without labels (plates 16, 18, 19 etc.) and photographs without legends (page 78).

Information given on subjects dealt are said to be up-to-date but this is not true (page 103 on Edogone-considerable literature has accumulated since 1974). Under rust, Craigie's work on sex in rust fungi has not been mentioned although it is old and important. The printing and paper used are of poor quality.

Notwithstanding some of the drawbacks enumerated above, the book will be useful to Mycologists in this country.

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V. AGNIHOTRUDU

NEWS

NATIONAL SYMPOSIUM ON SOLANACEAE

National symposium on 'The economic value and other properties of the plants of the family Solanaceae' was held at Tiruchirapalli from 4–6 August, 1983, under the auspices of the Bharatidasan University with financial assistance from Department of Science and Technology, and Department of Environment, Govt. of India, New Delhi. Fifty workers from different parts of the country participated in the Symposium. It was conducted in seven scientific sessions under five sections on various aspects of botany and chemistry of Solanaceae. The plenary session recommended for establishing a Solanaceae garden at Tiruchirapalli and to publish a periodical Solanaceae news letter.

Incidentally, the Third International Symposium on Solanaceae is likely to be held in India in 1987.

HIGH-PRESSURE UNITS FOR HYDRO-POWER STATIONS

(By Nikolai Nesvitenko)

The Angaro-Yeniseiskaya, Volzhsko-Kamskaya and other hydro-power systems in the Soviet Union effectively exploit hydraulic turbines of unique capacity and dimensions. The aggregate capacity of hydro-power stations built throughout the USSR amounts to more than 54 million kW (to compare, the aggregate capacity of all Soviet power stations exceeds 285 million kW).

The development of hydro-power engineering not only saves fuel resources of the country, but ensures the comprehensive fulfilment of the tasks pertaining to the expansion of electricity production, land irrigation, flood prevention, improvement of navigation, etc.

Decisive Impact

In the 1950–1965 period, turbines designed for water head of less than 100 m accounted for 90 % of all capacities installed in hydro-power stations. At that time the country had been tapping extensively the hydro potential of the rivers of the European plains of the USSR. In the following period, the country built several major power stations on the large rivers of Eastern Siberia, the mountain rivers of the Caucasus and Soviet Central Asia. About 50 % of all turbines at those stations have been designed for water head of over 100 m.

The greater the head of water, the more economical the construction of hydro-power stations. The dimensions, mass and cost of power equipment of hydraulic and electrical machines become smaller. This has had a decisive impact on present-day designs of turbines and on designs of turbines for the future with still greater water heads.

Soviet hydro-turbine engineering has been working to raise the specific speed of all types of hydraulic turbines and two-way turbines while retaining the existing high characteristics. The cost, dimensions and mass of units reduce and their maximum capacity grows.

"For more than 25 years, the specialists have been developing, studying and improving the designs of high-head Kaplan hydraulic turbines. The most important task is to develop a highly efficient setting of the turbines and their working wheels for new Soviet and foreign hydro-power stations," said Anatoly Podgorny, Corresponding Member of the Ukrainian Academy of Sciences and Director of the Institute of Machine-Building Problems of the same Academy.

Effective Operation

Kaplan turbines developed by the Institute jointly with the Kirov Turbine Factory (both the Institute and the factory are situated in Kharkov, a regional administrative centre of the Soviet Ukraine) are operating effectively at the Vilyuiskaya and Khantaiskaya hydro-power stations in Siberia, the Dniester station in the south-west of the USSR and some other facilities.

Along with the Kaplan turbines Soviet hydro-power engineers make broad use of Francis turbines. Such units are in operation at the Sayano-Shushenskaya Hydro-Power Station (unit capacity 640,000 kW) and the Krasnoyarsk Station (unit capacity 508,000 kW), both in Siberia, and at the Nurek Hydro-Power Station in Soviet Central Asia (unit capacity 310,000 kW).

The Khudonskaya Hydro-Power Station, which is being constructed on the Inguri river in Soviet Georgia, will use Francis turbines designed for a water head of 183 m. This station, with a capacity of 740,000 kW, will be the fifth station of the system being built on the Inguri.

The Khudonskaya Hydro-Power System will consist of a 200 m arch dam with a length along the causeway of more than 500 m. Water will be delivered by several pipelines to hydro-turbines and will then be released into the Inguri down a 3 km tunnel.

The new station is being erected in a highly seismic region where earthquakes can be expected. The investments on its construction will be repaid approximately within six months after its commissioning.

The scientists at the Institute are doing successful research into the setting up of two-way turbines which can operate both as turbines and as pumps. By now, they have developed a few designs of Francis turbines for water head of 140–300 m. In their specific speed, energy and anti-erosion characteristics they will be on par with the best foreign makes. (*Soviet Features, Vol. XXIII, No. 14, January 24, 1984*)

NUCLEAR SAFETY ASPECTS OF DECOMMISSIONING RESEARCH REACTORS

About 80 nuclear research and test reactors either have been decommissioned or are in various stages of the decommissioning process. The majority of these reactors have been in operation in industrialized countries. Out of the about 270 nuclear research and test reactors in operation world-wide today, some 110 have been operational for at least 20 years. As the average age of a research reactor before its ultimate shutdown is about 15 years, many of the 110 research reactors which are 20 years old will soon be "decommissioning candidates". About 20 of these are in the developing world. Research reactors vary considerably in type, physical size, power rating and operational history. Each reactor therefore requires individual consideration to ensure that it is decommissioned as safely as possible.

For the past 20 years the International Atomic Energy Agency (IAEA) has collected and disseminated information and experience on this subject. Several meetings have been conducted to discuss techniques and methods and the management of resulting radioactive wastes. These meetings have concluded that while it is true that there are no insurmountable problems, some aspects of decommissioning need further development, including safety criteria. It has also been recognized that there would be advantages in harmonizing principles and rationalizing standards on an international basis. The IAEA is therefore now developing a Safety Guide on the nuclear safety considerations in the decommissioning of Research Reactors. A Technical Committee with 22 participants from 16 countries and one Intergovernmental Organization met in Vienna from 19 to 23 March 1984 to review a preliminary draft of this document drawn up last year.

The Safety Guide will be based on a Code of Practice for the safe operation of research reactors and critical assemblies published by the IAEA in 1971, a revised version of which will be issued this year. It will provide recommendations on how to meet the safety requirements on decommissioning laid down in the code.

The Safety Guide will address particularly the needs of the group of operating research reactors, which, because of their advancing ages, will sooner or later have to be decommissioned. Current experience in such decommissioning is concentrated at present in industrialized countries such as France, USA, Italy, Netherlands, UK and Japan. On the other hand, there are several reactors in the developing countries (for example, Bangladesh, Jamaica, Libya, Malaysia, Turkey) which have either just recently become operational (or near operational) or are in the design/construction stages (*e.g.* Ecuador, Indonesia, Morocco, Peru, Syria). The Safety Guide is intended to assist these countries as well in formulating plans for eventual decommissioning. The Guide should be available by mid-1985.

International Atomic Energy Agency, Wagramerstrasse 5, P.O. Box 100, A-1400 Vienna Austria.

SPLITTING HAIRS OVER PREOPERATIVE SHAVING

"Surgeons have been urged to give up shaving in favour of chemical depilatories for preparative hair removal, but some would rather fight than switch. Preoperative shaving has come under fire recently as a source of postoperative infection. A *Lancet* editorial recommended the switch to depilatories on the basis of several studies, including one that showed a 5.6% incidence of infection among patients shaved the day before surgery, compared with a 0.6% incidence when depilatory cream was used. But not everyone is convinced depilatories are the answer. 'Rather glib and premature' is how Walter Gurainick, doctor of dental medicine and director of operating rooms at Massachusetts General Hospital (MGH), describes the recommendation. Surgeons at MGH have tried depilatories in the past, he says, but gave them up because they precipitated uncomfortable reactions". (*Medical World News, 10 October 1983, p. 43*).

WORLD OCEAN STUDIES

The role played by the World Ocean in the life of our planet is hard to overestimate. Some four-fifths of all transportation in the world is done through the world oceans and adjoining seas. About twenty per cent of food protein is obtained by man from the oceans. Off-shore oil and gas production accounts for almost a quarter of the world total and is rapidly growing. Valuable metals, such as copper, nickel and cobalt, will begin to be mined from the seabed in the next ten years. The very sea water is amazingly rich in various elements.

In areas of the mid-ocean ridges, outlets of hot and heavily mineralised waters have been discovered which were found to contain copper, zinc, iron, silver, cobalt, cadmium and other metals. Near underwater geysers were found bottom-dwelling creatures of gigantic size (for example, worms up to a metre long). In spite of the constant darkness that reigns at great depths, this new form of life is surprisingly colourful.

Of fundamental significance is the determination of the flow of carbon dioxide from the atmosphere into the ocean. The steady supply of carbon increases the greenhouse effect of the atmosphere and leads to a warmer earth climate. Some of the carbon dioxide passes from the atmosphere into the ocean and its concentration there is approximately 50 times greater than in the air. Biologists, together with chemists and physicists, are to trace the routes by which they undergo.

Biologists, for their turn, face a task of tremendous importance that of studying life in the oceans which includes about 180,000 species, from tiny bacteria to huge mammals. It is also necessary to analyse the effects of pollution on these creatures.

Methods of ocean studies are improving all the time. Of late, Space-assisted research has been making rapid strides. Apparently only this research can narrow the yawning gap between the information received and the information needed on the oceans.

From outer space it is possible to determine the colour of the sea water and thus pinpoint waters rich in chlorophyll, or areas abundant in life. Little explored regions, say in polar areas, and boundaries between open water and ice, can also be effectively studied from outer space.

Another method of oceanic studies, which has originated but recently, is a polygon-based one. Under it, several ships simultaneously survey physical processes occurring in the oceanic depths and in the atmosphere over a large area. One ship can also be used, but in this case it anchors stations with instruments at different depths. For months, these stations keep record of the ocean characteristics, such as temperature, salinity and currents at various depths.

Remote methods of oceanic investigation are developing widely as well. Nearly all of them rely on the use of sound waves, which alone can travel through the oceans over considerable distances. Improvements are being made in acoustic methods of the studies of bottom relief and deep-seated geological structures and also of fish detection. (*Soviet Features*, Vol. XXIII, No. 32, February 27, 1984).

HORMONAL IMPLANTS: THE NEXT WAVE OF CONTRACEPTIVES

"It will soon be possible for a woman who does not want to become pregnant to carry a five-year supply of hormonal contraceptives with her at all times—the equivalent of up to 1,800 pills. She won't have to lug her contraceptives around in a knapsack, however, since this method takes up only a few square inches of skin on the woman's arm. The NORPLANT system is the first hormonal implant to provide continuous contraceptive protection by the national drug regulatory commission in Finland, where the implant will be manufactured. Approval is expected shortly. In addition, The Population Council, developer of the implant, is now conducting research on a refined version, smaller and easier to administer but just as long-lasting". (Michael Klitsch in *Family Planning Perspectives*)

LISTENING TO THE BREATHING OF THE OCEAN

It was earlier assumed, that there was a stable current running along the equator from east to west in the Ocean. And now a Soviet expedition has discovered that in the Atlantic along the equator under the visible surface current there is a deep-water one heading in a narrow strip also along the equator, but only from west to east. They have also discovered in the Atlantic the striking, but so far little understood phenomenon of enormous vortexes these measuring 200 to 300 km in width. Such vortexes are now known to exist in all the oceans. The kinetic energy they possess far exceeds the energy of permanent currents. We still do not know from where there vortexes arise, how they interact between themselves and with middle currents or where and how they disappear. Moreover, these mighty formations keep migrating all the time under the action of unknown forces. The American scientists have also confirmed the existence of the Atlantic riddle.

The discovery of layers at a depth of about 1,000 metres in the tropical waters, and near the surface in northern regions of the Ocean, along which even a faint sound can, spread for hundreds and even thousands of kilometres assumes exceptional importance.

The acoustic methods of study of the terrain features of the ocean floor and deep geological structures are currently being perfected, and the acoustic ways of fish shoal detection are becoming ever more effective.

The Soviet scientists have worked out a program provisionally called "Sections". But, the scientists feel that not a single country, even a major one, can undertake continuous observation in all the oceans. Therefore, priority studies in key areas of the Ocean have been mapped out so far. In the Atlantic Ocean four such energy-active zones have been defined: the Newfoundland, the Norwegian, the Bermuda and the Tropical.

Space means of exploration of the World Ocean have been assuming ever greater importance in recent years. They help in reducing the vast gap between the amounts of received and required information about the Ocean. This applies primarily to compilation of maps of the temperature of the Ocean's surface, wind ripple, the vertical structure of the atmosphere over the Ocean and so on. (*Soviet Features*, Vol. XXIII, No. 32, February 27, 1984).

RADIATION ENRICHES GEM INDUSTRY

. . . "When exposed to gamma rays, x-rays, electron beams, or even ultraviolet light, certain colorless or weak-hued minerals—including topazes, sapphires, and diamonds—could be transformed into breathtaking blues, reds, and golds that found waiting commercial markets. Enthusiasts claim that this kind of irradiation is natural, since it merely accelerates what would occur gradually if the crystals remained buried underground, where they would be exposed to constant low levels of radiation from surrounding minerals. Such treatments are, in fact, safe; the high-energy beams do not penetrate the atomic nuclei and change them into radioactive substances. Rather, they create a colour change by 'bumping' electrons into new positions in the orderly arrangement of the crystal. The practice has become largely accepted despite strident opposition by some of the industry's top officials. A few laboratories still brand irradiated stones as such in their written appraisals, but disdain for the process is lessening, particularly with regard to specific gems." (*Reproduced with permission from Press Digest, Current Contents®, No. 15, April 9, 1984, Copyright by the Institute for Scientific Information®, Philadelphia, PA, U.S.A.*)

TV COMPONENTS FOR INDIA

India will import 500,000 sets of deflection yokes and fly-back transformers made by Goldstar from May 1984. They are both major components for use in black and white as well as colour TV sets. (*Korean News, Jan.–Feb. 1984, p.23*).

MOST POWERFUL ELECTRON MICROSCOPE IN THE WORLD

The world's most powerful electron microscope has been dedicated to the nation in the United States of America in the last week of September. The centre, first of its kind in the USA, and for that matter in the world, is available for general use by the scientific community. Funded by the Department of Energy it is situated at the University of California's Lawrence Berkely Laboratory and the new centre cost 8 million dollars.

This 46,000 lb. three story high microscope, manufactured in Tokyo can magnify objects one million times and it is the first in the world capable of showing individual atoms even in the densest matter. According to Dr Gareth Thomas, scientific director of the Institute, the things available at the centre are simply fantastic and it may not be possible to duplicate, simply because the costs are tremendous.

In the microscope, the electrons pass through a specimen and are collected by the lens system which focusses them into an image. The image provided is of such high resolution that the scientists can view atoms in a lattice and even watch structural rearrangements, as they occur in the atomic level. Thus, the instrument can provide, for the first time, a truly unique capability of making possible, the achievement of atomic resolution in solids. As such it is the most sophisticated electron microscope currently in existence and it holds great promise, especially, for material science research.

Scientists can use the tool to observe the life processes at molecular level or analyse minute flows or misalignment in atomic structure which may be responsible for material failures such as cracks in nuclear power plants, bridge collapse or to examine the quality of material going into the building of space vehicles.

It can be used to study mechanical failures of metal or electrical breakdowns of semi-conductors, to design material that can withstand intense pressure and heat and predict material behaviour. In short it will lead material science several strides in the coming years.

Though the major utility will be in material science, and inorganic materials, there will be biological uses, as in cancer research, to see what went wrong in the human cells at the molecular level. We knows that instrument may lead to a clear understanding of the disease and finally lead to a lasting cure. *(Science & Culture, Vol. 49, No. 10, October, 1983, p. 316)*

NEW DEFINITION FOR 'METRE'

Exactly how long is a metre? An absurd question, you might think, one that any school boy can answer. But not according to the General Conference on Weights and Measures which met in Paris last October to decide on how long a metre should be.

The fact is that the definition of metre has kept on changing over the years. At one time, it was defined as the length between two marks on a platinum-iridium bar stored at 0°C at the International Bureau of Weights and Measures in Paris. Then it came to be known as 1,650,763.73 wavelength of orange-red light emitted from a Krypton-86 lamp. And now it is 'the distance travelled by light by a vacuum during 1/299, 792, 458 of a second'.

The new definition is the culmination of the scientists' effort to use time—considered to be the most accurate measurement—for defining length. This will help define the metre ten times more accurately, thereby permitting a means of consistent communication among such groups of scientists as astrophysicists who measure planetary distances in light years and geophysicists who measure small movements of the earth's crust.

The new definition of metre will, however, not affect the lay mortals as they do not expect a very high degree of accuracy from their measuring tapes and rulers in their day-to-day life. (*ISI Bulletin, Vol. 36, Jan. '84, p. 2*).

AIR POLLUTION BY VEHICLE EXHAUST

More than 800–1000 tonnes of pollutants a day are estimated to cause air pollution in each of the four metropolitan cities and major towns in the country. Of this, 50 per cent constitutes the emission of exhaust gases from vehicles.

The major constituents of motor vehicle exhaust gases include carbon monoxide, nitrogen oxides, lead, smoke, organic vapours and odours. Carbon monoxide affects the mind, slowing the reflexes and the faculty to think and act. At high concentrations, it may even cause death. Smoke causes eye irritation. Nitrogen oxides combine with olefinic hydrocarbons to form toxic peroxy nitrates and poisonous ozone. Lead in small quantities shortens life and causes kidney damage and deterioration of the nervous system which leads to hypertension so evident in cities. In high doses, lead can cause death outright. Besides, pollutants emitted by motor vehicles are also known to cause such dreaded ailments as cancer, tuberculosis, asthma and various forms of allergy.

While better maintenance of vehicles is an important factor in controlling air pollution proper design of the engine is of crucial importance in achieving the safe limits of pollutants. To guide the manufacturer in achieving the object, the Indian Standard Institution has brought out a standard for smoke emission levels for diesel vehicles (IS: 8118-1976). The Standard specifies the maximum permissible limit for black smoke emission from automotive vehicles powered by diesel engines as measured by means of standard smoke meters. Another standard (IS: 9057-1979) prescribes emission limits and measurement procedure for carbon monoxide from new and old vehicles.

At the International level also, there is a growing concern about air pollution from road vehicles. An indication of this awareness is the work being done by the International Organization for Standardization (ISO) in this field. While ISO 6855-1983 prescribes methods for measurement of gaseous pollutants emitted by mopeds, ISO 6460-1981 deals with pollutants from motorcycles. Another International Standard (ISO 3929-1976) provides internationally agreed norms for determining carbon monoxide in exhaust gases emitted from road vehicles. (*ISI Bulletin, Vol. 36, January 1984, p. 2*).

CONCRETE BUILDINGS ARE CRACKING UP

. . . "Since the late 1840s, when a French gardener, Joseph Monier, reinforced concrete with (iron) rods to make tubs for his orange trees, use of this material has been on the rise. . . . Today, however, a number of reinforced concrete structures are rusting and cracking. . . . So far, researchers have found three causes of corrosion-cracking in reinforced concrete. Salts containing chloride ions destroy the protective effects of the steel rods' cement shield. In many places such salts used to be routinely added to precast concrete in order to speed setting. . . . Carbon dioxide and industrial pollutants from the air can also destroy the protective shield. . . . In the Middle East, brackish water and contaminated sand, containing chloride salts, were used to mix the concrete for many buildings. And everywhere some structures were built with a layer of concrete over the steel rods that were too thin to protect them from the air. Builders should have known better." (*Reproduced with permission from Press Digest, Current Contents®, No. 15, April 9, 1984, Copyright by the Institute for Scientific Information®, Philadelphia, PA, U.S.A.*)

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