

REVIEWS AND ANNOUNCEMENTS

Unitary Group Representation in Physics, Probability and Number Theory. By G. W. Mackay. (Benjamin/Cummings Publishing Company, Reading, Massachusetts), 1978. Pp. xiv + 402. Price: \$ 31.50 Hard Binding; \$ 19.50 Paper Binding.

The theory of unitary representation of groups appears in various branches of Mathematics and related disciplines. The role of unitary group representation in quantum mechanics is the most well known. Mackay's book is an excellent introduction to this field, albeit at an advanced level. To read the book with benefit, one needs a certain amount of mathematical sophistication and familiarity with elements of Group Theory, Borel structure on topological groups, Haar measure, and, some operator theory.

The book begins with a succinct treatment of finite groups and goes on to deal with compact and locally compact groups. All the important topics like Peter-Weyl Theory, Systems of Imprimitivity and Mackay's extension of Frobenius's theory of induced representation get a thorough coverage.

The bulk of the book deals with applications. The first application is to ergodic theory. If one were to look at Koopman's formalism, it is evident that one should look for unitary representation of the group of actions of the real line. The ergodic properties can be inferred from the spectrum of the generator. This was precisely what was done by Von Neumann. Mackay has extended this theory to the action of arbitrary separable locally compact groups.

Next Mackay applies representation theory to the study of Chaos on G-spaces. As every homogeneous chaos on a G-space can be canonically associated with a measure preserving action of G on a measure space (σ, μ) , one is led to the study of unitary representation of G. The study of the action of G leads to a Symmetric Hilbert space, *i.e.*, Fock space.

The author presents his own axiomatization of Quantum Mechanics and applies it to the study of single particle dynamics, potential scattering and free infinite particle systems. This part of the book is a minor variant of the author's 'Mathematical Foundations of Quantum Mechanics'—Benjamin-Cummings, (1963). As far as application to statistical mechanics is concerned, most of it is vintage stuff but extremely well presented.

The author gives a nice coverage of the application to number theory, centred around Dirichlet series, Fourier analysis, Analyticity, Diophantine equations and related topics. This part of the book has a very interesting notes which contain much background and connective material.

While the book is extremely well written useful and justly famous, one must point out certain lacunae. For one thing it would have been better, if the author had included the work of Konstant on unitary representation and quantization, particularly as there is quite a lot of interest these days in quantization procedures. The other, significant omission is cohomological aspects of group representation.

All in all, this is an excellent book and we must thank Messrs. Benjamin-Cummings for bringing out the famous but inaccessible 'Oxford Notes' and Prof. Mackay for his illuminating lectures.

Y. S. PRAHALAD.

The Flora of Osmanabad. By V. N. Naik. (Venus Publishers, Pandariba Road, Aurangabad 431 001), 1979. Pp. xiv + 466. Price Rs. 60; Overseas: £ 5.00; \$ 8.00.

The Flora of Osmanabad by Dr. V. N. Naik is among the host of such recently written books which go unnoticed due to lack of a propoganda machinery of a large publishing house; and also one among many such which owe their planning and production to the enthusiasm and zeal of an individual swimming against the current of botanical research in our Universities. This is an initial pioneering attempt at writing a much needed flora of the Marathwada region of present-day Maharashtra State; and ere long the collections on which it is based may be the only evidence of the existence of such plants in the region concerned.

It follows the usual pattern of Indian floras, and is concerned with 106 families, 472 genera and 804 species of flowering plants, among which are included nearly 10% exotics (some naturalised) and cultigens. The nomenclature is brought up-to-date, literature citations are adequate, and the notes provided are ample to cater to the needs of students at the post-graduate level. However, one wishes that the author had summarised the opinions of some others cited by him rather than merely referring the readers to some book or journal which is out of reach of most students and even some College Departments. There is a three line paragraph of METHODS, which is quite inadequate. It would have been more helpful if the localities of collection were shown on the map.

Apart from the several taxonomic notes, the best part of the flora is the uses of medicinal properties, chemical constituents and local names wherever they are given. In some of the keys the measurements overlap (*e.g.*, on page 116) thus rendering the key useless. Even though the author has used the correct name for

Derris indica, this has been placed under *Pongamia pinnata* on page 8. One wonders as to why *Scilla hyacinthina* remains as before, while *Scilla indica* is placed under *Drimys indica*! and also why "Orbanche should be burnt immediately after eradication (see page 231)". It is a matter of opinion whether flowers of the Magnoliaceae have sepals and petals (page 18). In the key on page 61, the leaves are said to have 1-3 leaflets in *Oxalis*, while the only species enumerated under this taxon is trifoliolate. *Melothria maderaspatana* (L.) Cogn. (1881) needs to be placed under *Mukia maderaspatana* (L.) Roem. (1846).

The sensitive plant has been reported by the villagers, but the author fails to locate it even after six years of search in the district. Does the plant fight shy in accordance with its local name—Lajalu—of appearing before the author? *Parthenium hysterophorus*, reported for the first time in India during the early sixties, has become so common in the district as to be named

Chatak chandini by the local people. Changes from one genus to another—e.g., *Oldenlandia* to *Hedyotis* (page 162), and *Diegea* to *Wattakaka* (page 206) are not accepted by the author, for which he has not adduced any reasons.

Some of the synonyms appear to be superfluous, and their exclusion would not detract from the merits of the flora, e.g., *Aitabotrys uncinatus* and *Annona uncinata* on page 28, *Maerua ovalifolia* on page 35, and *Gynandropsis gynandra* and *Hybanthus suffruticosus* on page 40 among many others.

A list of errata is appended in which the author places Pooideae as wrong, while a reference to Bor's (1960) book shows it to be correct. Considering that the book is published by a local firm at Aurangabad, it is comparatively free of printers' devil. The printing, format, paper used, and binding are satisfactory. The author needs to be complemented for bringing out this handy flora.

B. A. RAZI.

SHANTI SWARUP BHATNAGAR MEMORIAL AWARD FOR 1978-79

The following have been selected for the above award:

Prof. E. S. Rajagopal, Indian Institute of Science, Bangalore and Prof. J. V. Narlikar, Tata Institute of Fundamental Research, Bombay; shared the award of 1978 in physical sciences. Prof. S. S. Jha, Tata Institute of Fundamental Research and Prof. A. K. Ghatak, Indian Institute of Technology, Delhi; shared the award for 1979. In chemical sciences, Prof. Goverdhan Mehta, Hyderabad University and Prof. Girjesh Govil, Tata Institute of Fundamental Research, shared the prize for 1978. In biological sciences, Prof. Viswanath Sasisekharan, Indian Institute of Science, Bangalore, bagged the award for 1978. Dr. A. N. Bhaduri, Jadavpur University and Dr. M. K. Chandrasekharan, Madurai Kamaraj University, were the joint winners of 1979 in this discipline.

In engineering sciences, Sri. S. N. Sheshadri, Bhabha Atomic Research Centre, Bombay and Prof. D. V. Singh, University of Roorkee, were the winners for 1978. For 1979 Prof. Rama Rao, Banaras Hindu University, has been selected. In mathematical sciences, Prof. E. V. Krishnamurthy, Indian Institute of Science, Bangalore, bagged the award for 1978. Prof. S. Raghavan and Prof. S. Raman, both of Tata Institute of Fundamental Research, won it for 1979.

In earth sciences, Sri. H. N. Siddiqui, National Institute of Oceanography and Dr. B. L. K. Somayajulu, Physical Research Laboratory, Ahmedabad, were the winners for 1978. Prof. V. K. Gaur, Roorkee University, won the prize for 1979.

AWARD OF RESEARCH DEGREE

The M.S. University of Baroda has awarded the Ph.D. degree in Physics to Shri Suhas Padmakar Vaidya; Ph.D. degree in Chemistry to Shri Ranjit Chimantlal Desai and Shri Rakesh Kumar Kohli; Ph.D. degree in Biochemistry to Shri Mukut Sharma, Kumari Pallavi Harshadrai Jhala, Shri Seshagiri Rao Gudapaty, Shri Shankar Shashidhar; Ph.D. degree in Microbiology to Shrimati Leena Sudhir Trivedi.

Berhampur University has awarded the Ph.D. degree in Chemistry to Shri Brundaban Sahu, Shri Surjya Narayana Pati, Shri Chelli Janardhana; Ph.D. degree in Botany to Shri Brahma Bihari Panda.

Karnatak University, Dharwar, has awarded the Ph.D. degree in Chemistry to Shri Prasant Prasad Misra; Ph.D. degree in Chemistry to Shri Nalin Biharee Das.

INDIAN NATIONAL SCIENCE ACADEMY SYMPOSIUM ON INSECT VECTOR BIOLOGY

The Indian National Science Academy sponsored a 3-day Symposium (22-24 November 1979), which was organized by the Entomology Research Unit of Loyola College, Madras, with Prof. T. N. Anantha-krishnan (Director, Zoological Survey of India, Calcutta) as the Convener.

Inaugurating the Symposium, Prof. V. Ramalinga-swami (President, Indian National Science Academy) recounted the control of malaria and its later resurgence due to lack of efficient control strategies on one hand, and the evolution of the vectors of malaria, kala-azar and filariasis adapting themselves to the new chemical environment on the other. He indicated that the health implication of developmental activities should be considered seriously. While discussing the management aspects of the problem of insect-transmitted human diseases, Prof. Ramalinga-swami advocated a better understanding of the vector biology, with particular reference to the reproductive potential and behaviour of insect vectors, as these would help the concerned scientists greatly to develop newer methods for effective control. He also dwelt at length on the alternative strategies such as naturalistic and biological approaches including bio-environmental control methods.

During the deliberations, nearly thirty invited papers were presented which included information on the biology of vectors of human, animal and plant diseases. The effects of ecology and environment were discussed in detail with particular reference to the mosquito.

The section dealing with the biology of vectors of diseases of agricultural crops included papers on biology, host preference, and bionomics of the vectors of groundnut virus disease, egg plant mycoplasma disease, rice virus diseases, coconut (root) wilt and sandal spike. Emphasis was also laid on the vector potential of leaf-hoppers in general. Papers were also presented in relation to the biology of ticks and fleas, important vectors of various animal diseases. Topics of current, yet wider interest such as the behaviour of the malarial parasites in mosquito, defence mechanism in insect vectors and the ways to counteract them in control, insecticide resistance in Indian Anophelines, genetics of mosquito vectors, species complexes in malaria vectors and the possibilities of biological control methods were also discussed. One of the sessions had papers on the biology of vectors of other human diseases such as kala-azar and trypanosomiasis. Every afternoon session was marked by panel discussions on practical problems in relation to vectors of human, animal and plant diseases.

On the first and second days, special lectures on the Biology of Pollination, and Biology of Ticks were delivered by Professor H. Y. Mohan Ram (Department of Botany, Delhi University) and Dr. T. Ramachandra Rao (Former Director, National Institute of Virology, Poona) respectively.

Entomology Research Unit,
Loyola College, Madras 600 034,
December 6, 1979.

A. RAMAN.

THE INSTITUTE OF PHYSICS, LONDON

The biennial conference of the Optical Group of The Institute of Physics will be held at the University of Manchester Institute of Science and Technology (UMIST) from 10th to 12th September 1980. The committee will receive contributed papers on any topic of interest to the Optical Group. A few topics which have been suggested as being especially suitable are: (1) Volume Holograms, (2) Optics for Solar Energy Collection, (3) The Coupling of Optics to the Eye, (4) Optical Design with Desk-Top Computers, (5) Digitised length and angle measurement and (6) Optical Image Processing. Prospective contributors should send 50 word abstracts giving title, author(s), affiliation and address, to Mrs. P. Wormell, Optics Section, Blackett Laboratory, Imperial College, London SW7, as soon as possible but before 1st March 1980.

The Solid State Physics Sub-Committee of The Institute of Physics is arranging in collaboration with

the Institution of Electrical Engineers and the Dielectrics Society a conference on the Physics of Dielectric Solids to be held at the University of Kent, Canterbury, from 8th to 11th September 1980. The conference aims to bring together workers from a variety of areas to discuss recent developments, both in traditional fields (*e.g.*, transport, breakdown, dielectric loss) as well as in newer ones (*e.g.*, linear optics, theory of amorphous solids) to improve understanding of the physical properties of dielectric solids. Contributed papers falling within the broad subject of the conference are invited with particular emphasis on physical phenomena and their understanding. Offers of contributions should be sent to Professor A. K. Jonscher, Department of Physics, Chelsea College, Pulton Place, London SW6, by 31st May 1980.

Further details and application forms can be obtained from the Meetings Officer, The Institute of Physics, 47, Belgrave Square, London, SW1X 8QX.