

as this construction may be from the point of view of dry rot. The new edition of this Bulletin may be strongly recommended to those responsible for present building programmes, so that features likely to encourage dry rot may be avoided.

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AMONG the scientific papers mentioned in the report of the South Australian Museum for the period July 1, 1944, to June 30, 1945 (Adelaide, 1945) is one by H. Womersley, "Acarina of Australia and New Guinea. Family *Leeuwenhoekidae*" (*Trans. Roy. Soc. S. Australia*, 69, (1), 96). Mr. Womersley has published several other papers on the Acarina in the *Records of the South Australian Museum*, notably, in collaboration with Dr. W. G. Heaslip, on the Trombiculinae or itch mites, certain species of which have been responsible for scrub-typhus and scrub-itch among troops operating in New Guinea and the Pacific Islands. The taxonomic research on these has been centred in the South Australian Museum. Numerous specimens of Trombiculinae were collected by Dr. Heaslip in North Queensland, and by Dr. C. M. Gunther in New Guinea during their researches upon typhus fevers during the war period. It is reported that the Board has had under consideration the possibility of post-war extension of the Museum. The present congestion of both exhibition and storage space is acute, and it is now felt that the condition endangers the proper conservation of the collections, many of which are of a unique character and of inestimable value. The report also refers to needs in respect of the Museum's educational work, especially that connected with visiting school-classes. Hitherto the greater part of this service has fallen upon members of the scientific and technical staffs; but it is now felt that the position results in the inadequate employment of specialized qualifications. The situation could be relieved if the Education Department were to appoint two special teachers to act in co-operation with the Museum staff and to take charge of the school classes. It is pointed out that a similar arrangement is in operation in other Australian museums and that it has proved highly successful.

41- Introduction to Archaeological Method

No. 1 of the Handbook Series produced by the South African Archaeological Society is entitled "Method in Prehistory" and is by A. J. H. Goodwin (Cape Town, 12s. 6d.); it is an extremely useful little book. Prehistoric archaeology, whether in Europe or in South Africa, is a fascinating hobby subject, and as such is being increasingly taken up. But there are branches of the subject which are somewhat technical, as, for example, the processes which were used in the manufacture of the tools found, and their classification when collected in the field; also irreparable damage can be done to archaeological sites if amateur investigators without knowledge and experience start to excavate unaided. Some kinds of site are so common that little harm is actually done; but there are other rarer types, for example, cave sites or barrows, where the inexperienced amateur may do irreparable damage. Goodwin's book provides just that approach to prehistoric study which many people need. There are chapters on the scope of prehistory, on materials and technology, on field research and excavation, on the preservation and packing of material, on

nomenclature, and on the outfit required by an investigator. There is also a useful if short bibliography.

Literature on Soil Insecticides

THE Imperial Institute of Entomology has done good service in issuing "A Review of the Literature on Soil Insecticides" (Imperial Institute of Entomology, 41, Queen's Gate, London, S.W.7. 10s.). Since the subject is one of wide interest and economic importance, it is a great advantage to have so much scattered information brought together under one cover. The work took its origin at a Conference on Insecticides and Fungicides of the Agricultural Research Council, which decided to ask Dr. H. C. Gough to prepare the review now before us. The period covered by this work begins in 1914 and ends, except for a few references, in 1940; owing to war conditions, its publication at an earlier date was impracticable. In order to ensure as wide a circulation as possible, the Agricultural Research Council delegated the publication of the review to the Imperial Institute of Entomology. The subject-matter of the review is extremely well arranged under the chemicals employed. The most important of these are grouped together and arranged alphabetically. The remaining substances, also arranged alphabetically, follow; but they proved difficult to classify owing to their being often referred to by different authors under different names. Many foreign names also proved difficult to translate owing to their often having different significance in different languages. A perusal of the 150 or more pages of this work shows how contradictory so many of the results obtained by different authors have been for almost all the substances tested. It is, therefore, impossible to draw any but very limited conclusions. This in itself is a cogent argument for renewed and carefully controlled experiments. Also the need for a full analysis of the diverse factors likely to influence the results of experiments has to be constantly borne in mind. A very fair indication of the extent of the subject of soil insecticides is given by the bibliography at the end of this review, in which more than 650 works are listed.

Synthetic Philosophy of the Seventeenth Century

In his Herbert Spencer Lecture for 1945, "Synthetic Philosophy in the Seventeenth Century: a Study of Early Science" (Oxford: Basil Blackwell. 2s. net), Canon C. D. Raven maintains that popular writers on the history of science are giving us a defective account of the breakdown of the medieval and the development of the modern world, and a caricature of the characters and intentions of the founders of the Royal Society; their metaphysical and religious interests are minimized and the progress which they made towards a synthetic philosophy ignored. Secondly, he points out that almost all the recent histories of science neglect the biological sciences, and especially botany and zoology, treating the subject as if mathematics were the sole primary theme, with astronomy and physics as its derivatives. Canon Raven contends that the remarkable group of men who gathered as the 'Invisible College' meeting at Cambridge, inspired by Robert Boyle and John Wilkins, and expanded in 1662 into the Royal Society, not only brought Britain into the front rank intellectually and almost succeeded in creating an alternative for the medieval synthesis, but were also men of sincere and deep religious conviction, and

possessed of a genuine passion to see life as a whole and no less genuine faith that in the study of the "works of creation" they were enlarging man's knowledge of the wisdom of God. They pursued a synthetic philosophy, and the progress they made in the half-century of their greatness was large in extent and true in direction. Though they accepted data which we with nearly three centuries of further study rightly reject, it was their catholicity of outlook, and their willingness to prove all things, that made possible the speed and range of their achievements. If they had been less hospitable to old or new, if they had refused fresh notions through subservience to the past or renounced authority recklessly and in revolt, they would neither have laid the foundations for scientific inquiry nor effected so large and permanent a revolution. Canon Raven believes that it is arguable that there has never been so fine an attempt to formulate a synthetic philosophy as that which the Cambridge Platonists projected and Culverwel succeeded in expressing. Like the best of the medievals, they saw the world as emblematic or sacramental: like the best of the moderns, they strove to see it objectively and accurately.

Hospital Staffs and Working Conditions

THE urgency of the recent appeal for more nurses, midwives and domestic hospital workers is clearly set forth in the Government booklet "Staffing the Hospitals, an Urgent National Need" (H.M. Stationery Office, 1945. 3d. net). This booklet gives details of the unanimous agreement reached between the Government and the various hospital organisations. The Minister of Health, the Secretary for Scotland and the Minister of Labour and National Service say that "the situation is serious already. It is likely soon to become critical unless thousands of new recruits can be obtained quickly." The Government and the hospital authorities have agreed upon salary increases, improved working conditions and prospects, the formation of a national reserve of nurses, much-needed reforms such as the employment of married and part-time nurses and permission to live out of hospital, the training of more male nurses and the formation of a grade of 'ward orderlies' to assist the nurses. A National Joint Council for England and Wales has been formed to regulate the terms and conditions of service of hospital domestic workers. Further details of the proposed reforms are given in a memorandum issued with the booklet just mentioned. Certainly reform of the lot of the hospital worker has been, as every medical man will testify, overdue for many years. Without it we can scarcely hope to obtain enough workers to operate any national health scheme.

Generation and Regulation of Electric Power in Aircraft

A PAPER by I. O. Hookmeyer (*J. Inst. Elec. Eng.*, 93, Pt. 1, No. 31, February 1946) records the development of the generation of D.C. power in aircraft by windmill- and engine-driven generators, from its inception to the present day. Features of generator design which have called for special consideration, or have been the subject of failure, are discussed. Sections are devoted to the choice of speed range, brush wear at high altitude, systems of ventilation, design of end-frames, and bearing failure. Some mention is made of generators designed for power supply to radio equipment, as distinct

from general power services. These generators, which include high-voltage D.C. machines and high-frequency A.C. machines, have been combined with low-voltage D.C. machines, both in tandem and with a common magnet system.

The latter part of the paper deals with voltage regulation in so far as generator design is influenced by the system adopted; self-regulating generators of various types have been used from time to time in the past. Brief mention is made of the design of the several types of regulator which have been used, including Tirrill and carbon-pile types. The paper shows how the control of the system voltage had been conditioned by the inclusion of an accumulator, and how it has not been possible to devise a system which gives the constant line voltage required for current-using devices, and, at the same time, permit of adequate control of accumulator-charging current. Systems of paralleling, and their effect on line voltage, are also described.

Small Two-phase Induction Motor

A SPECIALLY small motor, developed in the Admiralty Compass Department for use in applying torques for controlling the precession of the gyros of the Admiralty Gyro Transmission Unit Mk. II, has now been described. The motor is totally enclosed and has an aluminium alloy shell and end shield. The rotor is mounted in ball bearings and the weight of the complete motor is 5½ oz. It is suitable for use in tropical countries. The stator core consists of radiometal laminations 0.010 in. thick. The stator windings are of the double-layer concentrated type, the individual coils being preformed and inserted in the 12-slot core to form a 2-phase 6-pole system. The squirrel-cage rotor is formed by copper strips secured in narrow slots in the laminations; the twenty-one slots are skewed by one slot pitch to eliminate cogging. The shaft is of stainless steel. The deep narrow rotor bars and open-ended slots assist in providing a relatively flat speed-torque characteristic, since at high slip frequencies the current in the bars is concentrated towards the outer edge giving effectively greater rotor resistance at low rotor speeds. As a torque motor, the machine was required to operate on 333 c./s. and works continuously under standstill conditions, with a temperature rise at 20 volts/phase of about 30° C. As a follow-up motor, at a frequency of 400 c./s., one phase is constantly energized, while the second phase is supplied from the output of a valve amplifier in proportion to the misalignment of following. Under these conditions a fixed phase voltage of 30 volts gives a temperature rise of about 30° C. in normal operation.

General Purpose Source-unit for Spectrographic Analysis

FOUR main types of light source are used for the spectrographic analysis of metals and alloys. They are the low-voltage D.C. arc, the high-voltage A.C. arc, the condensed spark either controlled or uncontrolled, and the low-voltage discharge initiated by a low-energy, high-voltage spark. Since they require only simple and inexpensive equipment, the D.C. arc and the uncontrolled condensed spark are generally used in Britain, the arc for work of high sensitivity but not high accuracy because of its instability, the spark for accurate analysis. For the accuracy and wide field of application required by present-day