Anthropological Research in Australia.

IT was announced in NATURE of Nov. 6, 1926, that the Rockefeller Foundation had made a grant of funds to the Australian National Research Council for anthropological research in Australia and the Pacific. With the help of these funds several important researches have now been carried out.

A systematic attempt is being made to collect as much information as possible about the surviving aborigines of Australia before it is too late. Mr. Wm. Lloyd Warner (University of California) has spent several months amongst the hitherto unknown natives of the north-eastern corner of Arnheim Land, where he has discovered an interesting form of social organisation and a highly elaborate system of totemism. He has now returned to the same region for a second season's work. Miss Ursula McConnel (University of Queensland) has spent some months making investigations amongst the Wikmankan tribe of the Archer River, Gulf of Carpentaria, and she will be continuing her work amongst the same people this year. Dr. A. P. Elkin (Universities of Sydney and London) is studying the natives of the Kimberley District of Western Australia. He has already obtained interesting and important results. His work will be continued for about eighteen months in all. Mr. C. W. M. Hart (University of Sydney) will be at work during 1928 amongst the natives of Melville and Bathurst Islands, North Australia. Mr. Donald F. Thomson (Universities of Melbourne and Sydney) is to spend twelve months amongst the natives of the eastern side of the Cape York Peninsula.

Outside Australia the chief problem that has been taken up has been the investigation of the Polynesian colonies in Melanesia. Mr. H. W. Hogbin (University of Sydney) has paid a short visit to Rennell Island and is now engaged in a systematic study of the people of Ontong Java or Luanuia, an outlying atoll of the Solomon Island group. The inhabitants are Polynesian in language, but have a very distinctive culture of their own, the affinities of which it is not yet possible to determine. Since the group was taken up by Messrs. Lever Bros., the population has decreased with extraordinary rapidity. Of an estimated population of five thousand in 1907, there only survive five hundred and sixty-eight, so that the present study of them is only just in time. Dr. Raymond Firth (Universities of New Zealand and London) left early in May for a year's field work in the outlying island of Tikopia—another of the Polynesian-speaking peoples of Melanesia.

The study of the native peoples of New Guinea is already being carried out by the Government anthropologists of the Territory of Papua and the Mandated Territory of New Guinea, but it is intended to supplement their work with that of special investigators. Mr. R. F. Fortune (Universities of New Zealand and Cambridge) is at present investigating the natives of the D'Entrecasteaux Archipelago.

In all the above-mentioned researches the aim is to study as completely as possible the language and customs of the people investigated. The Australian National Research Council has also provided for certain researches of more limited scope. The University of Adelaide has established a board for anthropological research and has carried out investigations in physical anthropology of the aborigines of South Australia and a study of the aboriginal music of the Arunta tribe. The Department of Physiology of the University of Sydney has initiated a series of investigations, still in progress, which have for their purpose the comparison of the physiology of the Australian aborignes with that of white people in Australia and in Europe. These investigations promise to give interesting results.

Optical Instruments for Research Laboratories and Works.

IT is not given to all men to be able to invent a proverb, but whereas it has been truly said that 'necessity is the mother of invention,' it has been the good fortune of Messrs. Adam Hilger, Ltd., to make invention the mother of necessity. There can be few persons responsible for the equipment of a physical or spectroscopic laboratory who will not realise the necessity of some of the beautiful instruments which have originated in the Hilger workshops.

The last fifteen to twenty years has seen an immense expansion in the range of products of this firm, disregarding the abnormal period of the War, and this growth of activity is reflected in the catalogue recently published.[1] In the early days, however, when the main products were confined to spectroscopic apparatus and optical work, the firm had the wisdom to build on a sound foundation of high quality work, and this reputation of thoroughness and consistency is still deservedly held at the present time. Hilger instruments have been concerned in many of the most important of modern researches, and the firm is entitled to an honourable place in the company of science, for it is true that the design and evolution of an instrument is a matter which often calls for the solution of problems quite as difficult as those in which the use of the finished instrument is employed.

The flattery of imitation cannot make the instrument maker vain; it calls not only for fresh invention but also for a continual improvement of his wares if he is to keep his lead. Of the various instruments wholly or largely originated by Messrs. Hilger, amongst which may be mentioned the group of wave-length spectrometers, the different spectrographs, the 'Twyman' interferometers, and instruments for spectrophotometry, ultra-violet refractometry, and the like, it is of the greatest interest to study the development of some of the leading types. The wave-length spectrometer has not only been greatly improved in convenience and optical performance, particularly in regard to stray light, but also the fundamental ideas in the design have been carried out in monochromators and various specialised forms of spectroscope, and the instruments have been adapted for spectrum photography and physical spectrophotometry.

In the class of spectrographs the new all-metal 'quartz' spectrographs will attract attention. They embody an optical system in which the number of component lenses has been reduced by the employment of aspherical surfaces, and it is claimed that a considerable improvement in the richness of spectrum detail has resulted, together with a possible increase in the range from 2000 A. in the ultra-violet to about 10,000 A. in the infra-red. It has been the general experience that quartz systems made from carefully selected material yield a degree of definition practically unattainable by systems made of glass, so that the performance expected of this instrument will certainly be of a very high order; it should be of great use in trying atmospheric conditions.

The spectrograph of standardised design with inter-

[1] "A General Catalogue of the Manufactures of Adam Hilger, Ltd." Pp. 8+D22+E36+F36+H32+K2+L7+M28+N14+iv. (London: Adam Hilger, Ltd., 1928.)

changeable optical systems is another new venture which should interest those who have no space for a multiplicity of instruments for different purposes, and the possibility of varying the optical and dispersion systems ought to be of the greatest interest to teachers.

Those interested in many recent advances in vacuum spectroscopy, X-ray work, physical photometry, and the like, will find new material of interest. Speaking generally, one great means of securing information about natural objects has been the production of visible pictures due to ordinary light; in this matter the limit of our resources has already been reached in regard to such possibilities as of resolution in microscopy, but when the range of radiation which we can employ for investigation directly or indirectly is extended far beyond the visible limit, our resources are indefinitely increased, and though the difficulties are great they will not be found to be insuperable. Such advances, then, are of fundamental importance.

The extension of so-called 'industrial research' has called for new instrumental developments. The 'Nutting' type of spectrophotometer can now be obtained in the form of a specialised industrial instrument complete in itself; the possibility of maintaining such an equipment in permanent adjustment should be valuable in a laboratory where absorption measurements are becoming of increasing importance in optical methods of control in manufacture. The optical system of the instrument is modified in the latest type by the introduction of a polarising prism into both of the separated beams.

There is still room for a satisfactory spectrophotometer which will produce a matching field of uniform colour without undue loss of light.

Amongst other newcomers to the catalogue we note the 'Mutochrome' and the 'Coverimeter,' names which those unfamiliar with the instruments should find intriguing enough. In the description of the Houston apparatus for investigating colour vision, we are told that a diagram can be produced to describe the colour vision of a subject which states results in 'an absolute manner.' There are not many matters in which Messrs. Hilger need be disillusioned, but this is one of them.

It might almost be considered that such an instrument as a measuring microscope had reached finality in design, but in recent years the present writer has been pointing out in lectures and in a book certain simple principles which should receive attention, although they had evidently been overlooked in many such instruments. It is gratifying to find that these principles have received full attention in a new photo-measuring micrometer of a very attractive design.

The fact that one or more Twyman interferometers will be found in almost every workshop in Messrs. Hilger's factory is a sufficient comment on the value and utility of these instruments. In the production of accurate optical parts for such instruments as these interferometers and the various other forms of interferometer of the Fabry-Perot and Michelson types, optical workmanship must touch the high-water mark of skill.

Work of the types which have been hinted at above means careful individual work. Especially in bringing out a new design for the use of workers in some branch of research, the maker is faced with problems which require time and patience for their solution; perhaps the first models may not meet all practical requirements; development work is essential, and yet in a way it is a 'liability'; it is like the injection of cold feed water into the boiler. The expense of development work must be borne by the better established branches of a business.

Yet there are ways in which such firms as Messrs. Hilger might perhaps make progress. Not for all are the marvels of precision, the charm of all possible refinements of workmanship, materials, and finish. How many of us have not learnt much of our optics with apparatus of the simplest description? On page D.10 we find a student's wave-length spectrometer of a simple type. Is it not possible that with care in design and with suitable choice of materials, a much wider range of apparatus could be made for students' use, which might not satisfy the requirements of research but would prove a godsend to teaching laboratories?

As the makers themselves state, this catalogue contains such instruments as are of most interest to chemists and physicists. The information is clear, precise, and usually sufficient; optical diagrams are given in many instances, and short bibliographies are often included in the descriptions. Special publications deal with particular groups of instruments of more restricted interest. Messrs. Hilger are to be congratulated on this catalogue. L. C. M.

The Etiolation of Shoots for Cuttings.

A RECENT paper by Dr. Edith Smith upon the vegetative propagation of Clematis (*Trans. Roy. Soc. Edinburgh*, **55**, Part 3, 643-664; 1928) again directs attention to the question of the etiolation of shoots used for cuttings. Dr. Smith finds it necessary to modify an earlier statement to the effect that clematis cuttings do not root at the node under ordinary conditions, as in fact many commercial houses still employ nodal cuttings with this plant. Normally, however, cuttings made an inch below a node root more readily. It was found, though, that after previous etiolation the stem rooted readily at the node. In an earlier paper from the Edinburgh Botanic Garden, Reed has described the ready rooting of cuttings of camphor after previous etiolation (*Trans. and Proc. Bot. Soc. Edin.*, **28**, 184-188; 1922–23). Knight and Witt have also rooted shoots of apple and plum more successfully after previous etiolation, and pointed out that in the etiolated shoots the roots did not emerge through the callus as in the normal case, but arose higher up the cutting and emerged through the cortex (*Journal of Pomology*, **6**, 47-60; 1927).

Priestley has described the ready rooting of etiolated shoots of broadbean and pea and correlated this with the development of an endodermis in these shoots upon etiolation (Master's Lectures, *Jour. Roy. Hort. Soc.*, **51**, January 1926). In etiolated apple shoots, however, he found no endodermis, and Knight, Reed, and Smith also do not find an endodermis developed in their etiolation experiments. Smith suggests that etiolation acts in two ways, first by exciting meristematic activity, and secondly by 'softening' the hard tissues of the fibres and the pith.

Probably modern experimental work upon propagation will find this a profitable line of investigation. It is by no means a new one. Goude recently described in the *Gardeners' Chronicle* (Jan. 14, 1928) the method used at the Danish Experiment Station at Blangsted for the successful rooting of scion varieties of apples. The one-year maiden trees are laid down and the lateral shoots earthed up; as these shoots then develop under etiolated conditions a ring of wire is bound tightly around them. Roots later develop above the ring. The same method for preliminary treatment of shoots before they were removed as cuttings was described admirably by Duhamel in "Physique des Arbres" in 1763.