Bogoliubov's style is abstract and formal: physical relationships, if mentioned at all, are merely sketched. The first, more general, half of the book can be recommended to every student of theoretical physics; the second part is for those who wish to specialize in the theory of metals and their magnetic properties, and they are advised to turn to Herring's book, *Magnetism, I V* (Academic Press: New York, 1966) for a profound discussion of the relevance of the polar model.

The translation reads smoothly, but I am baffled why a book of 242 pages without a single illustration should be priced at five pounds.

S. ZIENAU

PARTICLE MODELS

The Nuclear Independent Particle Model

The Shell and Optical Models. By A. E. S. Green, T. Sawada and D. S. Saxon. Pp. x+363. (Academic Press: New York and London, November 1968.) 149*s* 4*d*.

THIS book describes the evolution and application of the independent particle model, including the shell model for bound states and the optical model for scattering. In each case, the basic techniques of mathematics and quantum mechanics required for the application of the model are developed and then the use of the model for a phenomenological analysis of experimental data is described. Finally, there is a discussion of the nucleon–nucleon interaction and the theoretical basis of the independent particle model.

The chapters on the optical model provide a useful, though not very stimulating, review of nucleon–nucleus scattering over a wide range of energies and there is a very useful chapter on velocity-dependent and non-local potentials, but the treatment of the scattering of strongly absorbed projectiles is rather inadequate. The discussion of realistic shell model potentials is again useful but surprisingly out of date, and the lack of recent references is disappointing in view of the recent revival of interest in the shape of the nuclear matter distribution and the difference between the proton and neutron distributions.

There is certainly a need for an authoritative survey of the independent particle model, but the task is a demanding one and the present book, unfortunately, falls short of what one might hope for. It is not clear for whom the book is intended because it begins with the solution of the Schrödinger equation for a square well potential and ends with the Bethe-Goldstone equation and one boson exchange potentials. The detailed discussion of some of the formalism and calculational methods and the extensive list of references may be useful to research students, but the price will hardly be attractive to them.

DAPHNE F. JACKSON

ELECTRICAL COMPONENTS

Microwave Components

By P. A. Matthews and I. M. Stephenson. (Modern Electrical Studies.) Pp. viii+196. (Chapman and Hall: London, February 1969.) 60*s*.

FOR a number of years there has been a need for a book describing the basic principles of modern microwave components. Excellent design charts for waveguide components can be had free, and instrument manufacturers provide comprehensive notes on facets of microwave measurements. Expensive texts are available, examining a number of devices in detail, but the available material has tended to be too complex for a newcomer to the field. Matthews and Stephenson have produced this short volume in order to fill the gap, aiming particularly at the final year student–new graduate market. It is assumed that the reader will have a fair understanding of electromagnetic theory, and the amount of mathematics in the test is kept to a minimum, preference being given to description and explanation. The clarity of the large number of diagrams materially assists comprehension.

Transmission media for guiding waves are considered, including the parallel-plate and the triplate stripline, coaxial cable, and rectangular, ridged and circular waveguide. In order to discuss these topics Maxwell's equations are stated and the usual equations for components of H and E are developed. Transmission line theory serves as an introduction to circle diagrams and impedance matching, and the scattering matrix is used as a basis for a discussion of devices with up to four ports.

A detailed evaluation of the non-reciprocal properties of ferrites is included, on which descriptions of a number of types of isolator and circulator are based. Darlington's filter theory is also examined in some depth, for use in a section on microwave filters and cavities.

The remainder of the book, more than one hundred pages, consists, for the most part, of brief qualitative descriptions of a wide variety of components. The most commonly used forms of passive component are mentioned, including fixed, mechanically variable and electrically variable types.

Brief descriptions of various measurement techniques occupy a chapter, and include details of standing wave measurements, reflectometers, power and noise measurement.

There is some difficulty in relating the sections of general analysis to the components described in subsequent pages, and in some places the presentation is awkward, mixers and PIN diode attenuators each being described partly in one chapter, partly in another. Undergraduates should, nevertheless, find the text stimulating, introducing them as it does to a large number of present-day devices. The book makes generally easy and enjoyable reading, and is useful to anyone meeting microwave systems for the first time.

D. P. HOWSON

Correspondence

African Rift System

SIR,—The manner in which the African Rift System is portrayed on the new *International Tectonic Map of Africa* (ITMA 1968)* is both worrying and disappointing to students of African geology.

Officially published geological maps and internationally agreed interpretations made by geologists familiar with the ground have either been modified or ignored. The result can only be described as a caricature of rift geology as we know it today.

It is not possible here to mention or to plot all the variations from officially published national or from internationally accepted sources because of space and map scale problems, but the following examples drawn from the African Rift Zone are quoted. (1) Arabia: 65 per cent of the faults shown in ITMA 1968 for the Arabian section of the Afro–Arabian Swell enclosed by the sedimentary Palaeozoic boundary differ either in position, length or direction from those faults plotted on the US Geological Survey–ARAMCO map, 1963 edition, scale 1 : 2,000,000, No. I-270A. (2) Sinai: trends of folds forming part of the Syrian Arc system plotted in northern Sinai vary by as much as 30° from the published directions[1–3]. (3) Suez:

* General coordinator, G. Choubert, assistant coordinator, A. Faure-Muret; nine sheets, published by the Association of African Geological Surveys and UNESCO, Paris, and drawn and printed by the Institut Geographique National, France, 1968.

the structure contours drawn on the top of the Basement for this area trend at right angles to the generally accepted trend[1,4]. (4) Hadhramut: the plotted lengths of folds shown on ITMA 1968 differ from lengths shown on the USGS–ARAMCO map of the Arabian Peninsula and from Beydoun[5]. (5) Ethiopia: almost 95 per cent of the faults plotted on ITMA 1968 differ in some way from the faults shown on the International Committee of Scientific Unions (ICSU), Upper Mantle Committee (UMC)–UNESCO *Structural Sketch Map of part of the Rift Zone of Eastern Africa*, scale 1 : 5,000,000, published in Nairobi, 1965. (6) North-west Uganda and adjacent areas: in the Nimule (Sudan) and Lake Albert areas (Uganda) the fault pattern portrayed on ITMA 1968 differs from that plotted on 1 : 1,250,000 map 1961 published by the Uganda Geological Survey. The Aswa Mylonite Zone is plotted as a fault, even though a symbol for mylonite is listed in the legend. (7) Kenya and Uganda: the interpretation shown on ITMA 1968 differs widely from that published on the 1965 UMC–UNESCO East Africa 1 : 5,000,000 map. New data appear to have been added for Uganda but data of a similar type have been omitted from an area in Kenya west of Lake Rudolf. (8) Tanzania: the fault pattern for the whole of Tanzania has a novel look on ITMA 1968. New data have been added to the 1965 UMC–UNESCO 1 : 5,000,000 map and to the inter-territorial geological map of East Africa, 1961. Data plotted on both these maps have been omitted however from the ITMA 1968. (9) Faults and other structures plotted on the previous structural map of Africa, *Esquisse Structurale Provisoire de l'Afrique*, 1958 edition, scale 1 : 10,000,000, published by the International Geological Congress and the Association of African Geological Surveys, have been omitted from ITMA 1968 for the rift system. Similarly some of the rift structures shown on the *Geological Map of Africa 1963 Edition*, scale 1 : 5,000,000 (GMA), published by the Association of African Geological Surveys and UNESCO, are omitted or are plotted differently on ITMA 1968. (10) Distribution of the Mozambiquian Belt: much has been written in recent years about the nature and distribution of the Mozambique Belt, and other ancient fold systems in Africa. Attention has been drawn to both positive and negative correlations of rift trends and basement structures, therefore it is important that structural data and age determinations should be plotted as accurately as possible.

Cahen and Snelling[6] provided a convenient summary of knowledge of ancient fold systems and metamorphic belts in Central Africa but, despite the fact that reference is made to Cahen as a contributor to ITMA 1968, important conclusions made by them bearing on rift geology have been omitted.

ITMA 1968 shows a radically different interpretation. Mozambiquian (730–600–450 m.y.) is not shown at all in the area of the Albert–Edward rift depression, whereas the Uganda Basement (2,500–2,600 m.y. or older), between the Aswa Mylonite Zone and the Tertiary Volcanics of Turkana, and in the southern Sudan, is labelled Mozambiquian.

Also Mozambiquian pattern has been applied to approximately 300,000 square miles in the Sudan Republic. Only two radiometric ages have been reported for Sudanese Basement Complex rocks. Both are in the northern Sudan[7–9] and were submitted to the coordinators of ITMA 1968.

Because the Mozambiquian can only be defined radiometrically, it is misleading to attempt to delimit it in the Sudan Republic without radiometric data over an area of approximately 300,000 square miles.

The treatment of the African Rift on ITMA 1968 raises a number of fundamental points.

It is clear that the proofs of the map were not checked by contributors, and persons who contributed base documents, and whose names are listed on the ITMA 1968, are now placed in the position of condoning versions with which they do not agree.

A second point is why were UNESCO–UMC documents produced at an international meeting of geologists and geophysicists convened in Nairobi, 1965, specifically to coordinate African Rift studies, apparently ignored, and another version of the geology of the East African Rift System plotted on the AAGS–UNESCO sponsored ITMA 1968?

Finally, the state of portrayal of the African Rift System on the ITMA 1968 indicates grave defects in the method by which the basic data were collected, processed, plotted, checked and edited. Internationally acceptable procedures must be established and such maps must reflect the opinions of the contributors and not those of regional coordinators (North-East Africa and Arabia, L. Dubertret; eastern Africa and Madagascar, J. W. Pallister; and Central Africa, J. L. Mestraud).

Clearly if maps such as the ITMA 1968 and the GMA 1963 are to be revised, or new geological maps of Africa are to be produced, then this should be done through the national committees of the International Union of Geological Sciences which consist of representatives of the national surveys, universities, the mining and petroleum industries. A more representative view of African geology will then be obtained.

Yours faithfully,

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Worcester Foundation Marks Time

SIR,—The article in the April 19 issue of *Nature* (**222**, 216; 1969) gives a somewhat misleading picture of the Worcester Foundation for Experimental Biology. We are especially unhappy about the headline, "Worcester Foundation Marks Time". Since no mention was made of the present administration and direction of the foundation, I would like to comment on it.

Gregory Pincus and I were co-founders in 1944 and co-directors with equal seniority at the Worcester Foundation. We both directed research programmes and were responsible for the overall administration. I had planned to retire in 1968 at the age of 68, and Dr Pincus, three years my junior, planned to continue until 1970. We had agreed, with our trustees, on a new executive director, Mr Mason Fernald, and had engaged him to come to us on January 1, 1968. For the previous seven years he had been administrative director of research and development for the pharmaceutical firm of Smith, Kline and French, and was thus experienced in administering large research programmes. His department at Smith, Kline and French was over three times the size of the Worcester Foundation.

Mr Fernald came to us in September of 1967, immediately following the untimely and unexpected death of Dr Pincus in August of that year. I was asked to remain as president of the foundation for an additional year, retiring January 1, 1969. Mr Fernald has proved to be an excellent administrator and he appointed an advisory council of