DEEP-SEA RESEARCH

SEVEN papers, a foreword and a brief note on a symposium held in the Jane Herdman Geology Laboratories of the University of Liverpool during September 1–2, 1953, constitute the first number of a new scientific quarterly journal, *Deep-Sea Research**, sponsored by the Joint Committee on Oceanography of the International Council of Scientific Unions. All contributions deal essentially with the floor of the oceans, in accordance with the terms of reference of the sponsoring body, namely, "that its work should be restricted to the investigation of the deep-sea floor". The title of the journal tends, therefore, to be misleading, especially if, as seems to be indicated, its policy is to remain focused on deep-sea floor problems and research, the emphasis being mainly geological rather than oceanographical except by contingency. A title such as "Deep-Sea Floor Research" would thus appear more accurately to express the substance and intention of the journal, and would be more likely to attract those, besides oceanographers, to whom its contents would be of greatest concern and interest.

In the first article, on "International Collaboration in Deep-Sea Research", Dr. J. D. H. Wiseman (London), president of the Joint Commission on Oceanography, cites the complexity of the problems to be solved, together with the high cost of equipping and maintaining oceanic research expeditions, as the case for the practical necessity of international collaboration in such work, an essential prerequisite of which are accurate bathymetric charts of the sea-bed. Those produced by the International Hydrographic Bureau, Monaco, and collectively styled "General Bathymetric Chart of the Oceans", are commended provided they can be re-edited every five years. Dr. Wiseman suggests that if these charts were more widely known for their artistic and other qualities, not only among scientific workers, but also to librarians and shipping companies, they would soon become largely self-supporting. The paper further deals with recent scientific developments in deep-sea floor research; for example, the invention by Dr. B. Kullenberg (Sweden) of a new long-core (20 m.) bottom sampler[1], enabling the acquisition of unrivalled material for the study of historic and also prehistoric climatic changes; the evolution by Belgian and Swedish scientists, working in collaboration, of a new method for determining the rate of sedimentation on the sea floor; the rapid improvement in our knowledge of submarine topographical features by the aggregate efforts of a number of American submarine geologists working in conjunction with the United States Navy and Coast and Geodetic surveyors; the accurate measurement of the rate of heat-flow through the deep-sea floor by a co-operative effort of British and American scientific workers; and a number more. Of such promise, indeed, to the Joint Commission on Oceanography is the prospect of realization within a reasonable time of "a new level of understanding of deep-sea problems", consequent upon developments in electronics, physics, chemistry, methods of detailed surveying and sampling of the deep-sea floor; and recognizing the virtual necessity of international collaboration in investigations to that end, Dr. Wiseman gives it as the express intention of the Commission to explore the possibility of establishing a permanent, non-governmental bureau or council to act as an advisory and promoting organization for the conduct of deep-sea floor and contingent investigations. In this, one may be disposed to be sceptical of the necessity to establish yet another body, especially a permanent one, for purposes which perhaps a judicious modification or extension of the terms of reference of existing organizations, national or other, might well and sufficiently include.

A second paper, by Dr. Wiseman and Mr. C. D. Ovey, the secretary of the above-mentioned Joint Commission, usefully sets out a list of approved and defined terms, with a statement of agreed principles to govern nomenclature, which it is proposed should be applied to deep-sea topographical features. Some of the terms, such as 'continental borderland', 'borderland slope', 'seascarp', 'seahigh', 'seamount', 'tablemount', 'seapeak' and 'seaknoll' are new; and the list, which is largely the work of the British National Committee on the Nomenclature of Ocean Bottom Features, set up under the corresponding International Committee of the International Association of Physical Oceanography, is now published in order to test the degree of universal acceptance and employment of the terms before the parent Committee promulgates its decisions. These terms, if universally approved and adopted, would, by the introduction of systematic nomenclature on the lines proposed, obviate much future confusion and ambiguity in the specification of oceanic bathymetric features.

Prof. Hans Pettersson (Sweden), in a third paper, gives a summary account of the origin, aims and principal results of "The Swedish Deep-Sea Expedition, 1947–48", which he was chiefly instrumental in instigating and carrying through to a successful conclusion. The main work of this fifteen-month circumnavigating enterprise on the 1,450-ton motor-schooner *Albatross*, loaned by the shipping firm of Broström and Co., Gothenburg, before being put into service as a training-ship, centred around Kullenberg's long-core bottom sampler operated at great depths, the record depth at which a long core was taken being 7,500 m. Bottom profile records to more than 7,000 m. were also made, revealing that, in these abyssal regions, as in lesser depths, flat areas of practically uniform soundings are the exception rather than the rule. As Prof. Pettersson points out, this new fact raises important questions regarding the dynamics, tectonic and volcanic, of the deep-sea floor, and implies replacement of the former conception of a vast sea-floor peneplain due to age-long uninterrupted sedimentation smoothing out any original ruggedness in the rocky substratum, by that of a constant 'resculpturing' of the ocean bed, producing abrupt differences in level. New techniques, methods and means, some of them devised during, and by members of, the expedition, were employed in the measurement of the thickness of the bottom sediment, in determining bottom water movements in very deep water by study of its optical properties and the prevalence and stratification of suspended particles, and in the taking of undisturbed water samples quite near to the bottom. Large quantities of water were collected and preserved for uranium and radium measurements, and trawling operations were carried out at great depths in the North Atlantic Ocean to study the abyssal fauna. It is hoped that

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at least the essential scientific results of the expedition, some of which have already appeared, will be published before the end of 1956.

The next paper is a contribution by B. C. Heezen, M. Ewing and E. T. Miller, of the Lamont Geological Observatory of Columbia University, New York, and deals with a "Trans-Atlantic Profile of Total Magnetic Intensity and Topography, from Dakar to Barbados". Early flights over marine areas with an airborne magnetometer indicated that correlation might exist between topographical features and the character of the magnetic field. By enclosing this instrument in a non-magnetic, streamlined, waterproof case, and towing it behind a ship, magnetic surveys of oceanic areas have become possible without the use of specially constructed, non-magnetic vessels, and the above authors give an account of such a survey across the Atlantic in 1948, when west of Dakar for 170 miles the magnetic field was found to be smooth with anomalies of less than 25 gammas. Anomalies of 50 to more than 200 gammas, 5–40 nautical miles in width, were encountered from the Cape Verde Islands region to Barbados. The topographical contrast between the deep ocean basins and the Mid-Atlantic Ridge was not reflected in the anomaly curve, while large anomalies observed over the submerged parts of the Cape Verde Islands showed the effect of known volcanic islands. No such anomaly was observed near Barbados, or over the continental margin of Africa.

A paper follows by F. Bernard on the role of calcareous flagellates in deep-sea fertility and sedimentation, as shown by recent work in the Atlantic Ocean and in the Western Mediterranean. Coccolithophorids were found to be the chief subscribers to sedimentation to depths of at least 4,000 m., the total volume of calcareous flagellates generally amounting to more than 50 per cent, and often 95 per cent, of the phytoplankton in the bathypelagic zone.

Dr. Wiseman and N. Hendry, from a unique bottom sample collected by H.M.S. *Challenger* in 1951, write on the significance and diatom content of a deep-sea floor sample from the neighbourhood of the greatest oceanic depth. The sample was from a depth of about 10,505 m. at a position about five miles from the greatest known oceanic depth in the Marianas Trench[2] and was taken by means of a Baillie rod. The position was about 60 nautical miles west of that at which, during her classical voyage of 1872–76, the former H.M.S. *Challenger* took a similar sample in about 8,185 m. The two samples were similar in colour and of proportionately the same amounts of organically produced silica, but differed in the proportions of the organisms present, the earlier material being almost entirely composed of radiolarians with few diatom fragments, while approximately 4 per cent of the recent sample consisted essentially of diatoms with minor amounts of radiolaria. There was clear evidence of erosion, the authors state, in electron microscope photographs of the 1951 sample. In conclusion of this article, the geomorphological relations and some of the problems of deep-sea trenches are discussed.

The concluding article to this interesting number of the new journal is one giving further notes on the greatest oceanic sounding and the topography of the Marianas Trench, by Dr. T. F. Gaskell, J. C. Swallow and Commander G. S. Ritchie. J. B. Tait

[1] See *Nature*, **145**, 306 (1940).
[2] See *Nature*, **169**, 601 (1952).

THE TRAVELLING SCHOLAR IN EUROPE

BRITISH COUNCIL ACTIVITIES

THE report which the British Council has issued*, with a foreword by Sir David Hughes Parry, on a co-operative experiment in academic interchange between the universities of the United Kingdom and those of certain other European countries is a fitting complement, alike to the recent report on the Fulbright Programme (see *Nature*, **173**, 1; 1954) and to the discussions on academic interchange within the British Commonwealth at the Congress of Universities of the British Commonwealth last July. The experiment began as the product of a cultural convention in 1946 between the Governments of the United Kingdom and of Belgium, and the British Council was designated as the principal agent of the British Government in the joint administration of the mixed commissions established to further the aims of this and similar conventions concluded between the United Kingdom and seven other European countries. The British Council entrusted its responsibility for carrying out recommendations regarding university interchange to its Universities Advisory Committee, with Sir James Mountford as chairman; but in 1950 a special standing committee, under the chairmanship of Sir David Hughes Parry, the vice-chancellor of the University of London, was constituted to deal with proposals for foreign university interchange.

As a result of discussions with representatives of universities and education authorities in seven European countries, it became clear that there was a widespread demand throughout Europe for the re-establishment and increase of academic contacts with the United Kingdom, and that two main types of visit were required: the short visit of a few days to a week to enable scholar to meet scholar for the exchange of ideas, to give one or two formal lectures or to participate in colloquia; and the longer teaching visit of up to a term in length. More recently, Belgium has voiced a desire for the interchange for short periods of younger university scientists who have not yet achieved an international reputation. Concentrating first on the short visit by teachers of established reputation, an agreed Foreign University Interchange Scheme with Belgium came into operation in 1948. This was followed by similar arrangements with the Netherlands and Norway in 1949; with France and Austria in 1950; with Western Germany, Italy, Spain, Sweden and Switzerland in 1951; and with Finland and Portugal in 1952; arrangements were also concluded with Yugoslavia for an interchange scheme to commence in the academic session 1953–54. In all, the Scheme provides for a total of fifty-four visits to United Kingdom universities from thirteen countries each session, and for a like number of visits by British university teachers to universities in these countries.

Since the first Scheme came into operation in 1948, 252 such visits have taken place between universities in the United Kingdom and in the other participating countries. While the principles of procedure vary

* University Interchange Between the United Kingdom and Other European Countries, 1948–1953. (A Report on Reciprocal Schemes which are in Operation Between the United Kingdom and Other Countries in Europe, for the Promotion of Interchange Visits by University Teachers, and for the Award of Scholarships.) Pp. 24. (London: The British Council, 1953.)