GENERAL INTRODUCTION TO THE REPORTS AND LIST OF DEEP-SEA STATIONS

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1. HISTORY, SHIP, EQUIPMENT AND NARRATIVE

It is not necessary here to give a detailed description of the items of the heading of this chapter; in fact, it would be to duplicate what has been published especially in 1956 in the book: The Galathea Deep Sea Expedition 1950-52, described by Members of the Expedition. This book was a translation of the Danish edition which appeared in 1953 (see BRUUN et al. 1953); this latter book contains a full list of all the persons participating in the preparation and the realization of the expedition. But still earlier a series of more popular books (MIELCHE 1952a, 1952b, 1953) were published in Danish, giving some of the essential scientific achievements, but especially being a narrative of the expedition; these three books have later been united into a one volume edition and translated into several other languages (e.g. MIELCHE 1954).

So in view of this only certain points of importance will be mentioned here, and to facilitate further studies in connection with the expedition a list of references is given at the end of the General Introduction (p. 20) and another list of publications which contains, in whole or in part, results from the expedition, also from the many-sided activity outside the main task, biological deep-sea research (p. 18).

Administration. A special committee under the presidency of H.R.H. Prince AXEL, responsible for the whole expedition was formed in 1948 and so as to cover all aspects in connection with the plans, the economy, and the personel (see p. 10). The expedition was formally a Danish Government expedition, but in reality a joint task of the Royal Danish Navy, the Zoological Museum of the University of Copenhagen, and the Danish Expeditions Fund. This last-named fund, by its president vice-admiral A. H. VEDEL, R.D.N., D.Sc.h.c., and its general secretary Mr. LEIF B. HENDIL, in fact provided the very first grant for the start of the expedition, and by taking over all the expenditure of the scientific equipment made it possible to approach the Danish Government and ask its Royal Navy to furnish a ship and crew for two years. For details see SPÄRCK 1953 and 1956.

The Ship and her Complement. The Galathea was a former naval sloop with a displacement of 1600 tons, built at Devonport in England in 1934. In 1949 she was purchased by the Danish Admiralty with a view to her use on the projected deep-sea expedition. The vessel's length was about 80 m, the width 11 m, and the draught about 3.5 m. The main machinery consisted of two geared high-pressure and low-pressure turbines with a combined horse-power of 2000. On the two oil-fired boilers her maximum speed was 12 knots, and our action range at an economic speed was about 6000 nautical miles. Reconditioning and fitting out as an oceanic research vessel took place at the Royal Naval Dockyards in Copenhagen. A rough lay-out is

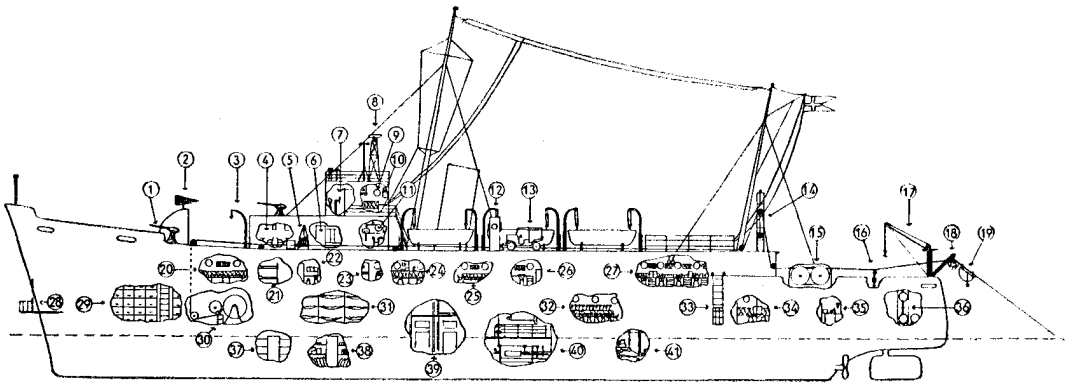

Fig. 2. Lay-out of the Galathea: **1** Salute gun. **2** Fixed insect-catching net. **3** Starbord davit for hauling up bottom samples from shallow water. **4** Reception mess. **5** Hydrography winch on port side. **6** Commander's cabin. **7** Wheel-house. **8** Radar. **9** Chart-house. **10** Echo-sounder. **11** Radio station. **12** Photographic tank for taking under-water films. **13** Jeep. **14** Accumulator for regulating tension of wire between winch and drum. **15** The big trawling winch. **16** Dynamometer for gauging tension of wire. **17** Crane for putting out heavy gear. **18** The big trawl gallows. **19** Angle gauge fixed to wire. **20** Orlop deck. **21** Sick cabin. **22** Consulting cabin. **23** Canteen. **24** Petty Officers' cabin. **25** Petty Officers' mess. **26** Leader's cabin. **27** Laboratory. **28** Removable harpooning platform. **29** Hold for scientific collections. **30** Drum for the large wire, course of the latter over the deck being as shown. **31** Sleeping deck. **32** Officers' and scientists' mess. **33** Removable angling chair. **34** Officers' cabins. **35** Dark-room. **36** Gear hold containing spheres for magnetic surveys. **37** Cold stores. **38** Pantry. **39** Stokehold. **40** Engine-room. **41** Deep-freezing store.

given in fig. 2. The result was a very good sea-boat, steady even in quite rough weather, and with negligible vibrations interferring with microscopic work. For details see GREVE 1953 and 1956. The full complement was a little over a hundred. Complete lists of names are given by BRUUN et al. 1953, pp. 297 to 300. On pp. 10-11 are given lists of all the personel who took a direct part in the special activity of the ship, the responsible navigators, scientists and technicians. A special feature of the ship was the ever changing complement except for about half of it serving the whole expedition. This was a happy combination of keeping a continuity of experience with refreshing additions of specialists for longer or shorter periods of time. Seven foreign scientists were invited to cover special fields and 29 others were invited onboard from the countries along the route. The success of this feature has been described by WOLFF (1953, 1956).

Objects of the Expedition. – These have been

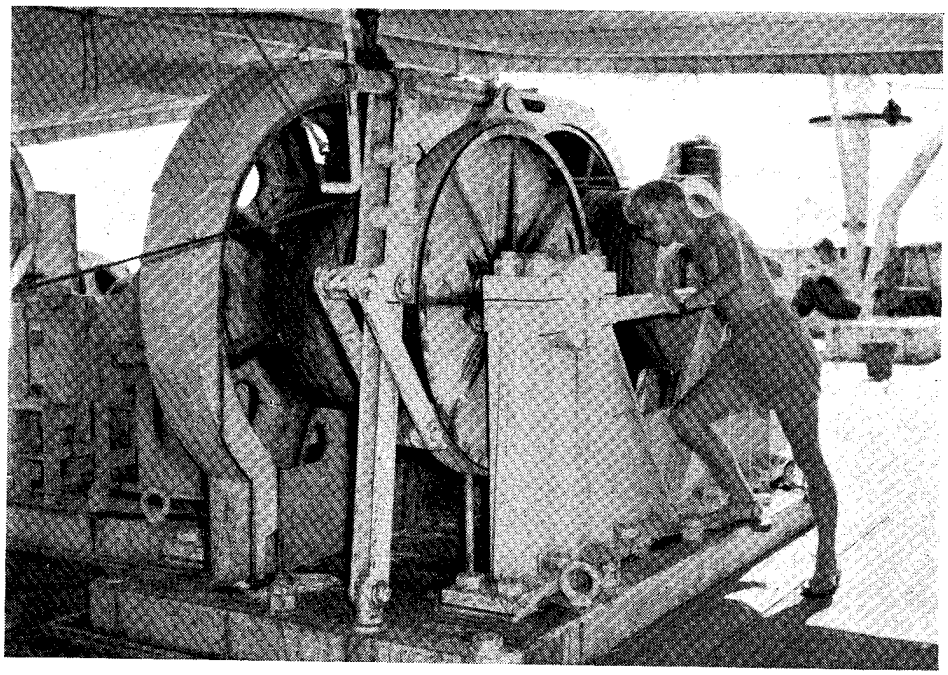

Fig. 3. Part of the electrical winch on the aft deck.

summarized by BRUUN (1953, 1956), and it is hoped that the titles of the publications listed in this paper and the scientific reports of which this is the introduction will sufficiently show that an essential part of the programme was carried out as planned.

The Technique of Deep-Sea Trawling. The Expedition had a very great advantage in being able to utilize the new technique used so successfully by the Swedish Deep-Sea Expedition 1947-1948 (NYBELIN 1951), even to the extent that the Galathea acquired three winches from this expedition (fig. 3), and still more important, could profit from the personal experience of Prof. O. NYBELIN and Prof. B. KULLENBERG both before the Galathea started and when they accepted the invitation to come onboard for some time. KULLENBERG (1953, 1956) has described the special features of the technique as adapted to the conditions on the Galathea. A full description of the winches has been given by KULLENBERG and MICHAELSON (1954) and JERLOV, KOCZY, KULLENBERG and MICHAELSON (1957), while KULLENBERG (1951) contains the method of calculating the correct length of the cable for towing trawls or dredges along the deep-sea bottom.

Acknowledgments. An innumerable number of persons, in Denmark and all over the world, gave, in some way or other, support and advice or took an active part in the tasks of the expedition, from the time when Captain Greve many years ago listened to the author's first vague outlines of a deep-sea expedition till the return of the Galathea.

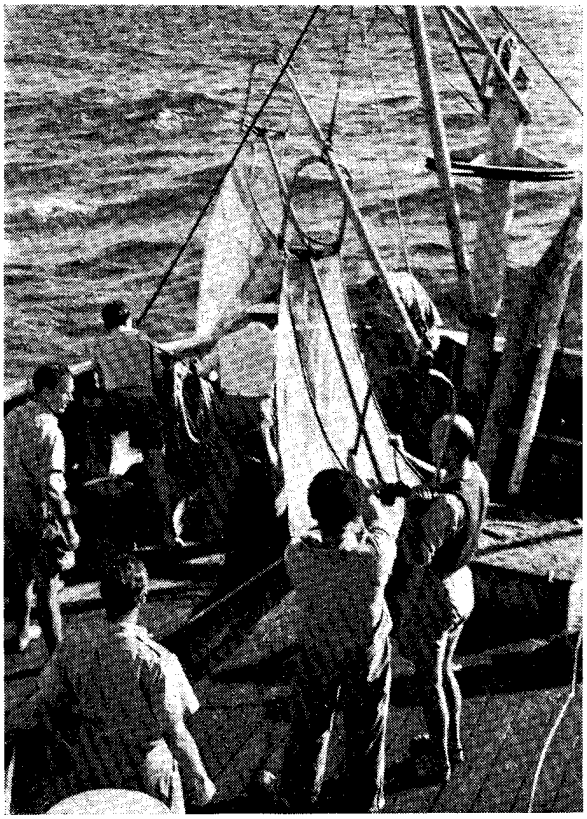

Fig. 4. The 6 m sledge trawl being put out.

Without this grand collaboration the expedition would never have become a reality, so the author would like to end this chapter by expressing his deep gratitude to every single person adding to the fulfilment of his youthful dreams.

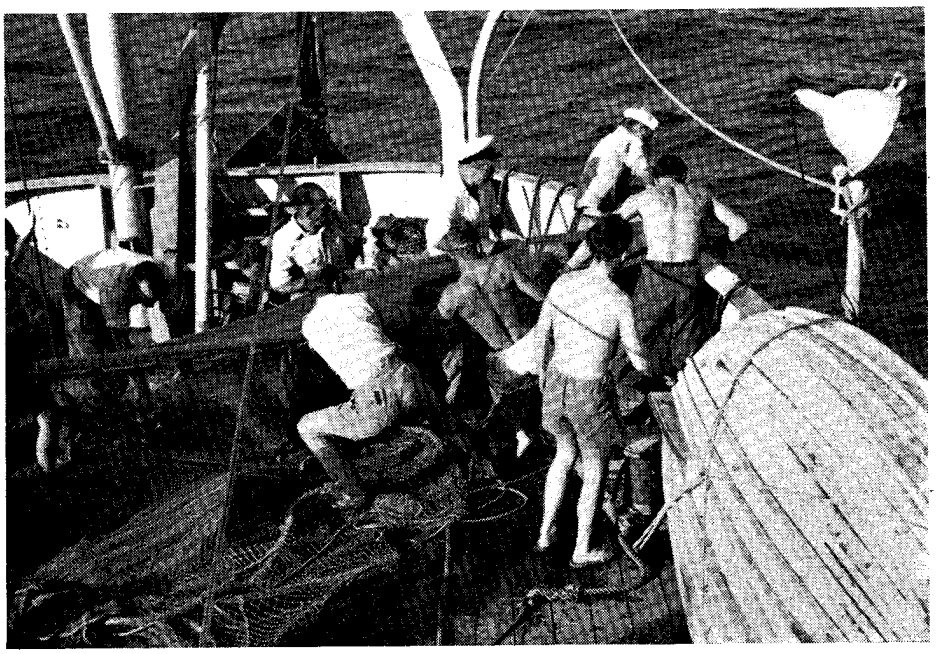

Fig. 5. The shrimp trawl being hauled on bord. Part of one otter board is seen in the gallows.

2. THE COMMITTEE OF THE EXPEDITION

The Executive Committee:

H.R.H. Prince Axel, President
Professor August Krogh, Vice-President, died 1949
Professor R. Spärck, Vice-President from 1949
Professor Niels Bohr
Dr. A.F.Bruun, Scientific Leader of the Expedition
Captain S. Greve, R.D.N., Commander of the Galathea
Mr. C.C.F. Langseth, Ministry of Defence
Mr. E. Lindgren, Ministry of Defence
Mr. Hakon Mielche, Public Relation Officer of the Expedition
Vice-Admiral A. H. Vedel, R.D.N., D.Sc.h.c.

Mr. Verner Christiansen, Secretary of the Committee.

Consultative Members:

Dr. N. Arley, Physics
Dr. K. Birket-Smith, Ethnology
Dr. H. Blegvad, Director Danish Biological Station, died 1951
Mr. C. A. C. Brun, Ministry of Foreign Affairs
Dr. M. Degerbøl, Zoology
Mr. P. Jensen, Hydrographic Office
Professor Martin Knudsen, Hydrography, died 1949
Dr. P. L. Kramp, Zoology
Dr. Th. Mortensen, Zoology, died 1952
Mr. K. Paludan-Müller, Ministry of Education
Mr. H. Petersen, Director Meteorological Institute
Professor E. Steemann Nielsen, Phytoplankton
Mr. H. Thomsen, Hydrography

3. PARTICIPANTS IN THE EXPEDITION

Danish Scientists:

Name	Field	Service
Andreasen, P., Engineer	Magnetism	6.10.50 – 17.7.52
Arley, N., D.Sc.	Magnetism	6.9.50 – 8.10.50
		25.10.50 – 20.12.50
Benzon, B., D.Sc.	Zoology	27.12.51 – 11.1.52
Birket-Smith, K., D.Sc.	Etnology	17.6.51 – 31.10.51
Bruun, A.F., D.Sc.	Zoology	1.9.50 – 17.7.52
Degerbøl, M., D.Sc.	Zoology	27.12.51 – 29.1.52
Egedal, J., Ph.D.	Magnetism	6.9.50 – 16.9.50
		13.10.50 – 16.12.50
Espersen, J., Ph.D.	Magnetism	4.2.52 – 17.7.52
Hansen, B., Ph.D.	Zoology	1.9.50 – 17.7.52
Jensen, E. Aabye, M.Sc.E.	Chemistry	1.2.52 – 17.7.52
Kiilerich, A., Ph.D.	Hydrography	2.6.51 – 29.9.51
Kirkegaard, J., Ph.D.	Zoology	15.12.50 – 22.3.51
Kramp, P.L., D.Sc.	Zoology	19.3.51 – 29.9.51
Lemche, H., D.Sc.	Zoology	1.12.51 – 17.7.52
Madsen, F. Jensenius, Ph.D.	Zoology	22.6.51 – 17.7.52
Nielsen, E. Steemann, D.Sc.	Phytoplankton	25.10.50 – 19.1.51
Olsen, J., Ph.D.	Magnetism	6.9.50 – 16.9.50
		13.10.50 – 16.3.51
Pfaff, J. R., Ph.D.	Zoology	15.12.50 – 26.5.51
Spärck, R., D.Sc.	Zoology	6.10.50 – 8.10.50
		15.12.50 – 6.1.51
		19.3.51 – 22.3.51
Vilstrup, T., M.D., D.Sc.	Zoology	2.2.52 – 16.4.52
Volsøe, H., D.Sc.	Zoology	19.3.51 – 26.5.51
Wolff, T., Ph.D.	Zoology	1.9.50 – 17.7.52

Foreign Scientists

Name	Field	Service
Bolin, R.L., D.Sc., USA	Zoology	8.1.52 – 11.4.52
Gislén, T., D.Sc., Sweden	Zoology	22.6.51 – 10.11.51
Kullenberg, B., D.Sc., Sweden	Oceanography	6.9.50 – 16.9.50
		6.10.50 – 8.10.50
		15.12.50 – 12.2.51
Morita, R.Y., M.Sc., USA	Microbiology	9.2.52 – 12.4.52
Nybelin, O., D.Sc., Sweden	Zoology	6.9.50 – 16.9.50
Pickford, Grace, D.Sc., USA	Zoology	16.4.51 – 9.7.51
ZoBell, C.E., D.Sc., USA	Microbiology	9.7.51 – 2.10.51

Public Relation Service

Benzon, J.	Journalist	13.10.50 – 5.6.51
Høyer, M.	Photographer	22.6.51 – 17.7.52
Mielche, H.	Head P.R.S.	1.9.50 – 20.3.51
		17.6.51 – 1.11.51
		2.1.52 – 17.7.52
Nielsen, J.	Photographer	13.10.50 – 19.1.51
Rasmussen, P.	Photographer	1.9.50 – 17.7.52

Officers of the Royal Danish Navy

Barfoed, S.H.L., Commander	Executive officer	15.1.51 – 17.7.52
Christensen, J., Ltnt.-comdr.	Officer of the watch	4.9.50 – 17.7.52
Crilsen, C., Ltnt.-comdr.	Engineer	11.2.51 – 17.7.52
Feddersen, T.G., Commander	Medical officer	1.9.50 – 29.9.51
Ferdinand, L., Ltnt.	Medical officer	15.9.51 – 17.7.52
Flemming, V.C.A., Count of Rosenborg, Ltnt.-comdr.	Officer of the watch	1.9.50 – 12.6.51
Greve, S.B.V.J., Commodore	Commanding officer	13.2.51 – 17.7.52
Hansen, N.E., Ltnt.	Engineer	1.9.50 – 17.7.52
Koch Jensen, G.A., Commander	Chief-engineer	1.9.50 – 21.11.51
Lessél, O., Captain	Chief-engineer	15.12.50 – 29.6.51
Madsen, C.H.A., Captain	Commanding officer	1.9.50 – 13.2.51
Seehusen, K.H., Captain	Executive officer	1.9.50 – 15.1.51
Thegler-Jensen, A.C., Ltnt.-comdr.	Engineer	1.9.50 – 28.6.51
	Chief-engineer	29.6.51 – 17.7.52
Thorsen, A.W., Ltnt.-comdr.	Officer of the watch	12.6.51 – 17.7.52
Thygesen, N.J., Petty officer	Radio, echo-sounder	1.9.50 – 17.7.52
Westergaard, I., Commander.	Navigating officer	1.9.50 – 17.7.52

University Students on National Service in RDN

Crossland, I., B.Sc.	Chemistry	1.9.50 – 17.7.52
Degerbøl, J., LL.B.	Secretary of the Scientific Leader	1.9.50 – 5.6.51
Horsted, Sv.Aa., B.Sc.	Zoology	1.9.50 – 26.5.51
Jacobsen, P. Holmelund, B.Sc.	Zoology	22.6.51 – 17.7.52

Name	Field	Service
Jensen, E. Aabye, M.Sc.E.	Chemistry	1.9.51 – 31.1.52
Jensen, K.E., Ph.D.	Zoology	22.6.51 – 17.7.52
Kläning, U., B.Sc.	Chemistry	1.9.50 – 17.7.52
Knudsen, H., B.Sc.	Zoology	22.6.51 – 17.7.52
Marckmann, K.V., Ph.D.	Zoology	1.9.50 – 26.5.51
Nielsen, J., B.Sc.	Zoology	1.9.50 – 26.5.51

Visiting Scientists

Batham, Elisabeth, Ph.D., New Zealand	Zoology	12.1.52 – 22.1.52
Bennett, Isobel, Australia	Zoology	1.12.51 – 15.12.51
Brodie, F.W., New Zealand	Oceanography	11.1.52 – 22.1.52
Cassie, R.M., M.Sc., New Zealand	Zoology	24.1.52 – 27.1.52
Chavernphol, Swarng, Thailand	Zoology	18.6.51 – 9.7.51
Davies, D., South Africa	Zoology	19.1.51 – 9.2.51
Dell, R.K., M.Sc., New Zealand	Zoology	24.1.52 – 26.2.52
Downie, R., Captain, Australia	Trawling	1.12.51 – 15.12.51
Falla, R., Ph.D., New Zealand	Zoology	27.12.51 – 11.1.52
Fleming, C.A., D.Sc., New Zealand	Marine Geology	11.1.52 – 22.1.52
Hardenberg, J.D.T., D.Sc., Indonesia	Zoology	1.9.51 – 16.9.51
Harry, R.R., Ph.D., USA	Zoology	10.4.52 – 12.4.52
Medina, R., Philippines	Zoology	10.7.51 – 25.7.51
Megia, T., Philippines	Hydrography	10.7.51 – 11.8.51
Moreland, J., M.Sc., New Zealand	Zoology	27.12.51 – 8.1.52
Powell, A.W.B., New Zealand	Zoology	23.1.52 – 26.1.52 12.2.52 – 26.2.52
Prasad, R., Ph.D., India	Zoology	19.4.51 – 12.5.51
Ramage, F., England	Echo-sounding	20.10.50 – 24.10.50
Rayner, G., Australia	Zoology	10.11.51 – 14.11.51
Ronquillo, I., Philippines	Zoology	25.7.51 – 11.8.51
Sidwell, P.M., England	Echo-sounding	20.10.50 – 24.10.50
Sparling, S.C., England	Echo-sounding	20.10.50 – 24.10.50
Turbott, G., Ph.D., New Zealand	Zoology	12.2.52 – 26.2.52
Veen, Ch., Indonesia	Hydrography	1.9.51 – 16.9.51
Whitley, G.P., Australia	Zoology	8.11.51 – 15.12.51
Willimowsky, N.J., Ph.D., USA	Zoology	10.4.52 – 12.4.52
Wood, F., Ph.D., Australia	Microbiology	1.12.51 – 7.12.51
Yapchiongcho, J.N., Philippines	Zoology	27.7.51 – 11.8.51

4. THE ECOLOGICAL ZONATION OF THE DEEP-SEA BOTTOM FAUNA

The activity of the Galathea Expedition was focussed at the bottom fauna of the deeper and deepest parts of the ocean; but a considerable effort was also made in shallower depths. This effort served several purposes; the first one was simply to obtain experience and prove the efficiency of the various gear under less difficult conditions, because in general, the greater the depths the greater become the difficulties of the operations.

Other important aspects were however also kept in mind. For the treatment of the abyssal and hadal faunas it might be very useful to get an idea of the composition of the shallower faunas both in respect to quantity and quality. This should also furnish some background for a study of the vertical distribution of many animals; unfortunately, a great number of deep sea animals are so poorly known and described that the taxonomic situation very often is quite obscured. Therefore, it is to be hoped that the numerous specimens from the Galathea Expedition may clear up many such problems which are more easily solved when for the study of a particular group, a relative abundance of material is available, from many parts of the ocean and at the same time from many different depths.

It goes without saying that spending two years with this kind of work, and with a background of several more years of collecting animals also in coastal regions and the pelagic zones of the deep sea from the arctic to the subantarctic latitudes, gives a certain general picture of the ecological situation of the deep sea.

The Galathea Reports will mainly comprise the animals from the bottom at depths exceeding 400 m.

For the sake of uniformity of ecological terminology in these reports the many collaborators should consult the same standard work in this field: Treatise on Marine Ecology and Paleoecology, vol. 1, Ecology, edited by JOEL W. HEDGPETH, being Memoir 67 of the Geological Society of America, 1957.

When, sometime, the collections from the Galathea Expedition have been worked up, and at the same time many more results have been published from other expeditions, a revision of the general picture of today will most certainly be needed. But for the time being the following considerations are presented in line with the Treatise on Marine Ecology and similar suggestions given elsewhere (e.g. BRUUN 1956).

The 400 m curve was chosen because this depth is well below the photic zone, and, from the geological point of view, outside the continental shelf or some way down the continental slope: the *deep sea,* this very vague term, is about but certainly not the abyss. In some geographical areas this modest depth of 400 m is even not below the thermocline, meaning that temperatures may run above 10°C. In consideration of the importance of the situation of the thermocline so clearly seen in the distribution of the pelagic communities of the open ocean, it seems essential always to study the distribution of benthic faunas in their relation both to temperature and depth.

HEDGPETH (1957, p. 23) is perfectly right in his statement: For some reason ecologists have not as yet paid as much attention to the temperature as a factor in the major divisions of the oceans, although it is of primary concern to biogeography.

But this involves some difficulty as to the terminology if we want to use the parallel terms of the benthic and pelagic communities of greater depths. If, e.g., the term *bathyal* is used in consistency with the term *bathypelagic,* it is implied that the environment is aphotic and below the thermocline in a temperature range between about 4° to 10°C. For the pelagic environment above the thermocline, but in the aphotic zone, the very useful term *mesopelagic* has been adopted (HEDGPETH 1957, p. 18, fig. 1); no corresponding term for the benthic environment seems available. It should in fact cover the lower part of the Outer Sublittoral of HEDGPETH and at the same time express that the temperatures are similar to those of the mesopelagic zone, i.e. above 10°C. To avoid adding to the confusing state of terminology of the shelf environment the coining of such a term should be delayed until many more studies have been made of the importance of the combination of temperature and depth in the distribution of animals in the deeper part of the Outer Sublittoral, especially in relation to the thermocline where this feature is present and most pronounced.

Below the thermocline, or at temperatures below about 10°C. in the regions outside the range of the thermosphere, the bathypelagic zone has its corre-

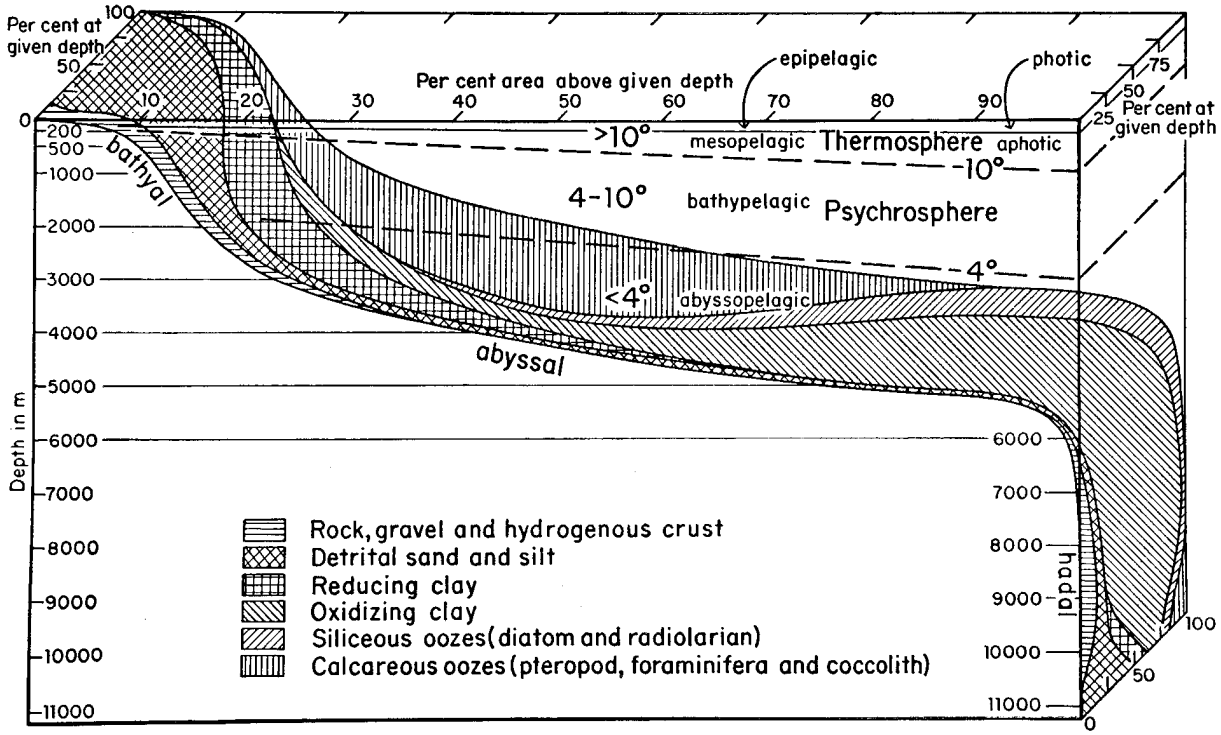

Fig. 6. Ecological zonation of the deep-sea.

sponding benthic zone, the *bathyal* which extends downwards and polewards until the temperature goes around 4°C.

Correspondingly the abyssopelagic zone of the open ocean has its benthic counterpart in the *abyssal* zone with temperatures below about 4°C, mostly 1° to 2°C.

Finally, the deepest parts of the oceans, the trenches with depths exceeding 6000 m, contain a special benthic assemblage of species forming the *hadal* fauna.

Ever since REGNARD (1891) and later e.g. FONTAINE (1930) and EBBECKE (1935) the hydrostatic pressure has been suggested as an important ecological factor in the deep sea. These experimental physiologists, using shallow-water animals, found a wide range of tolerance towards a high pressure in the various animal groups and even of the different stages of life or different isolated organs of the same species. This was in good agreement with the empirical finding of eurybathic and stenobathic animals. But the final proof came from the catch of species living only in the trenches, and, most important, from the studies of barophilic bacteria from the Philippine Trench (ZOBELL 1952, ZOBELL and MORITA 1959). In view of this it is not so surprising that a species like the holothurian *Elpidia glacialis* quite recently could be considered a characteristic arctic deep-sea species (EKMAN 1953, p. 298) when it should rather be regarded as being typically a cosmopolitan abyssal species of a relatively high quality of eurybathy combined with some eurythermy (HANSEN 1956).

It is only when the geographical distribution of the single species is reasonably well known and has been studied in relation to depth, temperature, oxygen, sediments, food supply and other important ecological factors that a fuller understanding may be reached. In this connection a comparative study of the faunas of bassins isolated from the open ocean by sills at various levels are of particular interest, especially by the North Polar Sea, the Mediterranean Sea, the Red Sea, and the Sulu Sea. Equally important is a comparison of the hadal fauna in its geographical diversity so similar to the terrestrial alpine faunas and floras.

It has long been known that species living in the bathyal and abyssal zone may lead a larval life in quite a different zone. An extreme case are species of the deep-sea eel *Synaphobranchus*, whose larvae live in the epipelagic zone of the tropics and subtropics, while adolescent and adult specimens are even abyssal (BRUUN 1937). In such a case suitable breeding places more than anything else determine the distribution of the species; but also the adolescent and adult stage are naturally limited by their own ecological requirements as when the North Atlantic species *S. kaupi* lives just outside the Strait

of Gibraltar, but does not occur in the corresponding depths in the Mediterranean where much higher temperatures prevail.

In view of this example it would be of great interest to study the sexual state of the animals whenever possible. Many cases of eurybathy may naturally be ascribed to the spotwise sounding method used until recent years; this is very clearly borne out by the continuously recording echo-sounding methods used nowadays with any deep-sea trawling or dredging. But the turbidity currents and mudslides may also play some role in carrying animals from the continental slopes into greater depths, as the case may be from the bathyal into the abyssal zone; such animals might very well live and grow in the new environment but remain sterile, and thus give a false impression of the normal distribution of the species.

5. REMNANTS OF PLANTS FOUND IN THE DEEP-SEA

Already at an early stage of deep-sea research remnants of plants from land or the coastal belt have been observed (AGASSIZ 1888, p. 291). The importance of such organic matter in relation to the food supply in the aphotic zone has been discussed elsewhere (BRUUN 1957, pp. 655-661).

During the Galathea expedition any plant débris was preserved for possible later identification. Therefore, it has also been possible to give a rough picture of its quantity and distribution along the route which may be useful for considerations regarding the distribution of various animal groups. Fig. 7 gives a general picture while table 1 contains a certain amount of details. Due to the variety of gear used no true comparative study of the quantities could be made, but figures have been given indicating the amount by volume and weight after drying in the air. Besides, a certain characterization of the kind of material has been attempted.

It is perhaps especially remarkable that some material was recovered from the depths exceeding 7000 m in the trenches, even right down to the bottom of the Philippine Trench. The greatest amount was naturally found in regions not very far from the mouths of big rivers with mangroves or Pandanus swamps. As examples may be mentioned the South East Asian Seas and the Panamanian region.

Apart from the biological significance of the plants as a source of food when turned into bacteria, which may serve as a first link in a secondary food chain, these observations may be of some relevance for the interpretation of cores of deep-sea sediments. A mudslide or turbidity current might easily bury the plant remnants, making them fossils rather surprising in the deep-sea.

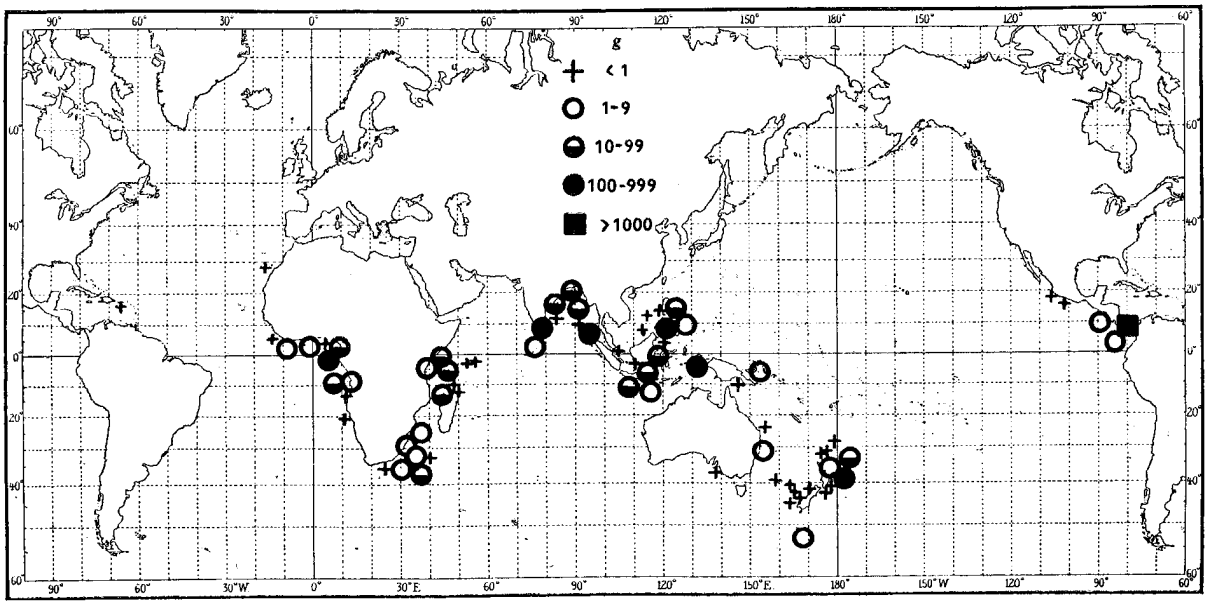

Fig. 7. Remnants of plant material collected along the route of the expedition. Ciphers in g.

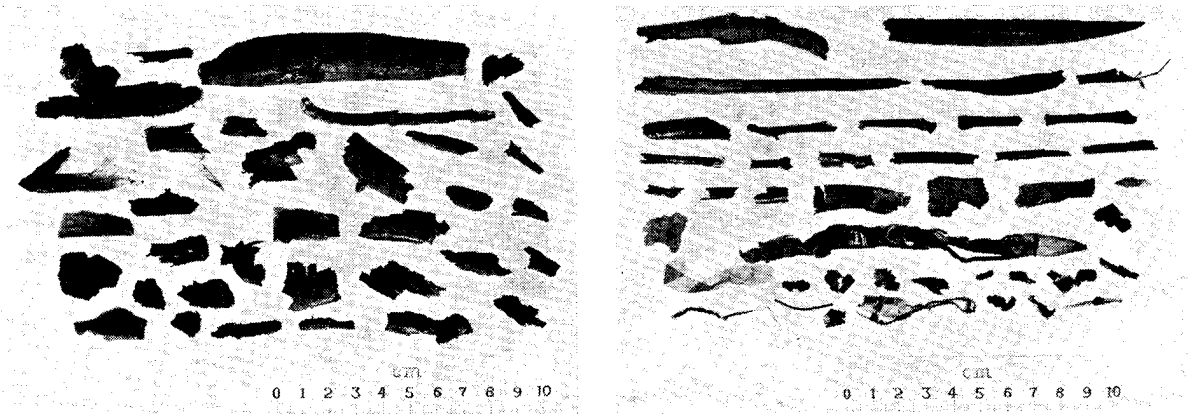

Fig. 8. Remnants of plants from the Philippine Trench; left: St. 419 (10.150-10.210 m); right: St. 418 (10.190-10.150 m).

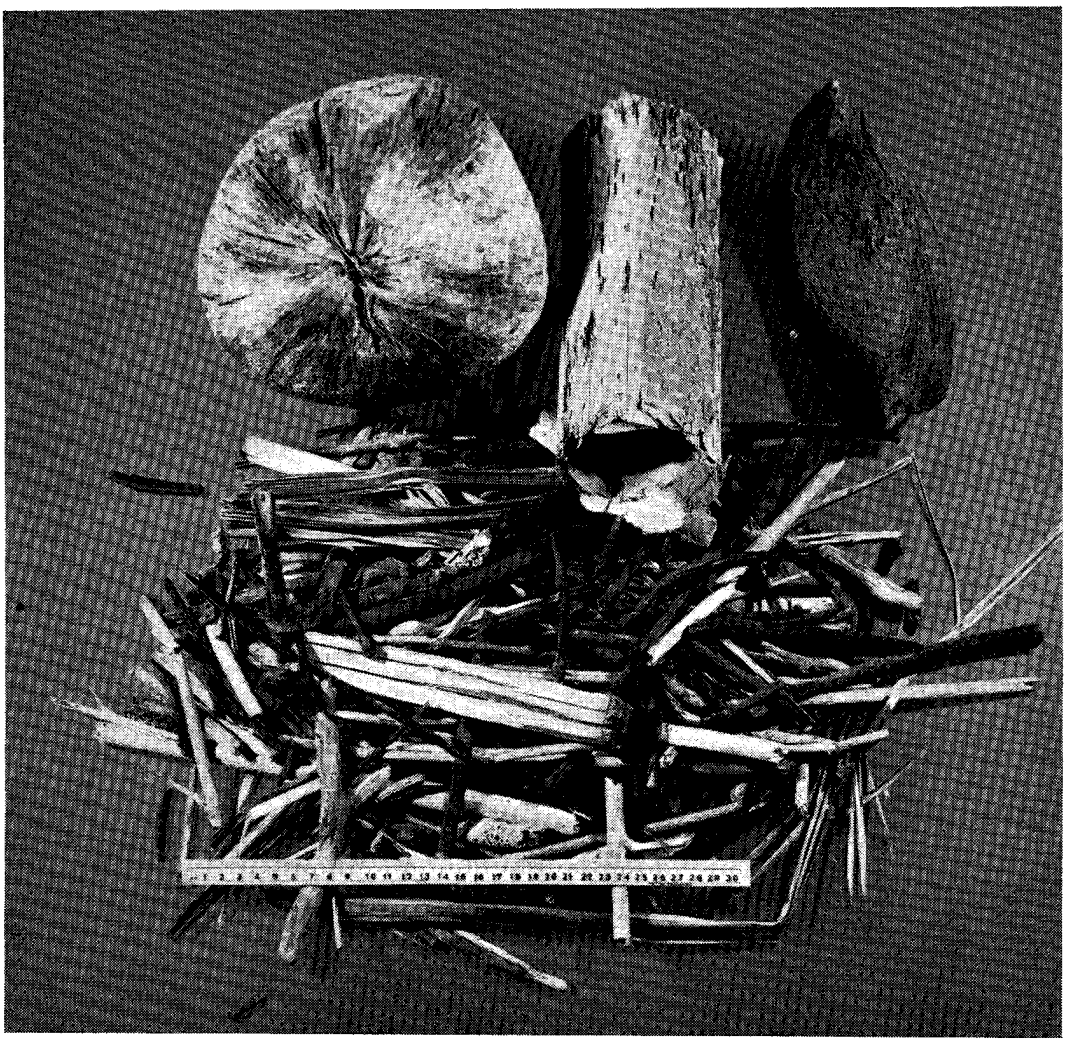

Fig. 9. Remnants of plants from the Celebes Sea, St. 450 (4940-4970 m).

Table 1. Remnants of Plants

St. No.	Depth in meters	Gear (cf. p. 22)	Total		Branches and twigs		Coconut husk		Fruit of Pandanus		Large-sized seeds and shells		Bark		Leaves		Pieces of wood and chips		Various	
			ccm	g	ccm	g	ccm	g	ccm	g	ccm	g	ccm	g	ccm	g	ccm	g		
24	3200	ST 300	2	2	1	1							1	1						
32	2100	SOT	1	1									1	1						
52	2550	SOT	320	275	250	150	55	90							15	35				
63	1520	SOT	35	50	35	50														
99	2690	SOT	22	26	20	25							2	1						
101	990	ST 300	4	3	2	1					1	1	1	1						
180	5220	ST 300	5	10	5	10														
192	3530	SOT	25	35									25	35						
194	4360	SOT	10	5	10	5														
196	430	ST 300	7	5	5	2							1	1			1	2		
202	575	HOT	25	8	25	8														
217	3390	HOT	35	32	10	5							5	2			20	25		
232	4930	HOT	28	12	25	10													3	2
234	4820	HOT	33	14	30	10							1	2					2	2
235	4810	HOT	47	29	30	12					10	12					7	5		
238	3960	HOT	30	15	20	10											10	5		
241	1510	HOT	5	4	3	2											1	1	1	1
279	4320	ST 300	4	2	2	1							2	1						
280	4350	SOT	2	1							2	1								
281	3310	ST 300	5	3	5	3														
282	4040	HOT	690	435	650	400					15	15					25	20		
299	2820	HOT	110	80			100	75									10	5		
302	1190	ST 300	41	21	20	5					10	10	10	5	1	1				
314	2600	HOT	140	80	15	10					25	20					100	50		
324	1140	ST 300	225	125			75	25	75	75							75	25		
418	10150	ST 300	25	20	5	5					15	10	4	4			1	1		
419	10150	ST 300	75	40							40	30	35	10						
429	10020	ST 300	2	12	1	1									1	1				
436	710	ST 300	18	12	2	1									1	1	15	10		
443	1500	ST 300	1105	602	200	100			100	100							800	400	5	2
444	5050	HOT	3300	2100	1000	400	1500	1200									800	500		
450	4890	PGI 0,2	300	125	200	75											100	50		
450	4940	HOT	1105	430	50	50	100	50	750	250							200	75	5	5
452	2000	PGI 0,2	26	16									1	1			25	15		
466	7160	HOT	240	82	200	50					15	10					20	20	5	2
471	2780	PGI 0,2	1	1															1	1
473	2650	PGI 0,2	1	1													1	1		
474	3810	ST 300	107	53	50	25					1	1	5	2			50	25	1	1
477	780	PGI 0,2	3	2	3	2														
489	1160	ST 300	111	61	50	30	50	25			10	5	1	1						
490	545	ST 300	5300	2100	1500	750	500	150	1000	650			800	100			1500	450		
491	1560	ST 300	761	381	50	25			100	100			10	5	1	1	600	250		
494	7280	ST 300	62	37	50	30					10	5			2	2				
497	6490	HOT	312	194	25	40	200	100			25	20	10	8	2	1	50	25		
517	8940	ST 300	121	55	5	2	100	40			10	10	5	2	1	1				
521	8780	ST 200	3	2	2	1									1	1				
550	4530	ST 200	20	7	15	5													5	2
649	8210	ST 600	32	21							2	1					20	10	10	10
661	5340	ST 600	75	135	20	15					40	100					15	20		
668	2640	HOT																		
716	3570	HOT	36	11	35	10							1	1						
724	2950	ST 600	10	6	5	3							5	3						
739	915	HOT	10100	3950	1000	500	100	50					1000	400			8000	3000		
741	440	ST 300	300	225	50	35							50	40	10	5	200	150		
758	2840	ST 600	23	13	20	10											2	1	1	2

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8. LIST OF DEEP-SEA STATIONS

This list comprises all the stations which were operated in water of 400 metres of depth or deeper. Excluded are here also the numerous stations at which observations on the productivity of phytoplankton were made; they are published by E. STEEMANN NIELSEN & E. AABYE JENSEN (1957).

Depth was recorded from echo-soundings, for details about method and corrections see KIILERICH (1959).

Hour is the local time of the ship which was corrected every day at noon; slight deviations from the time of the longitude may, therefore, occur. The hour given indicates the time at which the gear was calculated to have reached the bottom or the intended water layer. In the case of hydrography, however, only the time of starting the operations is indicated.

Gear. The abbreviation used are explained in the special list below.

Bottom. This is a very rough estimate of the character of the bottom deposits as judged from whatever material was brought up by the gear, and should not be taken as a detailed analysis of the sediments. Whenever possible, samples were preserved for a later examination by geologists; these samples have been deposited in the Geological Institute of the University of Copenhagen.

Estimated Fishing Depth, E.F.D., was calculated according to the formulae developed by KULLENBERG (1951). No closing net was used, so E.F.D. indicates the depths at which the gear was towed and does not exclude a certain number of animals caught between the E.F.D. and the surface.

Wire out indicates the length of wire used for the particular gear; in the case of hydrographical observations two figures mean measurements carried out between the two levels.

Inclination of wire is the angle between the vertical and the wire; the first figure gives the value which according to KULLENBERG (1951) should ensure contact between the gear and the bottom, while the two following figures are the extreme values of the actual readings carried out every fifth minute during the operation.

Speed in knots. This is not the speed of the ship, but the speed of the gear in relation to the bottom as calculated from KULLENBERG'S formulae.

Duration of haul was estimated from the readings of the inclination of the wire and should indicate the length of time in which the gear had contact with the bottom.

Length of haul in sea-miles was calculated from the estimates of the speed of the gear and the duration of the haul.

Remarks give partly a variety of irregularities about the operations and partly, in the case of the bottom-grabs, the volume brought up (litres), and in the case of the core-samples the length of the core (centimetres).

A number of meteorological observations was as usual entered in the ship's log, but these data, as also the direction of the haul, have been omitted here because they were considered of no general importance in the treatment of the collections of the animals.

In fig. 11 is given the route of the expedition with a selection of dates of the visits to a number of ports. The frames in this chart refer to the detailed charts on pp. 23-29 (pls. 1-4) in which the stations have been plotted.

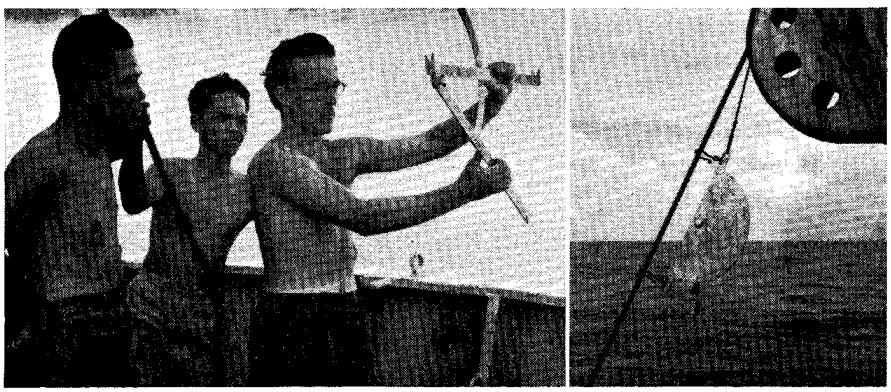


Fig. 10. Left: Gauging the angle while paying out.
Right: Angle gauge in position while trawling.

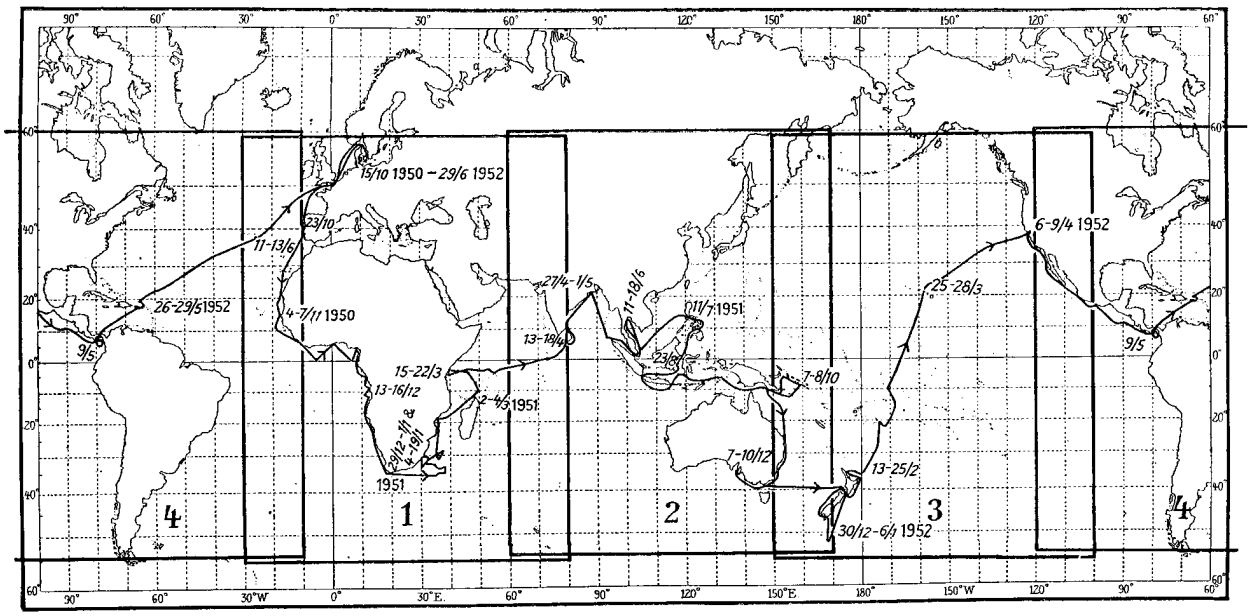
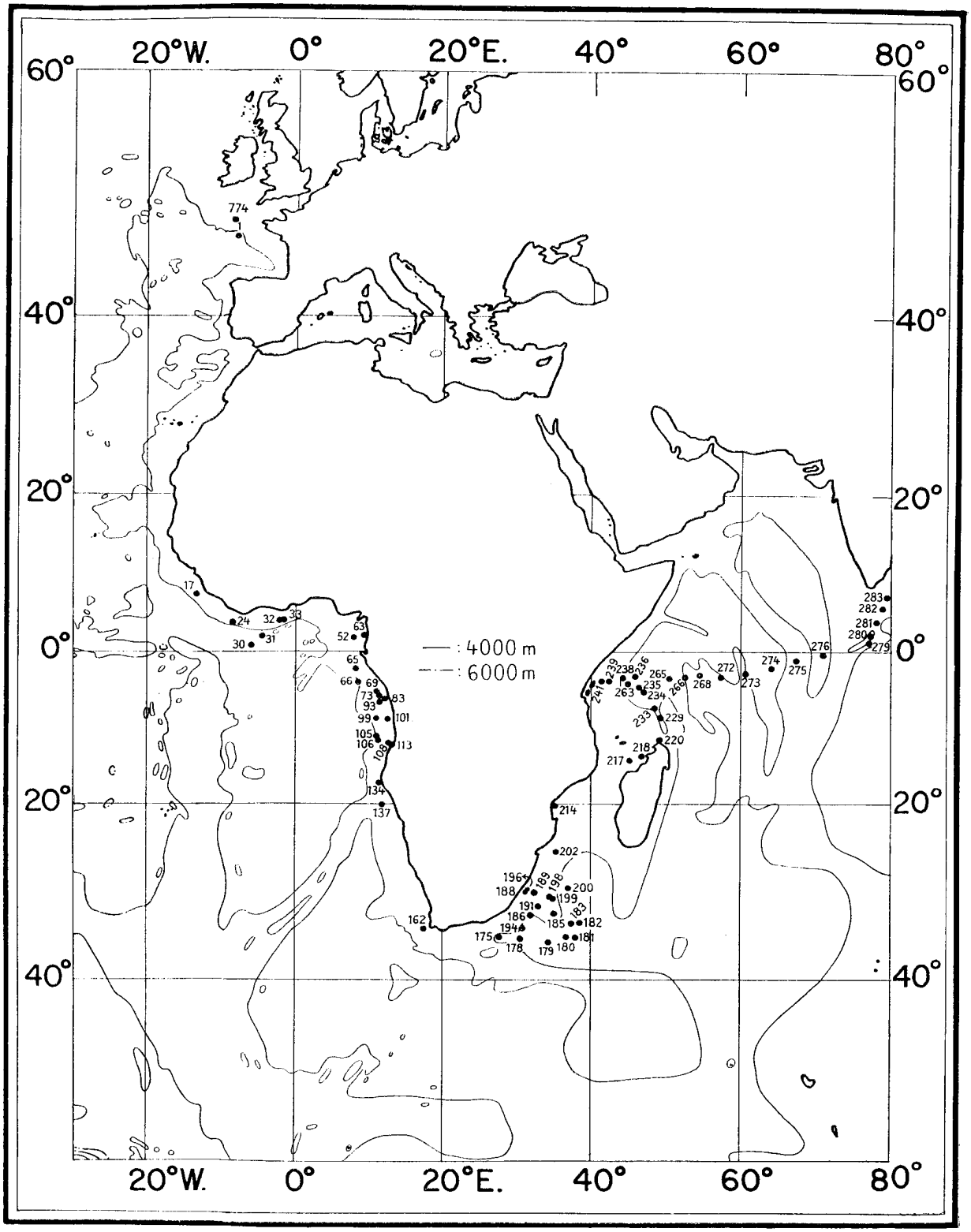


Fig. 11. The route of the expedition with a selection of dates of the visits to a number of ports. The frames refer to the detailed charts on pp. 23-29 (pls. 1-4).

List of Abbreviations

B T	Bathy-Thermograph, supplied by the Woods Hole Oceanographic Institution
D 45	Triangular Dredge, each side 45 cm
D 80	Rectangular Dredge, 80 × 30 cm
D O	Oyster Dredge
D R	Depth Recorder, supplied by the Woods Hole Oceanographic Institution
E. F. D.	Estimated Fishing Depth
H O T	Herring Otter Trawl of the type used by Danish fishermen. Length of the head-rope 32 m. Size of the meshes from 80 mm at the head to 14 mm in the cod-end. A bag made of canvas was attached to the inside of the cod-end to retain some of the fine bottom sediments and small animals
H Y D R	Hydrography
K C S	Kullenberg Core Sampler, one meter long
L L H	Long Lines with Halibut hooks
L L S	Long Lines with Shark hooks
P C S	Pfleger Core Sampler
P G 0.2	Petersen-Grab (Bottom Sampler) 0.2 sq.m
P G 1 0.2	Petersen-Grab (Bottom Sampler) 0.2 sq.m, with two extra iron weights, each of 25 kg
S 100 C	Stramin Net, circular opening, diameter 100 cm. Stramin is a coarse canvas made of hemp, 400 strands to the meter
S 200 C	Stramin Net, circular opening, diameter 200 cm. Stramin as in S 100 C
S B T	Shrimp Beam Trawl, beam about 6 m.
S O T	Shrimp Otter Trawl of the type used by Danish fishermen (fig. 5). Length of head-rope 30 m. Size of meshes from 40 mm at the head to 16 mm in the cod-end. The cod-end lined inside with canvas as in the H O T
S S D	Shooting Star Dredge, magnetic rake, described by BRUUN, PAULI & LANGER (1955)
S T 100	Sledge Trawl, 1 m wide, of the Sigsbee-Agassiz-Monaco type. Single bag
S T 200	Sledge Trawl, 2 m wide. Single bag
S T 300	Sledge Trawl, 3 m wide. Single bag
S T 600	Sledge Trawl, 6 m wide (fig. 4). Two bags, each of the size used in the S T 300
T O T	Triangular Otter Trawl for pelagic fishing; of the type described by PARR (1934). Each of the three head-ropes was 13 m and each of the otter-boards was 110 cm long and 55 cm broad. Meshes 50 mm at the opening, 12 mm in cod-end to which was attached a canvas bag, 45 cm long.
V G	van Veen Grab (Bottom Sampler), 0.2 sq.m.

For literature references see p. 20.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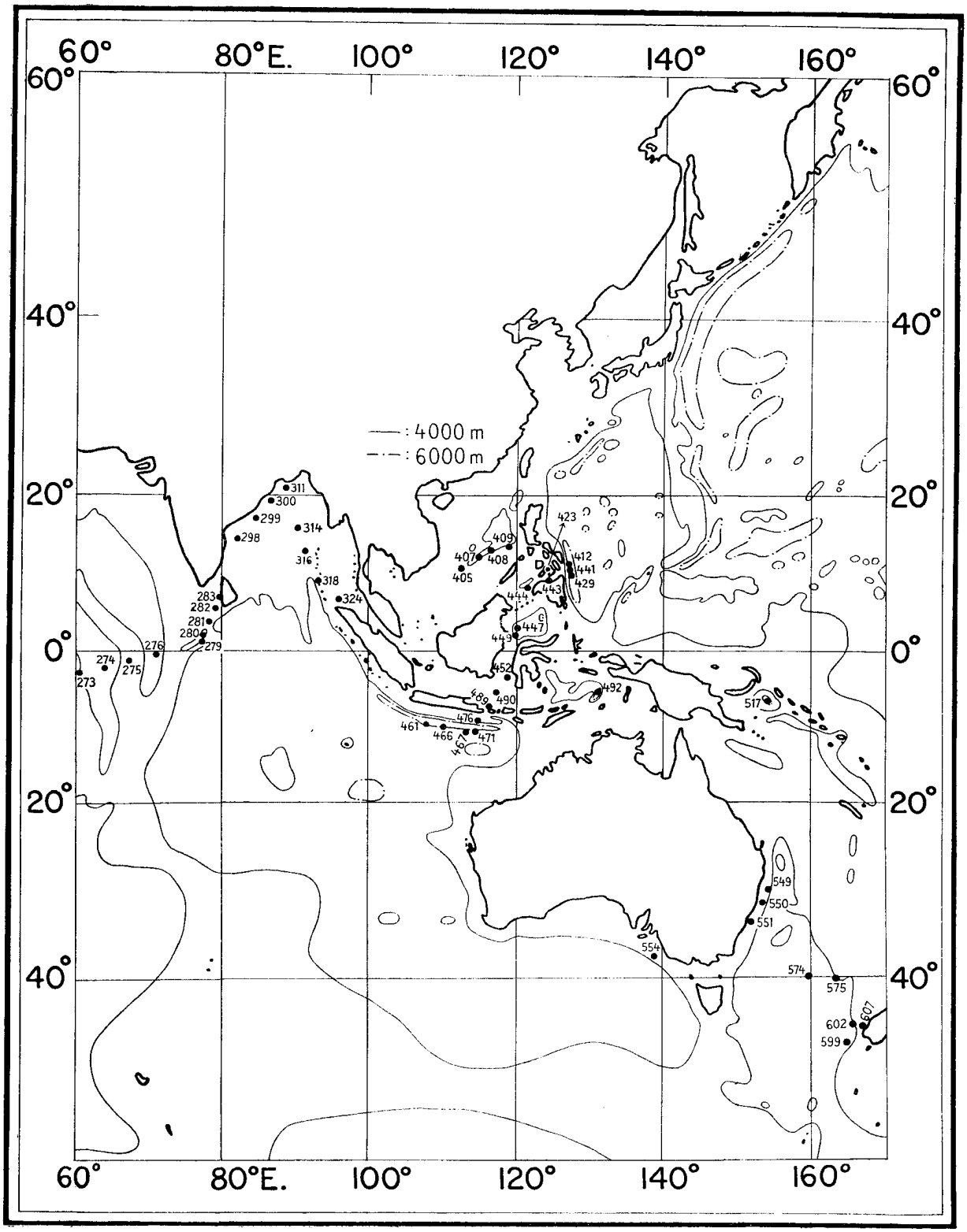
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—·—: 6000 m
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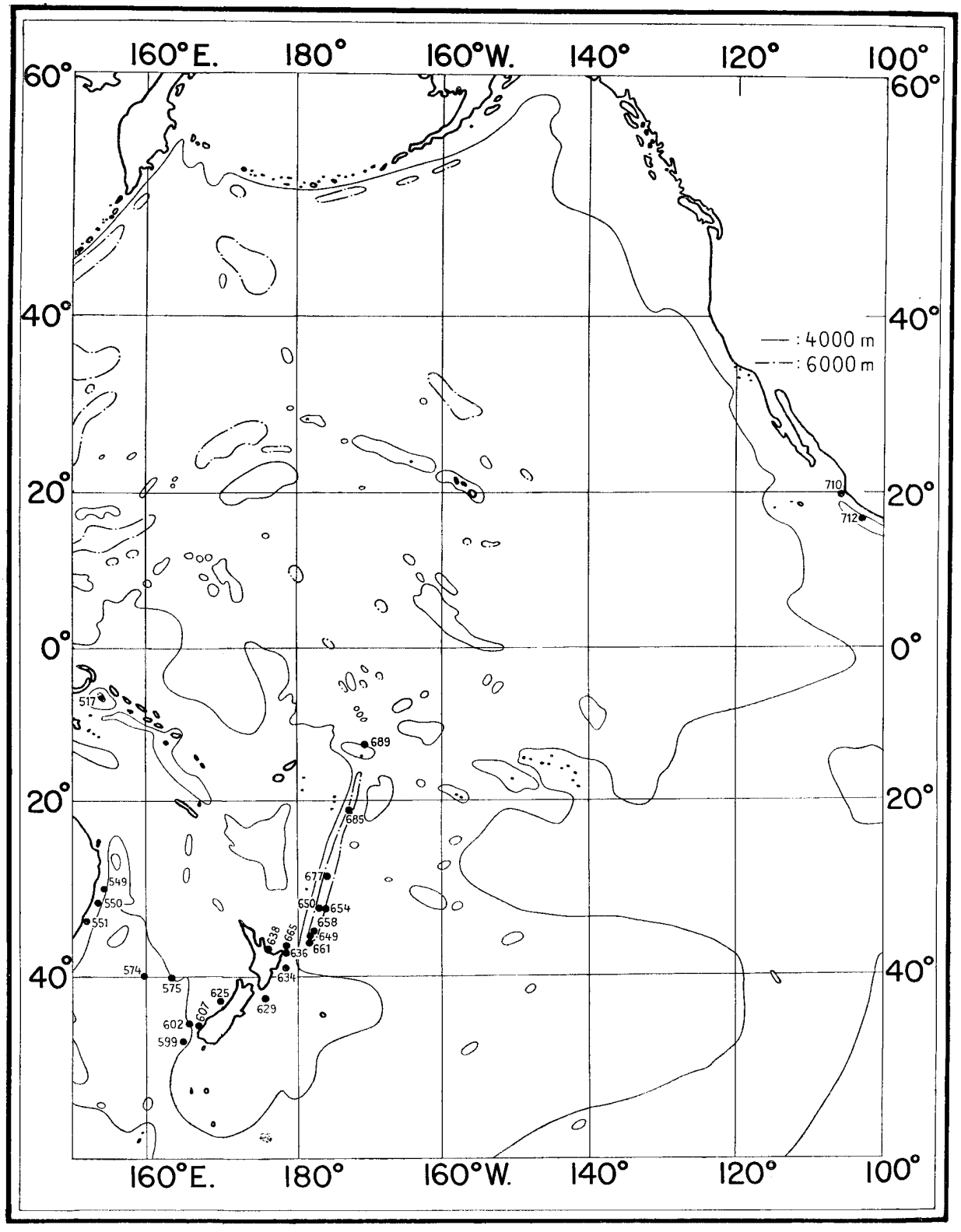
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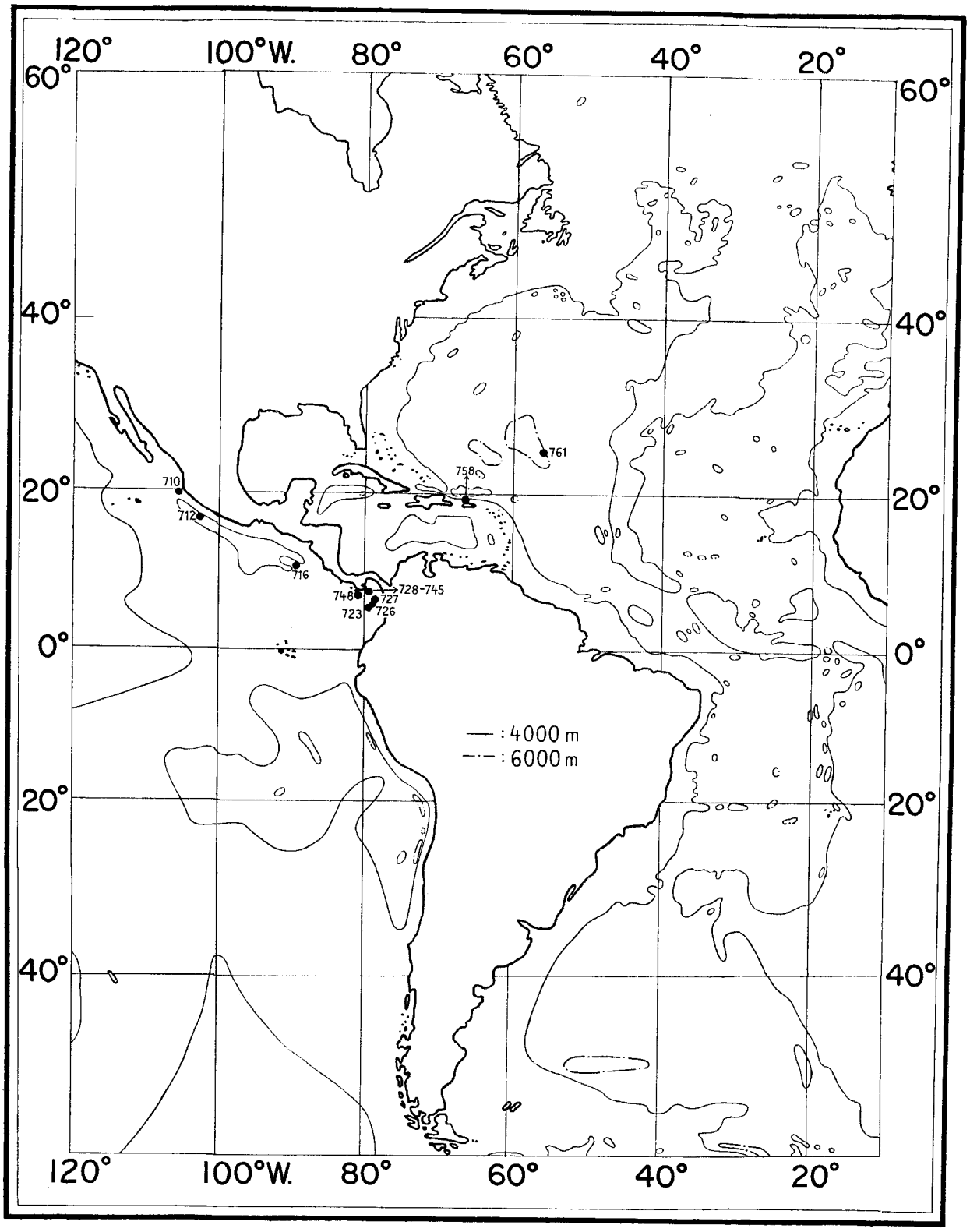
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Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
Atlantic Ocean				**1950**										
1	Bay of Biscay	46°28′N 8°01′W	4530	22.10.	8.30	HYDR	–	0–4500	–	–	0	405	–	–
17	Dakar-Monrovia	7°17′N 13°28′W	1260	10.11.	16.15	ST 100	mud	2000	–	40–47°	1.5	10	0.1	–
24	Monrovia-Takoradi	3°54′N 8°22′W	3200	15.11.	11.20	ST 300 + SSD	clay	4900	40°	47–58°	1.5–2	60	1.5	–
30	Monrovia–Takoradi	0°42′N 5°59′W	5160	18.11.	10.00	ST 300 + SSD	clay	7000	58°	58–63°	1.5	65	1.5	–
31	Monrovia–Takoradi	1°56′N 4°37′W	4930	19.11.	9.25	HYDR	–	0–4900	–	–	0	420	–	–
32	Monrovia–Takoradi	4°05′N 2°13′W	2100	20.11.	11.25	SBT	–	4000	43°	45–52°	2.2–2.5	180	6–7	–
33	Monrovia–Takoradi	4°00′N 1°43′W	1445	20.11.	17.30	PG 0,2	grey clay	1525	–	–	0	–	–	10 l.
52	San Tomé–Cameroon	1°42′N 7°51′E	2550	30.11.	12.00	SOT	muddy clay	4500	49°	50–52°	1.7	50	1.5	–
	San Tomé–Cameroon	1°42′N 7°51′E	2550	30.11.	17.45	HYDR	–	900	–	–	0	120	–	–
63	Off Gabon	2°00′N 9°14′E	1520	2.12.	12.35	SOT	blue clay	3500	38°	41–43°	2.2	70	2.3	bag lost
	Off Gabon	2°00′N 9°14′E	1500	2.12.	16.00	HYDR	–	0–1200	–	–	0	180	–	–
65	Off Gabon	2°17′S 8°10′E	2770	4.12.	11.20	ST 300 + SSD + D 45 + S 200 C	bluish clay	4500	50°	55–58°	1.8–2	60	1.8	bag of S 200 C lost
	Off Gabon	2°17′S 8°10′E	2610	4.12.	15.25	PG 0,2	bluish clay	2780	–	–	0	–	–	–
66	Off Gabon	4°00′S 8°25′E	4020	5.12.	10.25	ST 300 + SSD + D 45	greenish grey mud with Foraminifera	6300	50°	50–54°	2	60	2	net entangled in wire during lowering
	Off Gabon	4°00′S 8°25′E	4020	5.12.	10.25	+ S 200 C	–	5300	50°	50–54°	2	60	2	–
69	Off Congo River	5°18′S 11°08′E	1430	6.12.	22.15	HYDR	–	1440	–	–	0	360	–	–
	Off Congo River	5°18′S 11°08′E	1430	6.12.	23.10	PG 0,2	muddy clay	1550	–	–	0	–	–	23 l.
70	Off Congo River	5°17′S 11°18′E	1230	7.12.	1.30	HYDR	–	1220	–	–	0	150	–	–
	Off Congo River	5°17′S 11°18′E	1200	7.12.	4.20	PG 0,2	bluish clay	1360	–	–	0	–	–	33 l.

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
71	Off Congo River	5°23′S 11°28′E	880	7.12.	9.40	PG 0,2	muddy clay	990	–	–	0	–	–	23 l.; grab not released in first attempt
	Off Congo River	5°23′S 11°28′E	880	7.12.	10.00	HYDR	–	840	–	–	0	45	–	–
72	Off Congo River	5°31′S 11°25′E	790	7.12.	11.55	HYDR	–	750	–	–	0	110	–	–
	Off Congo River	5°39′S 11°19′E	735	7.12.	14.35	PG 0,2	mud and clay	850	–	–	0	–	–	33 l.
73	Off Congo River	5°41′S 11°26′E	450	7.12.	16.30	HYDR	–	435	–	–	0	55	–	–
	Off Congo River	5°41′S 11°26′E	430	7.12.	17.50	PG 0,2	muddy clay	465	–	–	0	–	–	11 l.
83	Off Congo River	6°02′S 12°12′E	800	8.12.	12.20	HYDR	–	725	–	–	0	52	–	–
	Off Congo River	6°02′S 12°12′E	750	8.12.	13.30	PG 0,2	–	850	–	–	0	–	–	not released
	Off Congo River	6°02′S 12°12′E	800	8.12.	14.05	PG 0,2	mud	870	–	–	0	–	–	45 l.
	Off Congo River	6°02′S 12°12′E	800	8.12.	14.40	HYDR	–	725	–	–	0	35	–	–
	Off Congo River	6°02′S 12°12′E	770	8.12.	15.25	PG 0,2	mud and clay	810	–	–	0	–	–	36 l.
93	Off Congo River	6°38′S 11°32′E	710	10.12.	8.10	HYDR	–	700	–	–	0	35	–	–
	Off Congo River	6°38′S 11°32′E	685	10.12.	9.15	PG 0,2	mud	800	–	–	0	–	–	25 l.
94	Off Congo River	6°48′S 11°19′E	990	10.12.	13.00	HYDR	–	980	–	–	0	30	–	–
	Off Congo River	6°48′S 11°19′E	960	10.12.	13.25	PG 0,2	muddy clay	1030	–	–	0	–	–	33 l.
95	Off Congo River	6°51′S 11°15′E	1170	10.12.	15.05	HYDR	–	1155	–	–	0	40	–	–
	Off Congo River	6°51′S 11°15′E	1150	10.12.	15.55	PG 0,2	muddy clay	1200	–	–	0	–	–	32 l.
96	Off Congo River	7°00′S 11°10′E	1510	10.12.	18.20	HYDR	–	1450	–	–	0	60	–	–
	Off Congo River	7°00′S 11°10′E	1435	10.12.	19.50	PG 0.2	mud	1620	–	–	0	–	–	31 l.
99	Off Angola	8°40′S 11°10′E	2690	11.12.	11.10	SOT	yellowish clay	5200	47°	48–50°	2	120	4	–
101	Off Angola	8°50′S 12°32′E	990	12.12.	9.00	ST 300	greenish mud	1800	48°	58–66°	1.6	50	1.5	bag filled with mud
	Off Angola	8°50′S 12°32′E	990	12.12.	12.00	LLH	–	1500	–	–	0	300	–	200 hooks
105	Loanda–Lobito	10°45′S 11°03′E	3980	17.12.	21.20	SOT	–	7000	49°	51–54°	2.1	140	–	trawl lost except one otter board

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
	Loanda–Lobito	10°45′S 11°03′E	4040	18.12.	3.45	HYDR	–	0–3900	–	–	0	320	–	–
	Loanda–Lobito	10°45′S 11°03′E	3980	18.12.	9.15	PG 0,2	clay	4100	–	–	0	–	–	not released (0,5 l.)
106	Loanda–Lobito	11°24′S 11°15′E	3660	18.12.	14.40	PG 0.2	clay	3850	–	–	0	–	–	20 l.
107	Loanda–Lobito	11°33′S 11°51′E	2370	18.12.	23.35	PG 0,2	clay	2500	–	–	0	–	–	18 l.
108	Loanda–Lobito	12°00′S 13°00′E	1470	19.12.	7.58	PG 0,2	clay	1560	–	–	0	–	–	20 l.
109	Loanda–Lobito	12°06′S 13°08′E	1190	19.12.	10.30	HYDR	–	1175	–	–	0	40	–	–
	Loanda–Lobito	12°06′S 13°08′E	1170	19.12.	11.20	PG 0,2	clay	1240	–	–	0	–	–	12 l.
110	Loanda–Lobito	12°05′S 13°08′E	975	19.12.	15.30	PG 0,2	clay	1040	–	–	0	–	–	19 l.
	Loanda–Lobito	12°05′S 13°08′E	975	19.12.	17.20	ST 300	clay	1800	48°	48–56°	1.6	30	0.8	–
112	Loanda–Lobito	12°16′S 13°17′E	735	20.12.	0.45	HYDR	–	730	–	–	0	–	–	–
	Loanda–Lobito	12°16′S 13°17′E	715	20.12.	1.15	PG 0,2	clay	740	–	–	0	–	–	20 l.
113	Loanda–Lobito	12°15′S 13°21′E	400	20.12.	2.15	PG 0,2	clay	410	–	–	0	–	–	18 l.
134	Off Kunene River, SW Africa	17°13′S 11°21′E	412	22.12.	12.50	PG 0,2	sand with glauconite	440	–	–	0	–	–	1.5 l.
135	Off Kunene River, SW Africa	17°13′S 11°16′E	710	22.12.	13.50	HYDR	–	710	–	–	0	20	–	–
	Off Kunene River, SW Africa	17°13′S 11°16′E	720	22.12.	14.25	PG 0,2	greenish sandy mud	725	–	–	0	–	–	18 l.
136	Off Kunene River, SW Africa	17°13′S 11°12′E	960	22.12.	15.40	PG 0,2	clay	1040	–	–	0	–	–	4 l.
137	Off SW Africa	20°04′S 11°56′E	537	23.12.	11.30	ST 300 + D 45 + D 80	–	–	36°	41–44°	–	–	–	–
			1951											
162	Off Cape Peninsula	34°11′S 17°36′E	–	2.1.	18.00	HYDR	–	480	–	–	0	15	–	–
175	Cape Town–Durban	35°00′S 27°22′E	4330	21.1.	9.40	PG 0,2	–	4640	–	–	0	–	–	contents washed out
	Cape Town–Durban	35°00′S 27°22′E	4390	21.1.	11.30	ST 300 + SSD + D 80	Globigerina ooze	6600	–	–	–	–	–	net and wire entangled

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
176	Cape Town-Durban	35°12′S 27°35′E	4350	21.1.	19.30	PG 0,2	–	4660	–	–	0	–	–	failed
	Cape Town-Durban	35°12′S 27°35′E	4350	21.1.	23.55	ST 300 + SSD + D 80	–	6600	52°	52-54°	1.8	60	1.8	–
177	Cape Town-Durban	35°13′S 27°45′E	4380	22.1.	4.00	HYDR	–	0–4450	–	–	0	420	–	–
	Cape Town-Durban	35°13′S 27°45′E	4380	22.1.	16.15	SOT	–	7200	50°	50–53°	2	75	2.2	–
178	Cape Town-Durban	35°07′S 30°35′E	4470	23.1.	12.00	ST 300 + SSD + D 80	clay	7000	53°	53–54°	1.8	15	0.3	bag of ST 300 lost, D 80 torn
	Cape Town-Durban	35°07′S 30°35′E	4470	23.1.	19.45	ST 300	–	6800	52°	52–53°	1.9	10	0.2	–
179	Cape Town-Durban	35°44′S 34°16′E	3800	24.1.	17.30	ST 300	–	6480	48°	50–54°	2.2	100	3.5	frame bent, hole in bag
180	Cape Town-Durban	34°56′S 36°31′E	5220	25.1.	12.45	ST 300	–	7450	58°	58–62°	1.7	90	2.5	–
	Cape Town-Durban	34°56′S 36°31′E	5220	25.1.	21.35	ST 300	–	7500	56°	59–61°	1.7	220	6	–
181	Cape Town-Durban	34°54′S 38°02′E	5380	26.1.	10.20	KCS	–	5515	–	–	0	130	–	86 cm
	Cape Town-Durban	34°54′S 38°02′E	5470	26.1.	13.00	HYDR	–	0–5350	–	–	0	415	–	–
182	Cape Town-Durban	33°28′S 38°32′E	5110–5340	27.1.	14.40	SOT + DR	–	7500	57°	59–62°	1.7	180	5	DR lost
183	Cape Town-Durban	33°25′S 37°20′E	5210	28.1.	14.00	S 200C	3000-3600 m.	5300	–	51–53°	1.8	140	4	–
184	Cape Town-Durban	33°06′S 35°21′E	1470	29.1.	16.00	VG 0,2	–	1580	–	–	0	–	–	failed
	Cape Town-Durban	33°06′S 35°21′E	1470	29.1.	17.00	KCS	–	1565	–	–	0	–	–	no bottom-material some Foraminifera
	Cape Town-Durban	33°06′S 35°21′E	1470	29.1.	17.40	HYDR	–	0–1475	–	–	0	110	–	–
	Cape Town-Durban	33°06′S 35°21′E	1300–1355	29.1.	21.00	ST 100	–	2600	38°	42–44°	2.3	60	2.3	bag torn
	Cape Town-Durban	33°06′S 35°21′E	1270–1425	30.1.	0.15	DO	–	2400	42°	42–45°	2	100	3.2	DO torn
185	Cape Town-Durban	32°31′S 35°01′E	1680	30.1.	11.00	LLH & LLS	–	650	–	–	0	60	–	160 hooks 150 lost
186	Cape Town-Durban	32°33′S 32°01′E	3620	31.1.	8.15	KCS	Globigerina ooze	3770	–	–	0	–	–	–
	Cape Town-Durban	32°33′S 32°01′E	3620	31.1.	9.50	HYDR	–	1500–3670	–	–	0	220	–	–
	Cape Town-Durban	32°33′S 32°01′E	3620	31.1.	16.45	SOT	Globigerina ooze	7000	45°	45–48°	2.3	45	0.8	net torn

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
188	Off Durban	29°55′S 31°13′E	440	2.2.	14.55	ST 300 + D 45 + D 80	–	1250	–	27°	–	60	–	gear not at bottom
	Off Durban	29°55′S 31°13′E	495	2.2.	17.35	KCS	–	–	–	–	0	–	–	3 attempts all without contents
	Off Durban	29°55′S 31°13′E	495	2.2.	20.35	ST 100	rocky (?)	1600	36°	36–38°	–	40	–	bag lost
189	Off Durban	30°00′S 32°19′E	1580	3.2.	6.20	KCS	–	1630	–	–	0	40	–	2 attempts both without contents
190	Off Durban	29°42′S 33°19′E	2760	3.2.	14.10	KCS	Globigerina ooze	2950	–	–	0	40	–	sideways on bottom, empty
	Off Durban	29°42′S 33°19′E	2720	3.2.	16.55	ST 300	Globigerina ooze	4600	48°	48–50°	2	60	2	–
	Off Durban	29°42′S 33°19′E	2640	3.2.	22.05	ST 300	–	4600	47°	48–50°	2	110	3.8	trawl lost
191	Off Durban	31°49′S 32°52′E	3510	4.2.	18.30	KCS	clay with Foraminifera	–	–	–	0	–	–	62 cm
	Off Durban	31°49′S 32°52′E	3470	4.2.	21.35	ST 100 + D 45 + D 80	–	5250	51°	53–55°	1.8	100	3	gear not at bottom
192	Off Durban	32°00′S 32°41′E	3430	5.2.	7.05	ST 100 + D 45 + D 80	Globigerina ooze	6000	45°	48–52°	2.3	110	4	–
	Off Durban	32°00′S 32°41′E	3530	5.2.	16.20	SOT	Globigerina ooze	7200	44°	38–48°	2.4	55	2.2	–
193	Off Durban	32°34′S 31°52′E	3680	6.2.	7.30	KCS	Globigerina ooze	3780	–	–	0	–	–	36 cm
	Off Durban	32°34′S 31°52′E	3680	6.2.	11.35	SOT	Globigerina ooze	7400	45°	46–52°	2.3	55	2.2	–
194	Off Durban	34°09′S 30°45′E	4360	7.2.	6.40	KCS	Globigerina ooze	4480	–	–	0	–	–	almost empty
	Off Durban	34°09′S 30°45′E	4360	7.2.	11.10	SOT	Globigerina ooze	7500	50°	52–55°	2	80	2.3	–
	Off Durban	34°09′S 30°45′E	4360	7.2.	19.50	SOT	Globigerina ooze	7500	51°	51–56°	2	110	3.8	–
196	Off Durban	29°55′S 31°20′E	430	13.2.	21.30	PG 0,2	sand and clay	495	–	–	0	–	–	4 l.
	Off Durban	29°55′S 31°20′E	425	13.2.	22.50	ST 100	–	900	40°	40–50°	–	50	–	–
	Off Durban	29°55′S 31°20′E	430	14.2.	1.15	ST 300	sandy mud with stones	900 & 1200	38°	38–42°	–	100	–	–
197	Off Durban	29°57′S 31°26′E	495	14.2.	7.05	SOT	–	1450 & 1550	24°	24–25°	–	70	–	–
	Of Durban	29°57′S 31°26′E	530	14.2.	10.35	SOT	–	1550	19°	19–26°	–	115	–	net lost
	Off Durban	29°57′S 31°26′E	620	14.2.	14.15	HYDR + BT	–	0–608	–	–	0	45	–	–

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
198	Off Durban	30°32′S 34°27′E	2690	15.2.	15.50	PG 0,2	–	2825	–	–	0	–	–	empty
	Off Durban	30°32′S 34°27′E	2700	15.2.	17.00	KCS	–	2780	–	–	0	–	–	empty
	Off Durban	30°32′S 34°27′E	2700	15.2.	20.10	ST 100 + D 80	–	4400	47°	49–52°	2	60	2	–
	Off Durban	30°32′S 34°27′E	2700	15.2.	23.30	ST 300 + SSD	–	2850	–	–	–	–	–	gear not at bottom
199	Off Durban	30°42′S 34°58′E	2370–2320	16.2.	6.00	S 200 C	1500-1700 m.	2875	–	45–50°	1.7	300	8.5	–
200	Off Natal	29°39′S 37°01′E	5020	17.2.	5.30	ST 300 + SSD + D 80	–	7400	56°	56–57°	1.8	10	–	gear not at bottom
	Off Natal	29°39′S 37°01′E	5070	17.2.	15.00	KCS	Globigerina ooze	5280	–	–	0	–	–	71 cm
	Off Natal	29°39′S 37°01′E	5090–4880	17.2.	20.45	HOT	–	7400	59°	59–62°	1.6	110	–	gear not at bottom
	Off Natal	29°39′S 37°01′E	5110	18.2.	5.00	HYDR	–	0–5200	–	–	0	670	–	–
	Off Natal	29°39′S 37°01′E	5110	18.2.	21.55	BT	–	7400	60°	63–66°	1.6	120	3	–
	Off Natal	29°39′S 37°01′E	5110	18.2.	21.55	HOT	–	3500	–	–	0	–	–	–
202	Off Natal	25°20′S 35°17′E	630	21.2.	10.20	VG 0,2	sand	710	–	–	0	–	–	2 l.
	Off Natal	25°20′S 35°17′E	595–575	21.2.	12.15	ST 300 + D 45 + D 80	–	1800	38°	38–39°	–	50	–	–
	Off Natal	25°20′S 35°17′E	590	21.2.	16.35	HOT	–	1500	35°	35–37°	–	55	–	–
203	Off Natal	25°36′S 35°21′E	730	21.2.	20.15	HOT	–	2200	32°	32–34°	–	35	–	–
214	Off Beira, Mozambique	20°12′S 35°15′E	380	24.2.	20.40	PG 0,2	clay	412	–	–	0	–	–	19 l.
215	Off Beira, Mozambique	20°12′S 35°15′E	720	24.2.	21.55	PG 0,2	clay	755	–	–	0	–	–	3 l.
	Off Beira, Mozambique	20°12′S 35°15′E	720	24.2.	22.15	HYDR	–	200–700	–	–	0	25	–	–
217	Mozambique Channel	14°20′S 45°09′E	3530	27.2.	9.00	KCS	clay	3625	–	–	0	–	–	34 cm.
	Mozambique Channel	14°20′S 45°09′E	3530	27.2.	9.45	HYDR + BT	–	0–3590	–	–	0	300	–	–
	Mozambique Channel	14°20′S 45°09′E	3390	27.2.	18.35	HOT	Globigerina ooze	6300	47°	48–53°	2	140	4.5	–
218	Mozambique Channel	13°41′S 46°40′E	3220	28.2.	12.25	BT	–	3050	–	–	0	60	–	–
	Mozambique Channel	13°41′S 46°40′E	3340	28.2.	19.00	TOT	450-650 m.	2000	–	25–29°	2.5	120	5	–

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
220	Off Cape Amber, Madagascar	11°43′S 49°09′E	1070–1360	1.3.	19.30	TOT	450-700 m.	2000	–	25–30°	2	150	5	–
229	Madagascar-Mombasa	8°40′S 49°25′E	4580	5.3.	20.00	KCS	–	4400	–	–	0	–	–	74 cm.
	Madagascar-Mombasa	8°40′S 49°25′E	4290	5.3.	20.55	HYDR + BT	–	0–4350	–	–	0	430	–	–
230	Madagascar-Mombasa	9°02′S 49°27′E	4860	7.3.	9.00	VG 0,2	–	5100	–	–	0	–	–	released but empty
	Madagascar-Mombasa	9°02′S 49°27′E	4940	7.3.	13.40	VG 0,2	Globigerina ooze	5160	–	–	0	–	–	7 l.
231	Madagascar-Mombasa	8°52′S 49°25′E	5020	7.3.	20.20	ST 300 + SSD + D 80	–	6600	60°	60–63°	1.5	60	1.6	–
	Madagascar-Mombasa	8°52′S 49°25′E	4480	8.3.	5.15	KCS	–	–	–	–	0	–	–	empty
232	Madagascar-Mombasa	9°03′S 49°22′E	4960	8.3.	10.20	HYDR	–	4250–4500	–	–	0	175	–	–
	Madagascar-Mombasa	9°03′S 49°22′E	4930	8.3.	17.15	HOT	–	7440	58°	59–62°	1.7	100	2.2	–
233	Madagascar-Mombasa	7°24′S 48°24′E	4730	9.3.	13.30	ST 300 + SSD + D 80	Globigerina ooze	6200	64°	64–65°	1.2	30	0.6	–
234	Madagascar-Mombasa	5°25′S 47°09′E	4800	10.3.	11.50	PG 0,2	Globigerina ooze	5010	–	–	0	–	–	16 l.
	Madagascar-Mombasa	5°25′S 47°09′E	4820	10.3.	17.05	HOT	–	7400	56°	56–60°	1.8	180	5.5	–
235	Madagascar-Mombasa	4°47′S 46°19′E	4810	11.3.	10.50	HOT	Globigerina ooze	7400	56°	57–62°	1.8	120	3.5	–
236	Madagascar-Mombasa	3°22′S 45°50′E	4770	12.3.	8.40	HYDR	–	4000–4250	–	–	0	255	–	–
237	Madagascar-Mombasa	2°18′S 45°18′E	4670	12.3.	18.10	TOT	450-750 m.	2500	–	21–27°	–	160	–	–
238	Off Kenya	3°23′S 44°04′E	3980	13.3.	9.55	PG 0,2	–	4160	–	–	0	–	–	at bottom but not released
	Off Kenya	3°23′S 44°04′E	3960	13.3.	14.30	HOT	Globigerina ooze	6900	50°	52–55°	2	190	6	–
239	Off Kenya	3°59′S 42°03′E	3290	14.3.	14.00	PG 0,2	Globigerina ooze	3450	–	–	0	–	–	8 l.
240	Off Kenya	4°32′S 41°26′E	2660	15.3.	1.10	PG 0,2	Globigerina ooze	2800	–	–	0	–	–	1.5 l.
	Off Kenya	4°32′S 41°26′E	2660	15.3.	2.30	HYDR	–	1000–2650	–	–	0	186	–	–
241	Off Kenya	4°00′S 41°27′E	1520	15.3.	11.40	PG 0,2	pure Globigerina	1610	–	–	0	–	–	6.5 l.
	Off Kenya	4°00′S 41°27′E	1510	15.3.	14.30	HOT	pure Globigerina	3400	–	–	2.1	100	6.5	net torn

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
242	Off Kenya	4°09′S 40°19′E	1015	16.3.	0.30	PG 0,2	clay with Globigerina	1090	–	–	0	–	–	2 l.
243	Off Kenya	4°09′S 40°19′E	665	16.3.	4.30	PG 0,2	clay with a little sand	760	–	–	0	–	–	6 l.
244	Off Kenya	4°09′S 40°19′E	400	16.3.	6.00	PG 0,2	corals in sand	420	–	–	0	–	–	2 l.
263	Mombasa-Seychelles	4°14′S 44°52′E	4620–4680	24.3.	15.40	TOT	800-1050 m.	3000	–	27–29°	ca. 3	230	10	–
265	Mombasa-Seychelles	3°30′S 50°20′E	5210	26.3.	14.00	BT	–	3500	–	–	0	15	–	–
266	Mombasa-Seychelles	3°38′S 52°43′E	4580	27.3.	6.00	HYDR	–	0–4500	–	–	0	510	–	–
	Mombasa-Seychelles	3°38′S 52°43′E	4580	27.3.	6.00	BT	–	3500	–	–	0	–	–	–
	Mombasa-Seychelles	3°38′S 52°43′E	4520	27.3.	17.15	PG 0,2	Globigerina ooze	4800	–	–	0	–	–	4 l.
	Mombasa-Seychelles	3°38′S 52°43′E	4700–4970	27.3.	21.15	TOT	3400-3800 m.	7000	–	39–43°	2.5–2.7	340	15	–
268	Mombasa-Seychelles	3°14′S 54°28′E	4020–4130	28.3.	18.20	TOT	350-550 m.	1600	–	26–30°	3	120	–	–
272	Seychelles-Ceylon	3°20′S 57°16′E	4060	2.4.	14.05	BT	–	1800	–	–	0	40	–	–
273	Seychelles-Ceylon	2°54′S 60°26′E	4220	3.4.	14.10	BT	–	2100	–	–	0	45	–	–
274	Seychelles-Ceylon	2°04′S 64°00′E	4350	4.4.	14.05	BT	–	2500	–	–	0	50	–	–
275	Seychelles-Ceylon	1°15′S 67°25′E	2470–2300	5.4.	14.45	BT	–	2500	–	–	0	50	–	–
276	Seychelles-Ceylon	0°42′S 71°07′E	4530	6.4.	8.30	HYDR	–	4500	–	–	0	150	–	wire broken, 5 water bottles lost
279	Seychelles-Ceylon	1°00′N 76°17′E	4330	8.4.	14.55	PG 0,2	Globigerina ooze	4600	–	–	0	–	–	13 l.
	Seychelles-Ceylon	1°00′N 76°17′E	4320	8.4.	19.50	ST 300 + SSD	–	5800	60°	60–62°	1.5	45	1.2	–
280	Seychelles-Ceylon	1°56′N 77°05′E	4350	9.4.	11.55	SOT	Globigerina ooze	7400	51°	51–53°	2	60	2	–
281	Seychelles-Ceylon	3°38′N 78°15′E	3310	10.4.	13.40	ST 300 + D 80	Globigerina ooze	4700	59°	59–61°	1.5	35	0.8	–
282	Seychelles-Ceylon	5°32′N 78°41′E	4040	11.4.	14.00	HOT	blackish mud	6800	51°	51–54°	2	80	2.8	–
283	Seychelles-Ceylon	7°05′N 79°37′E	920–880	12.4.	14.00	LLS + LLH	–	–	–	–	–	280	–	240 hooks

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
298	Bay of Bengal	14°20′N 82°00′E	3230	23.4.	13.15	TOT	1800-2200 m.	4900	–	30–36°	2.7–3.4	155	8	–
299	Bay of Bengal	17°10′N 84°30′E	2820	24.4.	17.25	HOT	mud	5300	46°	46–47°	2	30	1	–
300	Bay of Bengal	19°22′N 86°27′E	1545	25.4.	10.40	PG 0,2	–	1680	–	–	0	–	–	released, but empty
301	Bay of Bengal	19°30′N 86°32′E	1180	25.4.	16.00	PG 0,2	greenish mud	1300	–	–	0	–	–	3rd attempt success, 29 1.
	Bay of Bengal	19°30′N 86°32′E	1110	25.4.	18.10	TOT	700-800 m.	2100	–	29–31°	2.8	180	8.5	–
302	Bay of Bengal	19°42′N 86°48′E	1190	25.4.	23.00	ST 300	clay	2200	43°	43–44°	1.8	15	0.3	–
311	Off Ganges Delta	20°49′N 88°40′E	445	2.5.	6.35	PG 0,2	clay, a little sand	450	–	–	0	–	–	37 1.
312	Off Ganges Delta	20°16′N 88°59′E	700	2.5.	8.30	PG 0,2	clay and mud	710	–	–	0	–	–	36 1.
314	Bay of Bengal	15°54′N 90°17′E	2600	3.5.	19.05	HOT	brownish ooze	4800	47°	47–49°	2	60	2	–
316	Bay of Bengal	12°43′N 91°17′E	3170	4.5.	17.15	TOT	1700-1900 m.	4500	–	31–34°	3	180	9	–
318	Bay of Bengal	9°02′N 93°07′E	1440	5.5.	19.15	TOT	800-1100 m.	2800	–	27–32°	3	180	9	–
324	Strait of Malaca	6°38′N 96°00′E	1140	9.5.	13.00	ST 300	brownish Globigerina ooze	2100	48°	50–54°	1.7	35	1	–
405	South China Sea	10°25′N 112°37′E	2910	2.7.	11.45	PG 0,2	Globigerina ooze	3060	–	–	0	–	–	21 1.
406	South China Sea	10°34′N 112°51′E	2310	2.7.	16.10	TOT	1850-2150 m.	4500	–	35–37°	2.2–2.25	160	6.5	–
	South China Sea	10°34′N 112°51′E	2310	2.7.	20.20	HYDR + BT	–	1550–2300	–	–	–	80	–	no BT recording
407	South China Sea	12°10′N 114°56′E	4390	3.7.	11.00	HYDR	–	0–4400	–	–	–	330	–	–
	South China Sea	12°10′N 114°56′E	4390	3.7.	11.00	BT	–	3000	–	–	–	–	–	–
	South China Sea	12°10′N 114°56′E	4390	3.7.	19.00	TOT	3400-3800 m.	5300	–	50–55°	1.5	180	4.5	–
408	South China Sea	12°47′N 116°24′E	4330	4.7.	11.00	ST 300	Globigerina ooze	6600	54°	54–56°	1.5	120	3	–
	South China Sea	12°47′N 116°24′E	4330	4.7.	17.00	PG 0,2	Globigerina ooze	4530	–	–	0	–	–	not released
409	South China Sea	13°44′N 118°56′E	3780–3850	5.7.	9.00	TOT	1600-2000	2900	–	44–52°	1.5	180	4.5	–
412	Philippine Trench	11°13′N 126°21′E	8870	12.7. 13.7.	18.10	HYDR	–	0–9150	–	–	0	1020	–	–
	Philippine Trench	11°13′N 126°21′E	8990	13.7.	16.10	PG 0,2	clay and sand	9300	–	–	0	–	–	125 cc.

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
413	Philippine Trench	10°20′N 126°36′E	8600	15.7.	1.15	KCS	–	9000	–	–	0	–	–	empty
	Philippine Trench	10°20′N 126°36′E	10060	15.7.	7.30	KCS	–	10480	–	–	0	–	–	75 cm.
	Philippine Trench	10°20′N 126°36′E	10010	15.7.	21.00	PG 0,2	clay	10470	–	–	0	–	–	not released, clay on gear
417	Philippine Trench	10°20′N 126°38′E	9200–8380	20.7.	18.00 21.45	PG 0,2	–	9400 & 8900	–	–	0	–	–	not released
418	Philippine Trench	10°13′N 126°43′E	10190–10150	21.7.	19.15	ST 300 + D 80 + S 100 C	clay with gravel and stones	12160	74°	74–76°	1	90	1.5	–
419	Philippine Trench	10°19′N 126°39′E	10150–10210	22.7.	21.30	ST 300 + D 80 + S 100 C	clay	12220	74°	74–76°	1	120	2	S 100 C lost
420	Philippine Trench	10°24′N 126°40′E	10170	23.7.	18.15	PG 0,2	–	10700	–	–	0	–	–	not released
421	W of Philippine Trench	10°26′N 126°05′E	1000	24.7.	4.00	PGI 0,2	clay	1025	–	–	0	30	–	15 l.
422	W of Philippine Trench	10°47′N 126°02′E	2040	24.7.	8.30	PGI 0,2	clay	2035	–	–	0	90	–	26 l.
	W of Philippine Trench	10°47′N 126°02′E	2100	24.7.	10.30	KCS	–	2350	–	–	0	–	–	empty
423	E of Cebu, Philippines	10°27′N 124°18′E	810	25.7.	2.50	PGI 0,2	green mud	832	–	–	0	–	–	31 l.
	E of Cebu, Philippines	10°27′N 124°18′E	750	25.7.	5.35	ST 300	green mud	2200	36°	50–60°	2	10	0.3	–
424	Philippine Trench	10°28′N 126°39′E	10120	27.7.	20.55	PGI 0,2	brownish clay covering blackish green sand	11100	–	–	–	–	–	26 l.
429	Philippine Trench	9°49′N 126°44′E	10020–10120	2.8.	22.10	ST 300 + D 45 + D 80	clay	11940	73°	73–75°	1	5–120	–	gear entangled in wire, 500 m.
430	Philippine Trench	10°20′N 126°37′E	10020	3.8.	8.15	HYDR	–	8000–10270	–	–	0	345	–	bottles not released
	Philippine Trench	10°20′N 126°37′E	10040	3.8.	14.00	HYDR	–	1000–10270	–	–	0	330	–	bottles not released
	Philippine Trench	10°20′N 126°37′E	10060	3.8.	19.30	HYDR	–	8000–10270	–	–	–	360	–	bottles not released
431	Philippine Trench	10°21′N 126°38′E	10030	4.8.	11.00	HYDR	–	8000–10270	–	–	–	930	–	–
433	Philippine Trench	9°51′N 126°51′E	10000	5.8.	23.15	HYDR	–	4000–10250	–	–	0	945	–	–
434	Philippine Trench	10°04′N 126°44′E	9580–9530	7.8.	5.15	ST 300 + D 45 + D 80	–	11700	73°	73-74°	1	120	2	gear not at bottom

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
435	Philippine Trench	10°20′N 126°41′E	9820–10000	7.8.	20.10	ST 300 + D 45 + D 80	very stiff clay	11900	72°	72–73°	1	100	1.7	ST 300 entangled in wire, 300 m.
	Philippine Trench	10°20′N 126°41′E	9980	8.8.	4.20	HYDR + KCS	–	10615	–	–	0	630	–	core sample lost at surface
436	E of Cebu, Philippines	10°12′N 124°14′E	710	9.8.	7.30	ST 300 + D 45 + D 80	green mud	2000	35°	35–39°	1.8–2	50	1.7	–
440	Philippine Trench	10°25′N 126°40′E	10020	14.8.	9.00	HYDR + KCS	clay	3250–10610	–	–	0	540	–	KCS: 74 cm. the lower 4 cm. disturbed
441	Philippine Trench	10°26′N 126°40′E	10040	14.8.	20.00	ST 300 + D 45 + D 80	–	11770	–	–	–	–	–	no echo sounding, gear not at bottom
443	Mindanao Sea	8°48′N 124°09′E	1500	16.8.	22.30	ST 300 + D 45 + D 80	mud, many fragments of plants	2700	46°	46°	1.5	20	0.4	–
444	Sulu Sea	7°54′N 121°30′E	5050	17.8.	21.35	HOT	mud, many fragments of plants	8000	56°	57–60°	1.6	55	1.5	–
445	Sulu Sea	7°45′N 121°34′E	4980	18.8.	2.30	HYDR + KCS	–	0–5190	–	–	–	330	–	KCS: 75 cm.
	Sulu Sea	7°45′N 121°34′E	4980	18.8.	2.30	BT	–	1500	–	–	–	–	–	–
447	Celebes Sea	3°05′N 120°10′E	4660	20.8.	13.45	PGI 0,2	brownish clay	5000	–	–	0	–	–	51 l.
448	Celebes Sea	2°54′N 120°04′E	4600	20.8.	18.45	TOT + DR	1700-2200 m.	4200	–	37–40°	2	120	4	–
449	Celebes Sea	2°13′N 119°42′E	5160	21.8.	2.30	HYDR + KCS	–	0–5375	–	–	0	425	–	KCS: 81 cm.
	Celebes Sea	2°13′N 119°42′E	5160	21.8.	2.30	DR	–	2000	–	–	0	–	–	–
450	Celebes Sea	1°50′N 119°20′E	4940–4970	21.8.	13.20	HOT	–	9700	47°	50–57°	2	100	3.7	bag torn
	Celebes Sea	1°50′N 119°20′E	4890	21.8.	23.50	PGI 0,2	bluish clay with fragments of plants	5220	–	–	–	–	–	39 l.
452	Makassar Strait	3°37′S 118°34′E	2000	24.8.	11.00	PGI 0,2	greenish clay	2150	–	–	0	–	–	32 l.
453	Makassar Strait	3°56′S 118°26′E	2000	24.8.	15.20	ST 300 + D 45 + D 80	greenish clay	3500	48°	48–50°	1.5	65	1.6	–
	Makassar Strait	3°56′S 118°26′E	1990	24.8.	18.00	HYDR + KCS	–	0–2140	–	–	0	230	–	KCS: 56 cm.
461	Sunda Trench	10°05′S 107°54′E	6810	3.9.	5.00	ST 300 + D 45 + D 80	–	9750	59°	59–61°	1.5	115	3	gear not at bottom

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
462	Sunda Trench	10°02′S 107°52′E	6730	3.9.	14.45	PGI 0,2	bluish clay	7400	–	–	0	–	–	16 l.
463	Sunda Trench	10°16′S 109°51′E	7130	4.9.	7.00	HYDR + KCS	–	0–7440	–	–	0	675	–	core sample lost at surface
464	Sunda Trench	10°18′S 109°38′E	7150–6200	4.9.	22.10	ST 300 + D 45 + D 80	–	10200	59°	59–60°	1.5	90	2.2	gear not at bottom
465	Sunda Trench	10°20′S 109°55′E	7000–6900	5.9.	13.50	ST 300 + D 45 + D 80	–	10300	59°	61–64°	1.5	180	4.5	bag of ST 300 lost
466	Sunda Trench	10°21′S 110°12′E	7160	6.9.	8.35	HOT	bluish clay	10600	60°	61–62°	1.5	125	3	–
467	Sunda Trench	10°46′S 113°06′E	5110	8.9.	5.30	KCS	–	5440	–	–	0	180	–	empty
468	Sunda Trench	10°55′S 113°06′E	4700	8.9.	9.30	PGI 0,2	–	5140	–	–	0	–	–	not quantitative, 25 cc.
	Sunda Trench	10°55′S 113°06′E	4750	8.9.	13.15	KCS	–	4985	–	–	0	–	–	core sample lost at surface
469	Sunda Trench	10°51′S 113°10′E	5020	8.9.	15.55	PGI 0,2	–	5350	–	–	0	–	–	1 l.
470	Sunda Trench	11°04′S 113°34′E	5210–5130	9.9.	1.45	ST 300 + D 45 + D 80	–	8000	54°	56–58°	1.5	80	2	gear not at bottom
471	Sunda Trench	10°26′S 114°15′E	2820	9.9.	18.00	KCS	–	3150	–	30–90°	0	–	–	empty
	Sunda Trench	10°26′S 114°15′E	2780	9.9.	21.30	PGI 0,2	clay	3025	–	–	0	–	–	25 l.
	Sunda Trench	10°26′S 114°15′E	2990–2810	10.9.	1.25	ST 300 + D 45 + D 80	clay and vulcanic tuff	4900	50°	52–58°	1.6	90	2.4	bag of ST 300 torn
472	Sunda Trench	10°24′S 114°07′E	2250–2030	10.9.	11.20	HOT	800-900 m.	3600	–	–	3	100	5	gear not at bottom
473	Sunda Trench	10°16′S 113°57′E	2650	10.9.	19.10	PGI 0,2	–	3030	–	–	0	–	–	almost all bottom material washed out
474	Sunda Trench	9°49′S 114°13′E	3840–3810	11.9.	5.15	ST 300 + D 45 + D 80	–	6100	52°	54–57°	1.5	90	2.2	–
476	S of Bali	9°04′S 114°43′E	1555	11.9.	19.25	PG 0,2	clay with fine sand	1675	–	–	0	–	–	6.5 l.
477	S of Bali	9°01′S 114°48′E	780	11.9.	21.30	PG 0,2	sandy clay	810	–	–	0	–	–	12 l.
478	S of Bali	8°50′S 114°55′E	600	12.9.	0.25	PG 0,2	sandy clay	625	–	–	0	–	–	21 l.

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
480	S of Bali	8°49′S 115°00′E	440	12.9.	2.35	PG 0,2	sand, a little clay	470	–	–	0	–	–	20 l.
489	Bali Sea	7°38′S 116°08′E	1160	13.9.	16.15	ST 300 + D 45 + D 80	dark clay	1950	59°	59–60°	1	60	1	–
490	Bali Sea	5°25′S 117°03′E	570–545	14.9.	9.40	ST 300 + D 45 + D 80	sand and clay	1300	39°	39–45°	1.5	60	1.5	–
491	Makassar Strait	4°56′S 117°39′E	1560	14.9.	20.00	ST 300 + D 45 + D 80	muddy clay	2800	48°	50–52°	1.6	60	1.6	–
492	Banda Trench	5°31′S 131°01′E	7250	20.9.	3.45	PGI 0,2	green clay	7650	–	–	0	–	–	not released
	Banda Trench	5°31′S 131°01′E	7250	20.9.	6.45	HYDR + KCS	–	0–7680	–	–	0	615	–	KCS: 59 cm.
	Banda Trench	5°31′S 131°01′E	7240	20.9.	6.45	BT	–	3600	–	–	0	–	–	–
494	Banda Trench	5°36′S 131°01′E	7280	21.9.	13.05	ST 300 + D 45 + D 80	–	10300	60°	60–63°	1.5	130	3	gear not at bottom
	Banda Trench	5°36′S 131°01′E	7240–7290	22.9.	0.00	ST 300 + D 45 + D 80	clay	10400	60°	64°–72°	1.5	125	3	–
495	Banda Trench	5°26′S 130°58′E	7290–7250	22.9.	15.45	HOT	clay	11200	58°	60–62°	1.5	120	3	–
496	Banda Trench	5°36′S 131°06′E	7270	23.9.	4.30	PGI 0,2	soft clay	7765	–	–	0	–	–	6.5 l.
497	Banda Trench	5°18′S 131°18′E	6490–6650	23.9.	20.00	HOT	soft clay	9800	59°	59–61°	1.5	125	3	–
499	Banda Trench	5°21′S 131°17′E	6580	24.9.	17.50	PGI 0,2	greenish clay	6950	–	–	0	–	–	43 l.
517	New Britain Trench	6°31′S 153°58′E	8820	11.10.	5.50	HYDR + KCS	clay	0–9500	–	–	0	755	–	KCS: 47 cm.
	New Britain Trench	6°31′S 153°58′E	8840	11.10.	21.55	PGI 0,2	clay	9200	–	–	0	–	–	content almost totally washed out
	New Britain Trench	6°31′S 153°58′E	8850	12.10.	8.15	HYDR	–	0–5000	–	–	–	265	–	–
	New Britain Trench	6°31′S 153°58′E	8810	12.10.	8.15	BT	–	1800	–	–	–	–	–	no recording
	New Britain Trench	6°31′S 153°58′E	8940	13.10.	3.25	ST 300 + D 45 + D 80	–	11100	70°	73–74°	1.2	155	3	D 80 lost
	New Britain Trench	6°31′S 153°58′E	8720	13.10.	16.05	PGI 0,2	clay	9255	–	–	0	–	–	20 l.
518	New Britain Trench	6°11′S 153°31′E	8800	14.10.	2.00	ST 300 + D 45 + D 45	–	11100	–	–	–	–	–	gear not at bottom

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
519	New Britain Trench	6°12′S 153°43′E	8950	15.10.	4.50	ST 300 + D 45 + D 45	–	11100	70°	72–75°	1.2	120	2	gear not at bottom
520	New Britain Trench	6°10′S 153°42′E	c. 7800	15.10.	18.00	ST 300 + D 45 + D 45	–	5000	–	–	–	–	–	no echo, gear not at bottom
521	New Britain Trench	5°59′S 153°28′E	8830–8780	16.10.	9.50	ST 200	clay	11600	67°	71–73°	1.4	150	3.5	–
549	Coral Sea	30°05′S 154°33′E	1560	11.11.	21.50	PGI 0,2	–	1710	–	–	0	–	–	not released
550	Tasman Sea	31°27′S 153°33′E	4090	12.11.	12.00	PGI 0,2	very stiff clay	4345	–	–	0	–	–	12 1.
	Tasman Sea	31°27′S 153°33′E	4530	12.11.	21.40	ST 200 + D 45 + SSD	very stiff clay	6000	62°	69–75°	1.3	120	2.6	–
551	Off Sydney	33°42′S 151°51′E	680–760	13.11.	20.00	TOT	ca. 500 m.	1500	–	29–32°	2	180	6	–
554	Great Australian Bight	37°28′S 138°55′E	1340–1320	5.12.	19.00	ST 300 + D 45	Globigerina ooze	2500	45°	52–56°	1.5	70	1.7	–
	Great Australian Bight	37°28′S 138°55′E	1360	5.12.	22.00	PGI 0,2	–	1550	–	–	0	–	–	released before reaching bottom
555	Great Australian Bight	37°21′S 138°44′E	875	6.12.	0.05	PGI 0,2	clay, a little sand	955	–	–	0	–	–	3.5 1.
556	Great Australian Bight	37°18°S 138°43′E	795	6.12.	0.30	PGI 0,2	clay	750	–	–	0	–	–	9 1.
557	Great Australian Bight	37°13′S 138°42′E	680	6.12.	1.30	PGI 0,2	clay	455	–	–	0	–	–	5 1.
574	Tasman Sea	39°45′S 159°39′E	4670	18.12.	13.40	ST 600 + SSD	–	7500	53°	57–62°	1.7	130	3.6	–
575	Tasman Sea	40°11′S 163°35′E	3710	19.12.	13.35	SOT	pteropod ooze	7500	45°	47–50°	2	115	4	–
	Tasman Sea	40°11′S 163°35′E	3690	19.12.	18.30	HYDR + KCS	–	1250–4000	–	–	0	195	–	KCS at bottom but empty
		1952												
599	Tasman Sea	45°47′S 164°39′E	4390	13.1.	17.45	ST 300 + D 45 + SSD	–	6080	58°	65–69°	1.4	150	3.5	–
600	Tasman Sea	45°46′S 164°34′E	4420	14.1.	0.15	PGI 0,2	Globigerina ooze	4730	–	–	0	–	–	not quantitative

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
601	Tasman Sea	45°51′S 164°32′E	4400	14.1.	7.45	HOT	Globigerina ooze	7500	53°	55–60°	1.7	120	3.5	–
	Tasman Sea	45°51′S 164°32′E	4360	14.1.	14.00	HYDR + KCS	–	0–4625	–	–	0	375	–	KCS empty
602	Tasman Sea	43°58′S 165°24′E	4510	15.1.	17.35	ST 300 + D 45 + D 80	bluish clay	6300	60°	66–70°	1.3	135	3	–
607	Tasman Sea	44°18′S 166°46′E	3830	17.1.	17.15	VG 0,2	–	4130	–	–	0	–	–	released before reaching bottom
	Tasman Sea	44°18′S 166°46′E	3580	17.1.	23.30	HOT	clay	6600	50°	51–58°	1.7	90	2.5	–
625	Tasman Sea	42°08′S 170°20′E	610	20.1.	15.05	KCS	Globigerina ooze	630	–	–	0	20	–	45 cm.
626	Tasman Sea	42°10′S 170°10′E	610	20.1.	16.00	PGI 0,2	Globigerina ooze	630	–	–	0	–	–	13 1.
	Tasman Sea	42°10′S 170°10′E	610	20.1.	18.00	ST 300	Globigerina ooze	1500	–	41–50°	1.5	65	1.5	–
	Tasman Sea	42°10′S 170°10′E	610	20.1.	21.45	HOT	Globigerina ooze	1500	–	30°	2.5	60	2.5	–
629	E of Cook Strait	41°46′S 175°48′E	c.2000	24.1.	22.00	TOT+DR	1100-1300 m.	1700	–	42–48°	1.5	110	3	–
634	Wellington-Auckland	39°05′S 178°20′E	1400	25.1.	21.10	TOT+DR	1000-1200 m.	1700	–	37–41°	–	110	–	–
636	Wellington-Auckland	37°24′S 178°24′E	–	26.1.	10.50	PGI 0,2	–	1400	–	–	0	–	–	no echo, gear not at bottom
638	Wellington-Auckland	37°33′S 175°57′E	660	26.1.	16.55	PGI 0,2	clay with a little sand	685	–	–	0	–	–	31 1.
649	Kermadec Trench	35°16′S 178°40′W	8210–8300	14.2.	0.05	ST 600	grey clay with pumice	11700	60°	60–65°	1.6	115	3	–
650	Kermadec Trench	32°20′S 176°54′W	6620–6730	15.2.	23.35	ST 600	brown clay with pumice	9400	59°	61–64°	1.5	135	3.4	–
651	Kermadec Trench	32°10′S 177°14′W	6960–7000	16.2.	12.55	HOT	brown clay with pumice	11600	54°	54–56°	1.9	35	1	–
652	Kermadec Trench	32°07′S 176°48′W	6030–5950	17.2.	3.10	HOT	–	10600	51°	–	2	15	0.5	gear not at bottom
653	Kermadec Trench	32°09′S 176°35′W	6180	17.2.	19.20	HOT	brown clay with pumice	10800	51°	51–52°	2	35	1.2	–
654	Kermadec Trench	32°10′S 175°54′W	5850–5900	18.2.	12.45	HOT	brown clay with pumice	10500	50°	50–54°	2	100	3.3	net partly torn
656	Kermadec Trench	35°20′S 178°55′W	7640 7680	20.2.	6.05	ST 600	–	10600	61°	61–63°	1.5	70	1.8	–
658	Kermadec Trench	35°51′S 178°31′W	6660–6770	20.2.	22.45	ST 600	brown sand with clay and stones	9900	57°	60–64°	1.5	135	3.6	net partly torn

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
659	Kermadec Trench	35°30′S 178°46′W	7840	21.2.	20.15	ST 600	–	11200	59°	61–63°	1.6	120	3.2	gear not at bottom
660	Kermadec Trench	35°35′S 178°51′W	7800–7310	22.2.	11.15	ST 600	–	11200	59°	61–64°	1.6	120	3.2	gear not at bottom
661	Kermadec Trench	36°07′S 178°32′W	5340–5230	23.2.	2.40	ST 600	pumice in abundance	8500	53°	56–62°	1.7	125	3.5	–
662	Kermadec Trench	36°22′S 178°23′W	4630	23.2.	13.25	HOT	–	9100	44°	44–47°	2.2	80	3	gear not at bottom
663	Kermadec Trench	36°31′S 178°38′W	4410	24.2.	0.30	HOT	brown sandy clay with pumice	9000	44°	46–50°	2.2	125	4.5	–
664	Kermadec Trench	36°34′S 178°57′W	4540	24.2.	11.30	HOT	brown sandy clay with pumice	8900	46°	46–51°	2.1	120	4.2	–
665	Kermadec Trench	36°38′S 178°21′E	2470	25.2.	7.40	HOT	grey clay	5600	41°	41–44°	2	100	3.3	bag lost
668	Kermadec Trench	36°23′S 177°41′E	2640	29.2.	1.50	HOT	clay	5000	47°	48–51°	2	75	2.5	–
677	Kermadec Trench	28°38′S 175°53′W	9130	4.3.	10.45	HYDR + PCS	–	6910–9715	–	–	–	390	–	PCS at bottom, but empty
	Kermadec Trench	28°38′S 175°53′W	9190	4.3.	20.00	HYDR + PCS	clay	0–9760	–	–	0	610	–	PCS: 30 cm.
685	Tonga Trench	21°06′S 173°33′W	9840	10.3.	15.05	HYDR + PCS	rocks or stones	7550–10100	–	–	0	912	–	PCS empty
686	Tonga Trench	20°53′S 173°31′W	9770	11.3.	7.35	HYDR + PCS	grey clay	7860–10390	–	–	0	445	–	PCS: 90 cm.
689	Tonga-Samoa	13°03′S 170°46′W	4980	15.3.	18.00	HYDR + KCS	brown clay	4060–5210	–	–	0	230	–	KCS: 70 cm.
710	Off Mexico	19°42′N 105°41′W	670	26.4.	20.40	TOT+DR	350-500 m.	1500	–	20°	–	100	–	–
712	Off Mexico	17°00′N 102°42′W	4830–4730	28.4.	17.00	ST 600	–	6500	62°	58–60°	1.5	90	2.3	gear not at bottom
716	Acapulco-Panama	9°23′N 89°32′W	3570	6.5.	11.45	HOT	dark, muddish clay	8000	41°	41–43°	2.3	55	2.2	–
723	Gulf of Panama	5°38′N 79°30′W	3230	12.5.	11.00	PGI 0,2	dark clay	3600	–	–	0	–	–	41 1.
724	Gulf of Panama	5°44′N 79°20′W	2950–3190	12.5	18.40	ST 600	dark clay and stones	5500	40–48°	49–58°	1.8	120	3.6	bags torn
725	Gulf of Panama	5°43′N 79°20′W	2730	13.5.	0.20	PGI 0,2	–	3000	–	–	0	–	–	not released, gear entangled in wire
726	Gulf of Panama	5°49′N 78°52′W	3670–3270	13.5.	11.10	HOT	clay	8000	43°	43–47°	2.2	80	3	–

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
727	Gulf of Panama	6°23′N 78°43′W	3570	13.5.	20.10	TOT + DR	850-1150 m.	3000	–	25–31°	2.5	170	7	–
728	Gulf of Panama	7°26′N 79°31′W	775	14.5.	11.00	LLH & LLS	–	–	–	–	0	540	–	200 hooks; line lost
	Gulf of Panama	7°26′N 79°31′W	775	14.5.	12.50	PGI 0,2	–	860	–	–	0	–	–	not released
	Gulf of Panama	7°26′N 79°31′W	755	14.5.	13.30	PGI 0,2	green clay	785	–	–	0	–	–	24 l.
729	Gulf of Panama	7°22′N 79°33′W	875	14.5.	14.55	PGI 0,2	green clay	905	–	–	0	–	–	29 l.
730	Gulf of Panama	7°21′N 79°32′W	995	14.5.	15.55	PGI 0,2	green clay	1015	–	–	0	–	–	39 l.
731	Gulf of Panama	7°20′N 79°33′W	1175	14.5.	17.20	PGI 0,2	green clay	1270	–	–	0	–	–	30 l.
732	Gulf of Panama	7°20′N 79°33′W	995	14.5.	18.25	PGI 0,2	green clay	1025	–	–	0	–	–	25 l.
733	Gulf of Panama	7°21′N 79°35′W	730–760	14.5.	21.30	LLH	–	–	–	–	0	720	–	200 hooks; no catch
734	Gulf of Panama	7°20′N 79°38′W	520	15.5.	1.25	PGI 0,2	green clay	525	–	–	0	–	–	24 l.
735	Gulf of Panama	7°23′N 79°38′W	400	15.5.	2.35	PGI 0,2	green sandy clay	424	–	–	0	–	–	21 l.
736	Gulf of Panama	7°20′N 79°36′W	600	15.5.	3.35	PGI 0,2	green clay	610	–	–	0	–	–	22 l.
737	Gulf of Panama	7°20′N 79°35′W	695	15.5.	4.20	PGI 0,2	green clay	700	–	–	0	–	–	not quantitative
	Gulf of Panama	7°20′N 79°35′W	695	15.5.	4.55	PGI 0,2	green clay	700	–	–	0	–	–	26 l.
738	Gulf of Panama	7°19′N 79°36′W	775	15.5.	5.55	PGI 0,2	green clay	800	–	–	0	–	–	25 l.
739	Gulf of Panama	7°22′N 79°32′W	915–975	15.5.	13.15	HOT	green clay	3800	25°	26–27°	2.5	60	2.5	–
740	Gulf of Panama	7°24′N 79°38′W	450	15.5.	22.00	LLH & LLS	–	–	–	–	0	960	–	200 hooks; no catch
741	Gulf of Panama	7°28′N 79°36′W	440–460	16.5.	0.05	ST 300 + D 45 + D 80	green clay	1500	–	–	–	60	–	–
	Gulf of Panama	7°28′N 79°36′W	520	16.5.	2.40	PGI 0,2	green clay	525	–	–	0	–	–	40 l.
742	Gulf of Panama	7°28′N 79°37′W	500	16.5.	3.20	PGI 0,2	green clay	515	–	–	0	–	–	30 l.
743	Gulf of Panama	7°27′N 79°37′W	600	16.5.	4.40	PGI 0,2	green clay	620	–	–	0	–	–	17 l.
744	Gulf of Panama	7°28′N 79°39′W	420	16.5.	6.10	PGI 0,2	green sandy clay	450	–	–	0	–	–	25 l.

Station	Locality	Position	Depth in metres	Year Date	Hour	Gear	Bottom or estimated fishing depth (E. F. D.)	Wire out metres	Inclination of wire		Speed in knots	Duration of haul in minutes	Length of haul in sea-miles	Remarks
745	Gulf of Panama	7°15′N 79°25′W	915	16.5.	17.05	ST 600 + D 45 + D 80	green clay	3000	–	–	–	40	–	–
746	Gulf of Panama	6°42′N 80°18′W	3470	17.5.	5.40	HOT	–	8100	40°	40–49°	2.4	45	–	gear totally lost
747	Gulf of Panama	6°39′N 80°32′W	3490	17.5.	11.25	HYDR + KCS + DR	–	0–3675	–	–	–	290	–	KCS: 105 cm.
748	Gulf of Panama	6°35′N 80°48′W	3420–3460	17.5.	23.20	HOT	–	6800	43°	43–45°	2	65	2	ship stopped for 4 hours, gear totally lost
758	Puerto Rico Trench	18°45′N 66°27′W	2840	30.5.	23.30	ST 600	–	5000	46°	50–57°	1.5	60	1.5	One bag lost, one torn
759	Puerto Rico Trench	18°30′N 66°15′W	1250	31.5.	6.15	PGI 0,2	stiff red clay	1300	–	–	–	–	–	19 1.
761	Sargasso Sea	25°00′N 56°02′W	6300	4.6.	8.40	SOT	–	11200	50°	50–55°	2	120	–	gear and 3500 m. wire lost
771	Gulf of Biscay	47°48′N 8°26′W	1920	18.6.	11.10	PGI 0,2	stiff clay	2000	–	–	0	–	–	17 1.
772	Gulf of Biscay	48°00′N 8°18′W	1520	18.6.	13.10	PGI 0,2	–	1700	–	–	0	–	–	released before reaching bottom
	Gulf of Biscay	48°00′N 8°18′W	1520	18.6.	14.40	PGI 0,2	–	1800	–	–	0	–	–	a few cc.
773	Gulf of Biscay	47°50′N 8°23′W	1680	18.6.	18.10	PGI 0,2	sand and dark clay	1900	–	–	0	–	–	50 cc.
774	Gulf of Biscay	47°52′N 8°23′W	855	18.6.	20.10	PGI 0,2	–	1000	–	–	0	–	–	a few cc.

15. 12. 58. 600. 300.