

Preface

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Phil. Trans. R. Soc. Lond. A 1966 **259**, 135-136

doi: 10.1098/rsta.1966.0002

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PREFACE

Some years ago at the first and preliminary meeting of the Scientific Committee on Oceanic Research (S.C.O.R.) of the International Council of Scientific Unions (I.C.S.U.), one of the prime tasks was to seek some major international sea-going undertaking which the Committee could initiate and subsequently sponsor. This undertaking would have to interest many nations and embrace many oceanographical disciplines.

The meeting took place at the Woods Hole Oceanographic Institution and it was therefore appropriate (although not improbable!) that Dr C. H. O'D. Iselin should be first to suggest that an international research programme in the Indian Ocean fulfilled both these objects. He emphasized that many nations bordered it and that there were interests in this comparatively unknown ocean for any scientist concerned with meteorology, biology (above or below sea level), the physics and chemistry of the ocean waters, or the Earth beneath the sea. He also made clear that the monsoons made the Indian Ocean unique as regards oceanic and atmospheric circulation.

The meeting, after lengthy discussion, endorsed Dr Iselin's proposal and the end results of the tremendous international effort which thereby was created are now coming in. Some of these results were delivered at a Discussion Meeting held in the rooms of the Royal Society on 12 November 1964.

The papers given at this meeting, and which are published below were restricted to geological and geophysical aspects of the northwest Indian Ocean (except for the first paper concerning the physiography of the *whole* of the Indian Ocean). This collection of papers represents, by no means, the last word on these aspects of this area. Indeed there is much more work to be published on experimental work already completed, and for many of us the work already accomplished has produced many new problems which require further experimental work in the area.

The contributors to this Discussion Meeting were from the U.S.A. and the U.K.; regrettably, there were none from the U.S.S.R. The results published by the U.S.S.R. National Academy of Sciences have, however, been extensively used.

Research of the kind discussed below can be divided into various diffuse and interlinked categories; one is concerned with new concepts and with undiscovered features of the floor of the Ocean and what lies below, the second is less spectacular in that it confirms predictions based on work elsewhere and the third is of an essential but routine nature without which the other investigations would be valueless and which provides the basic information for work already completed but not included here, or for work to be undertaken in the future.

The main topics described here are:

- (i) the description of the physiography of the Indian Ocean, based largely on bathymetry;
- (ii) the geological history and present structural and geophysical features of the Gulf of Aden, which, with the Red Sea, seems to be an area of high stresses and movement in the mantle and crust of the Earth;

(iii) the major fracture crossing the northern end of the Carlsberg Ridge represented by the Owen Fracture Zone and the Murray Ridge, and the consequent displacement of the axis of the Ridge;

(iv) the mineralogy and petrology of rocks collected from a small but well surveyed and fractured area of the Carlsberg Ridge lying some hundreds of miles to the southeast of the Owen Fracture Zone;

(v) the sediments of the Seychelles Bank and a description of the late Glacial and post-Glacial platforms on which they are distributed;

(vi) the age, the deep structure and the origin of the Seychelles Bank;

(vii) the preliminary results concerning the structural changes which exist along the length of the Seychelles to Mauritius Ridge;

(viii) the deep structure, obtained by seismic refraction shooting methods, of the section between the Seychelles and the Kenya coast, and its relation to the structures found at each end, and to the structure of the deep ocean between the Seychelles and the Carlsberg Ridge.

(ix) the relation between the gravity and magnetic field anomalies and the many structural features of the northwest Indian Ocean;

(x) the heat flow results in the Red Sea, the Gulf of Aden and over the Carlsberg Ridge and its flanks;

(xi) the recent sediments in the Persian Gulf which represents an exceptional and almost totally enclosed shallow sea.

We are indebted to the Royal Society for the opportunity of holding this Discussion Meeting and I should like to express my gratitude for the cooperation and hard work from the participants, from the men and organizations ashore and at sea, which resulted in the Meeting being a success.

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