national Relations of Science, at which Dr. Julian Huxley and others from Unesco will discuss "Science Across the Frontiers".

The sectional programmes contain a wide variety of topics, ranging from cosmic magnetism to the effects of the cinema on young people. The objects of the annual meetings of the Association being to provide opportunities for men of science to meet each other and discuss their work in the setting of science as a whole, to allow men of science and laymen to meet each other, and to increase the public understanding of science, the programme includes both specialist and general topics (nearly three hundred speakers).

Among the former are sessions on recent advances in the crystalline state, opened by Sir Lawrence Bragg, geology and air photography, functional morphology (including an address by Prof. H. Graham Cannon), the denudation of the weald, applicable mathematics, the case for and against the metric system, transmission of effects from the endings of nerve fibres (opened by Sir Henry Dale), recent advances in colour vision (including an address by Prof. H. Hartridge), to mention only a few.

The more general topics include industrial applications of electronic devices (with exhibition), new metals in industry, new building materials, problems of Colonial development, movements of population, fuel economy with special reference to the heat pump, human blood groups, problems of old age. Various aspects of food and nutrition will be discussed at several sessions arranged by the Sections of Zoology, Economics, Physiology, Agriculture and Chemistry, and the programme also includes discussions and talks on science in industry as arranged by no fewer than seven sections.

Arrangements have been made for sixty excursions and a number of social engagements, and the members will be entertained at a civic reception in the buildings on the Royal Pavilion Estate.

Further details of the meeting may be obtained from the Secretary of the British Association, Burlington House, London, W.1 (Regent 2019). There is no closing date for registration, and hotel accommodation is still available in Brighton.

THE SWEDISH DEEP-SEA EXPEDITION

By PROF. HANS PETTERSSON
Göteborg

AN account has already been given of the first part of the cruise of the *Albatross* (see *Nature*, October 25, 1947, p. 559). On August 27, 1947, the *Albatross* started from Balboa on its cruise across the Pacific Ocean, and five months later terminated it in the idyllic harbour of Ternate, visited by the *Challenger* Expedition seventy-three years earlier. The course led first to the Galapagos Islands, where the upwelling cold water and the deposits beneath it were studied; then along a west-north-west direction until the eighteenth parallel was reached, from there turning south for Nukuhiva and for Tahiti. Between Tapeete and Honolulu the course of the *Challenger* was followed, although to the opposite direction, several of its stations being repeated under way. From Honolulu the course lay to the south-south-west and, after crossing the equator for a fourth

time, we steered west-north-west, finally reaching the great deeps south-east of Mindanao.

Our four first crossings of the counter-equatorial current were used for a close study of its hydrography by frequent deep series, intercalated by bathythermograph shots through the uppermost 140 metres. Interesting results are shown by our diagrams, as the signs of upwelling and descending water in the regions of divergence and convergence respectively in the surface. A distinct oxygen minimum extended from a few hundred metres downwards for 800 m. or more. Clouds of suspended particles studied by the Tyndall method were met with also at great depths.

The ruggedness of the sea bottom revealed by our echograms often proved an obstacle to coring operations, as were also the not infrequent encounters with hard bottom (lava beds) at great depths, sometimes leading to partial or total loss of the steel coring tubes. Nevertheless, fifty-seven cores, varying in length from a few metres to fifteen metres, were raised from depths between 2,000 and nearly 8,000 m., their total length approaching 500 metres. Many of them, especially those taken near the equator, showed a pronounced stratification indicating changes of surface conditions affecting the distribution of plankton organisms. A special feature on our echograms near the regions of divergence at the surface were diffusely reflecting layers in a depth of 100–250 metres, presumably fish shoals or masses of other pelagic organisms. Attempts to sample these reflecting layers failed for lack of suitable gear.

Landings made at different ocean islands afforded opportunities for making botanical collections and photographic studies of animals and plants.

Measurements of the thickness of sediment by means of recording echoes from exploding depth charges were made frequently along our course. Except near Panama, where higher values were found, no reflecting layers could be discovered below the 1,000-ft. level, in striking contrast with the much deeper echoes found in the Mediterranean and in the open Atlantic Ocean.

After proceeding through the Sunda Archipelago to Soerabaya, raising sediment cores displaying volcanic ash layers and taking hydrographic soundings under way, the expedition started on its cruise into the Indian Ocean on February 18, 1948, from Bali. Strong winds, approaching hurricane force in the squalls, made work impossible during the first week; but afterwards weather conditions were ideal. Such was not the case, however, with the state of the sea bottom, the ruggedness of which made both core sampling and measurements of sediment thickness precarious. The number of cores raised from the eastern Indian Ocean was therefore unexpectedly small—a total length of only 60 metres—and the loss of instruments was relatively heavy.

An interesting feature on our echograms was a perfectly flat bottom at a depth of about 4,300 metres, which extended for several hundred nautical miles from near the equator towards the coast of Ceylon, where the depth over long stretches did not vary by more than a few fathoms. Here the core sampler was broken in two, proving that the bottom was hard, with very thin cover of sediment (an extensive lava bed?).

Following from Colombo a course towards the south-south-east, we again passed over the southern hemisphere, afterwards setting course for the Seychelles. The cores raised from the western Indian

Track of the *Albatross* across the Pacific. The circles indicate the stations occupied

Ocean were more numerous than in its eastern parts; and especially after leaving the Seychelles on a northerly course over the Somali Deep they displayed very pronounced stratification. In the Gulf of Aden as well as in the southern part of the Red Sea in its northern part, the rocky nature of the bottom made core-sampling precarious—the lowest parts of the cores frequently gave off a smell of sulphureted hydrogen, indicating a deficient oxygenization of the bottom waters.

As earlier in the Pacific, our numerous soundings of the thickness of sediment made in the Indian Ocean gave very moderate depths for the reflecting layer, rarely exceeding 200 metres and frequently less than 100 metres.

The hydrographic soundings included two sections across the equatorial current system, where again indications of fish-shoals (or other densely packed pelagic organisms) were found on the echograms. The *Albatross* was considerably delayed coming up the Red Sea by a strong northwester, and arrived at Suez on May 8, having thus devoted two and a half months to the Indian Ocean and to the Red Sea.

OBITUARIES

Sir Clifford Paterson, O.B.E., F.R.S.

SIR CLIFFORD COPLAND PATERSON, director of the Research Laboratories of the General Electric Co., Ltd., Wembley, died at the Watford Peace Memorial Hospital on July 26, shortly after returning from Australia, where he had been acting as contact between British and Australian scientific bodies.

Born on October 17, 1879, Paterson was educated at Mill Hill School and Finsbury Technical College under Silvanus Thompson. After serving a four-year apprenticeship in an engineering works in London he obtained further practical experience in Glasgow and at the Oerlikon Works in Switzerland, going afterwards to Faraday House under Dr. Alexander Russell. From 1903 until 1919 he was principal assistant to Sir Richard Glazebrook at the National Physical Laboratory, and was responsible for the electro-technical and photometric departments. Under his guidance these departments made outstanding contributions in precision methods of measuring electrical power and the establishment of the international standard of light. The Paterson-Walsh electric height finder for indicating automatically the heights of aircraft was developed during the First World War.

Paterson joined the General Electric Co., Ltd., in 1919 to establish the research laboratories of that Company, of which he was made a director in 1941. The progress of so highly technical an industry as electrical engineering depends essentially on scientific research, and the research laboratories which grew up around the achievements and personality of Paterson are representative of the finest of their kind. Starting with a staff of twenty-nine, the General Electric Research Laboratories now employ 1,750 people. Working under the inspiration and guidance of Paterson a distinguished team have made valuable contributions to developments ranging from heavy engineering to electronics. In lighting and vision, fields in which Paterson's greatest personal contributions to science were made, they have been outstanding, as well as in many other branches of applied physics.

The successful prosecution of the War demanded the speedy solution of new problems requiring the application of scientific principles. Radar was a notable example—employed first for the detection of enemy aircraft, then for naval purposes for detection and intricate gun ranging. In this and in many other directions, the facilities and the personnel of the General Electric research organisation under Paterson's direction were a great national asset.

Paterson was a man of great personal charm. His high principles and great integrity in his business, professional and personal relations were so well recognized by all with whom he came into contact that there is no need to stress them. His wide interests and the confidence imposed in him and the esteem with which he was regarded are reflected in the numerous high offices which he held in his profession, and the honours and awards conferred upon him. He was a past president of the Institution of Electrical Engineers, the Institute of Physics, the Electrical Research Association, the Illuminating Engineering Society, the International Commission on Illumination, the Institution of Illumination Engineers in Charge, and the Junior Institution of Engineers. He had been vice-president of the Royal Institution and chairman of council of the British Standards Institution. He was on the Advisory Council of the Department of Scientific and Industrial Research and a member of the Executive Committee of the National Physical Laboratory. He received the degree of D.Sc. (*honoris causa*) of the University of Birmingham in 1937, he was elected to the fellowship of the Royal Society in 1942, awarded the Faraday Medal of the Institution of Electrical Engineers in 1945, and the Ewing Medal by the