

for oxygen has been found, which means that the oxygen solubility values in a number of recent publications are incorrect.

Zoology in South-west Africa

Cimbebasia, issued by the State Museum, Windhoek, South-west Africa, records present zoological research in that country. No. 8, December 1963, is an interesting account by R. F. Lawrence of the Solifugae of South-west Africa, a country that seems to offer a particularly favourable ecology to these creatures, for no less than 10 per cent of the 800 known species are found there. Although the paper is primarily systematic, the preliminary sections on the biology of these peculiar arachnids is of special value. *Cimbebasia* (No. 6; November 1963) contains four papers on various reptiles and one each on mites and diatoms, mostly by members of the Museum's staff.

Boliland Region of Sierra Leone

A 'BOLI' is the term for a flat treeless grassland that is flooded during the rainy season, and a survey of the bolilands was called for in order to delineate areas suitable for rice cultivation. The work was carried out under the Colonial Development and Welfare Scheme, and the results are described by A. R. Stobbs in *The Soils and Geography of the Boliland Region of Sierra Leone* (Pp. 45 + 12 plates. Freetown, Sierra Leone: Government Bookshop, London; Crown Agents for Overseas Governments and Administrations, 1963. 28s.). The area concerned consists of a strip about 140 miles long and 25 miles wide, with an annual rainfall of up to 130 in., mainly in a six-month period. The soils of the undulating upland are derived from sandstones and sandy shales; mudstones and shales, weathering into puddled clay subsoils, underlie most of the bolis, which are poor in mineral nutrients and have not attracted settlement as have the more fertile adjacent soils. The mapping of the soils was based on a geomorphological interpretation of aerial photographs, extended by the identification of soil series, which is a method of great value in a large area with poor communications but with uniform climate and geological pattern; six individual typical riverain and individual bolis were also mapped on a large scale to show the effects of variations in height on the flooding régime and to provide a basis for experimental work. The soils are classified, on the system that has already proved of value in West Africa, into the soil groups: oxysols, groundwater laterites, acid gleisols and alluviosols. Typical profiles are described and analytical results are appended, and comparisons are made for planning future development. There is a preliminary description of the existing plant communities by T. S. Bakshi. The land use in the uplands is based on shifting cultivation with bush fallow; there is a wide range of crops, but it is just subsistence farming and there is room for considerable improvement. In the flood plains, water control would enhance the possibility of swamp rice and dry-season pasture.

Witchcraft and Sorcery in Oceania

In his presidential address to the Anthropology Section of the Australian and New Zealand Association for the Advancement of Science, Prof. M. G. Marwick, of Monash University, examined some aspects of the sociology of witchcraft and sorcery (*Australian Journal of Science*, 26, No. 9; 1964). In Oceania, one of the well-founded propositions of the sociology of sorcery and witchcraft does not seem to apply. Elsewhere, especially in Africa, it has been repeatedly recorded that both believed attacks and accusations of witchcraft and sorcery occur only between persons already linked by close social bonds, but in Oceania it is more often reported that the sorcerer, who seems to be commoner than the witch, is believed to direct his destructive magic outside his own group. A corollary to the generalization supported by the

African material is that the relationship between alleged witch and sorcerer and believed victim is not only close but also strained; and this fact gives a means of detecting the tension-points of a social structure by the frequency with which attacks of witchcraft and sorcery are believed to occur between persons standing in various relationships. Prof. Marwick suggests that the person who carries out field-work on the sociology of Oceanian sorcery or witchcraft might bear the following points in mind. First, terms such as sorcery and witchcraft must be clearly defined and the differentiation between destructive magic socially approved and that socially condemned should be maintained; for the difference between them is, for clear reasons, material to sociological analysis. Secondly, the well-established principle of comparing the ideal with the real applies in this field of enquiry as much as in any other. Thirdly, beliefs in sorcery and witchcraft invariably have a social setting in a sense that they mediate, though they sometimes complicate, the living together of people in the on-going process we call a society. These considerations mean that, fourthly, the field-worker, in collecting his material, has to direct particular attention to the three central characters, the accuser, the alleged sorcerer or witch and the believed victim, and to the social relationships, the rivalries and the alliances between them. Finally, the ethnographer should again apply a well-established canon of field-work to his particular topic, that is, when he cannot observe the relationships believed to be involved in a particular instance of misfortune, and even when he can, he should not rely on only one informant for each case, but should record the interpretations of different persons differently placed in relation to the central characters.

Spiral Structure in the Andromeda Nebula

THE Great Nebula in Andromeda has played an important part in the development of our knowledge of galaxies. The late Dr. Walter Baade initiated many investigations of the Nebula which are now being completed by his colleagues. The results of an examination of the emission nebulae in the Nebula have just been published (Baade, W., and Arp, H., *Astrophys. J.*, 139, 1027; 1964). At one time it had been thought that no gaseous emission nebulae were present in the Andromeda Nebula. Baade doubted this, and accordingly photographed the Nebula with the 100-in. telescope at Mount Wilson, using various specially selected combinations of photographic plates and filters. Photographs taken in different wave-length regions were compared, and in all 688 emission nebulae were catalogued. These objects at first appeared to outline the spiral structure very well, but later work has shown that their interpretation is not easy. Arp (*Astrophys. J.*, 139, 1045; 1964) has made a detailed discussion of the problem. The distribution of the brightest stars must also be considered. Direct photographs have shown that the best representation of the spiral structure is obtained if it is assumed that the Nebula is tilted at an angle of 16° to the line of sight. When attempts are made to fit the emission nebulae to this picture difficulties arise. There does not seem to be any tilt angle which, when allowed for, will give a picture of the emission nebulae looking like a continuous spiral curve. A much better fit is obtained if the angle of tilt is 11° to the line of sight. Dr. Arp suggests that the whole plane of the Nebula is warped, with a tilt of 16° for the side more distant from us, and for the central regions, and a tilt of 11° for the near-side regions. On this picture the emission nebulae form a complete spiral. There is evidence that the warping is caused by the companion elliptical galaxy, M 32.

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