

photographic spectrum to λ 6000 A. The discovery of pinacyanol in 1904 extended the photographic spectrum to beyond λ 7000 A. The effect of dicyanine has been ignored in the construction of the chart, though for a few workers its use extended the photographic spectrum to beyond λ 8000 A. It was, however, only easy to reach

that wave-length after the discovery of kryptocyanine in 1919, while the production of neocyanine in 1925 extended the range to λ 9000 A. Xenocyanine, made first in 1932, enabled λ 11000 A. to be reached, and the pentacarbocyanine has now extended the photographic spectrum to beyond λ 12000 A.

Coral Reefs of the Western Indian Ocean

THREE papers recently published* conclude the reports on the intensive study of the reefs of the Western Indian Ocean that was carried out by the Percy Sladen Trust Expedition to the Indian Ocean in 1905. Such a study necessitated investigation along several lines, geological and geographical, as well as biological, for only by a judicious combination of this kind can one hope to solve such problems as: What are the foundations on which these reefs are built? How have they been formed, and what changes are taking place in them? How can the differences in the fauna of the different areas be explained?

Oceanographers and marine biologists are greatly handicapped by the inability of geologists to agree regarding the formation of the great oceans, and this is especially the case in the Indian Ocean, across which Gondwanaland, and, at a later period, the isthmus of Lemuria, are by some supposed to have connected India and Africa and to have formed the bases on which present reefs have been built. Others believe with Wegener that the oceans were formed by the drifting apart of the continents, such isolated fragments as the Seychelles being detached and left behind during the process.

At the present day we are woefully ignorant regarding the nature of the rock of the sea-floor, and in this connexion Dr. Wiseman's study of the basal rock of Providence Island is of particular interest, as it shows that this is volcanic in origin, and is probably of Eocene-Oligocene age. The southern end of the great Seychelles Bank is volcanic, and the recent work of the John Murray Expedition has shown that the Carlsberg Ridge is, at least in part, also volcanic in structure. This raises the question whether all these areas may not have been formed simultaneously in the Eocene-Oligocene period as part of a widespread disturbance in East Africa, and perhaps con-

temporarily with the curved ridges of the Malay Archipelago. Whatever the origin of these foundations, many of them are to-day covered with coral reefs or atolls, and Prof. Stanley Gardiner has concluded that these are probably of recent origin, perhaps only some 10,000 years old, while as recently as 3,500 years ago a world-wide recession of the sea-level caused the exposure of the reefs and the formation of islands. From the very outset, conditions appear to have been different in the various regions. In the Mascarene Region no atolls were ever formed and the coral reefs are now being cut back, leaving wide banks that extend for considerable distances beyond the reefs, as a result of a change that was probably world-wide, since similar conditions are to be found in the reefs of the southern part of the Pacific Ocean. In the Maldive and Chagos Archipelagoes, atolls were formed, but the islands and reefs are now being eroded away, though at different rates, so that while the Maldives are still in a comparatively stable condition, the Chagos group is composed mainly of submerged banks, the relics of former surface structures.

We are still uncertain as to the actual mode of formation of the reef and especially of the reef-rock that enables the reef to withstand the pounding of the seas, but Stanley Gardiner attributes this largely to the growth of *Lithothamnionæ*—"no bank reaches the surface to form a reef unless covered by *Lithothamnionæ*"—the upgrowing corals being firmly cemented together and converted into a reef by *Lithophyllum*. Thus any condition that may be detrimental to the growth of this alga would prevent the full development of the reef or, where such had been formed, its present maintenance; hence the necessity of a careful study both of the sea-water itself and of meteorological and other conditions.

Great differences are to be found in the fauna of the areas studied. The Seychelles appear to be inhabited by the remains of a fauna and flora of long standing, and this is explained by the erosion of a larger area into the smaller islands of the present time. The reef-fauna of the Maldive,

* *Proc. Linn. Soc.*, 1936. Reports of the Percy Sladen Trust Expedition to the Indian Ocean, 1905. The Reefs of the Western Indian Ocean. I. Chagos Archipelago. II. The Mascarene Region. By Prof. J. Stanley Gardiner. The Petrography and Significance of a Rock dredged from a depth of 744 fathoms, near to Providence Reef, Indian Ocean. By Dr. J. D. H. Wiseman. Concluding Remarks on the Distribution of the Land and Marine Fauna, with a List of the Water Temperature Observations. By Prof. J. Stanley Gardiner.

Chagos and Mascarene groups shows differences that can partly be explained by the differences in the reefs themselves, some reefs being stationary, while others are receding, and partly by different sources of origin dependent on their geographical situation. Throughout all the groups Stanley Gardiner found evidence of an invasion of species, probably by the dispersal of their larval stages along the great oceanic currents, from the East Indies, where there seems to have been a great outburst of new species in about Pleistocene times. One difficulty in accepting this explanation lies in the fact that we know too little about the length of time through which such a larva can survive, and, as Stanley Gardiner points out, the study

of the plankton catches at different depths around the Chagos and Maldivé Archipelagoes failed to reveal any larvæ that could be assigned to littoral animals. It has been suggested to me, however, that floating structures, such as tree-trunks or pieces of pumice, which after the explosion of Krakatoa drifted for years across the whole width of the Indian Ocean and were eventually flung up in thousands on all the coral banks of the Maldives, Laccadives and Chagos, may well have served as temporary rafts on which the larvæ might settle and develop to the adult stage, and thus provide a further succession of larvæ that might eventually reach even the farthest islands.

R. B. SEYMOUR SEWELL.

Obituary

Prof. J. G. Harrower

THE death is announced at the early age of forty-six years of Prof. Harrower, who as professor of anatomy at the King Edward VII Medical College, and consulting surgeon at the General Hospital, Singapore, rendered great services to medical education in Singapore.

Prof. Harrower received his primary education at Shields Road School, Glasgow, and then with two bursaries at Allan Glen's Higher Grade School, after which he became an apprentice in an engineering shop. On the completion of his five years' apprenticeship he joined the staff of the electrical power station of the Glasgow Corporation Tramways as a shift engineer. During this time he attended classes in the Royal Technical College, Glasgow, and so acquired that facility in mathematics which was displayed in his biometrical research in craniology. He devoted particular attention to electrical engineering so as to equip himself for practice in X-ray work and radiology, but he did not pursue this aim.

The stimulating example of Prof. Le Gros Clark, who was inspired by his life in Sarawak to begin his important researches on "The Early Forerunners of Man", prompted Harrower to take advantage of living in the same city as the Raffles Museum and to study the comparative anatomy of the tree-shrews and *Nycticebus*, as well as human remains that came to light in the Malay States.

The work of departmental teaching involved the study of Chinese coolies and, in addition to recording anomalies such as the variations around the foramen magnum, which seem to attract the attention of most anatomists who work in Africa and Asia, Harrower devoted much attention to the intensive study of the Hokien and Tamil skull and the Hylam Chinese. How carefully he dealt with this difficult subject is revealed in the memoirs published in *Biometrika* (1929) and the *Transactions of the Royal Society of Edinburgh*, 1925-26. These researches,

which were accomplished in the face of considerable local difficulty in Singapore, served to bring him into touch with others similarly occupied—Prof. Joseph Shellshear in Hong-kong, Prof. O. Hill in Colombo, Prof. Davidson Black in Peking—so that a chain of links was established to form a bond of union between workers who might otherwise have been isolated.

For Harrower these contacts were particularly important, for they encouraged him to persist with his research in face of obstacles which might have been discouraging. As it was, he was a genial and happy man who was able to play his part in maintaining scientific effort in the south-eastern corner of Asia, and in so doing bring credit to his Alma Mater at Glasgow.

GRAFTON ELLIOT SMITH.

WE regret to learn that at the beginning of this year Dr. Kálmán Lambrecht, the palæontologist, died at Budapest from heart failure in his forty-seventh year. He was librarian to the Geological Survey of Hungary, and will be best remembered by his researches and writings on the fossil remains of birds. In 1921 he contributed the section on birds to the "Fossilium Catalogus", and in 1933 he published his exhaustive "Handbuch der Palæornithologie", which was reviewed in *NATURE* of January 19, 1935, p. 84. Dr. Lambrecht was also interested in biography, and at the time of his death he was occupied with a life of the late Baron Francis Nopcsa.

WE regret to announce the following deaths :

Sir Wilmot Herringham, C.B., K.C.M.G., consulting physician to St. Bartholomew's Hospital, vice-chancellor of the University of London in 1912-15, on April 23, aged eighty-one years.

Prof. Karl Pearson, F.R.S., emeritus professor and formerly Galton professor of eugenics in the University of London, on April 27, aged seventy-nine years.