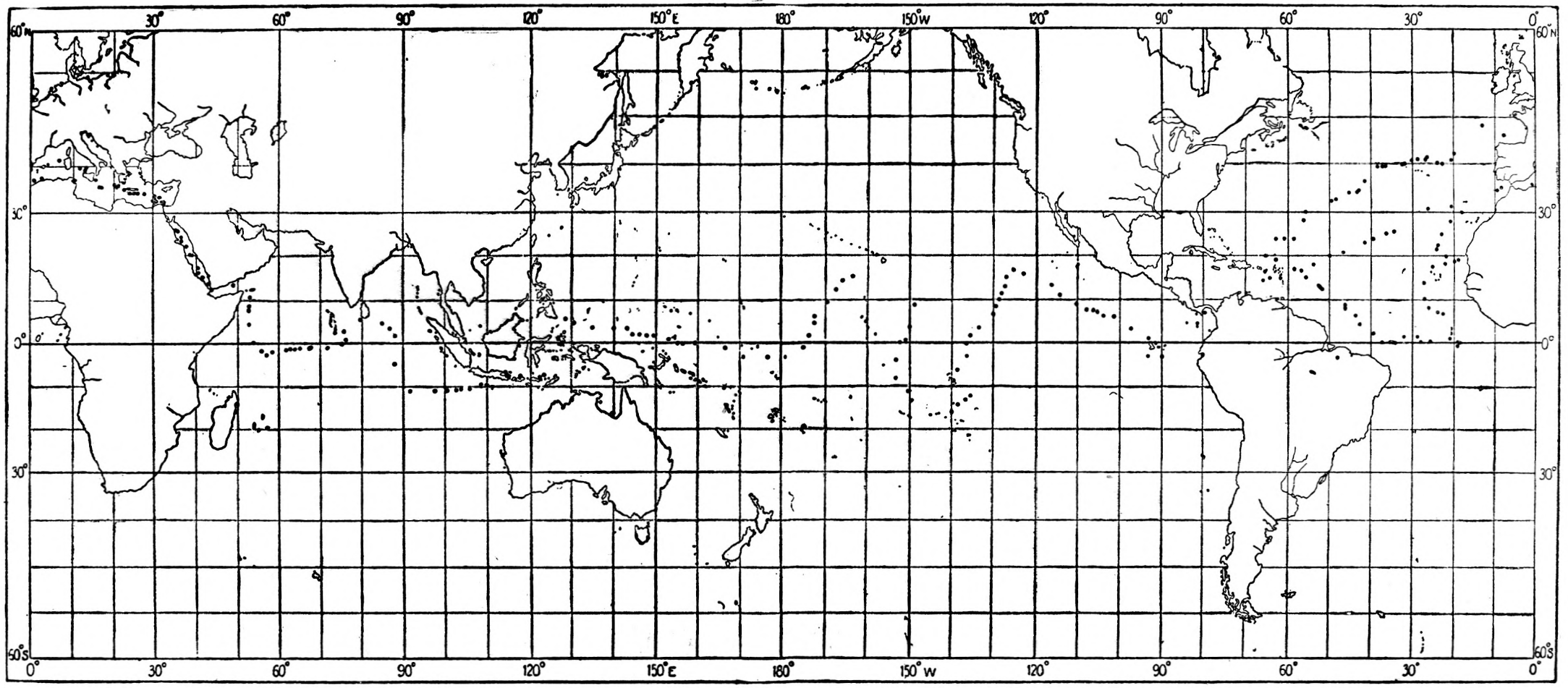

Sediment Cores of the Swedish Deep Sea Expedition "Albatross" 1947-48.

THE SWEDISH ROUND-THE-WORLD DEEP SEA EXPEDITION.

"Albatross" - 1947-1948 - Geological Collections.

The following passages in an article by Dr. Gustaf ARRHENIUS concerning the general results of the above expedition have been extracted from the *Geologiska Förcningens i Stockholm Förhandlingar*, Stockholm, March - April, 1950.

As it will take several years before the results of the geological investigations of the Swedish Deep Sea Expedition can be published in full, a wish has been expressed that a brief and informal survey of the material, the plans for its treatment, and the extent to which these plans have been realized should be accessible. The purpose of this paper is to provide such a survey.

The geological collection consists of sediment cores, fathometer records, and seismic reflection records. The sediment cores, raised with the *Kullenberg* piston corer (1947) — (a brief sketch of Martin Kullenberg's career will be found in the *International Hydrographic Review*, Volume XXIV, 1947, page 189) — vary in length up to 19 metres. The distribution of the samples taken during the Swedish Deep Sea Expedition in 1947-1948 is shown in Figure 1. The main stratigraphical and petrographical features and the sampling conditions are summarized below.

Biscay : Hard, flat bottom ; corer broke.

Madeira - Martinique : Different pelagic types of sediment with regional transitions. Columns frequently stratified as regards the carbonate content of the sediment.

Caribbean Sea : Only two coring operations. Reducing environment, pelagic, terrigenous, and volcanic components. Graded beds.

Balboa - Galapagos : Detritogenic muds, often koprolithic, branches and trunks of trees, green coloured sediment.

Galapagos - Hawaii via 20° N. 127° W. - Nukuhiva - Tahiti : Three cuts over the equatorial current system and the corresponding sediment zones. Calcium carbonate ooze, siliceous ooze, and different varieties of red clay. Well developed stratification caused by changes in plankton production and the effectiveness of mud eater action on the sediment. Dissolution and precipitation of silica within the sediment, causing flint layers. Submarine volcanism, graded beds, slides, erosion and inconformities in the neighbourhood of the archipelagos.

Hawaii - Philippines : Similar to the Eastern Pacific area, but the vicinity of the archipelagos influences the deposit. The bottom topography of the Philippine trough is very irregular like the other deep sea troughs investigated. Breccias and sand layers indicate extensive slides.

Austral - Asiatic Mediterranean : Terrigenous influence and appreciable degree of reduction. Presumably high content of organic matter. The layers appear to be highly homogenized by digging animals.

Indian Ocean via Java trough - Ceylon - Seychelles - Bab el Mandeb : Eastern part strongly marked by recent submarine volcanism, bottom often irregular and naked, sediments often siliceous. In the western part calcium carbonate oozes often remarkably fine-grained and stratified. South of Ceylon extremely flat bottom over wide areas, naked or covered with a thin layer of sediment.

Red Sea : Mixed deposit of pelagic and terrigenous origin. Layers sometimes strongly cemented with calcium carbonate.

Mediterranean : Unusually well developed stratification and graded bedding, volcanic and eolian influence, layers resembling peat consisting of marine humus.

Tanger - Romanche Deep via Cape Verde : Strong eolian influence from the African continent varying with time. Sometimes extremely well-rounded quartz grains with white, frosted surfaces. Local volcanism.

Romanche Deep : Breccias, sand and silt layers, well developed graded bedding. Upper part of one core rich in fine-grained organic matter.

St. Paul Rocks - Virgin Islands : In a series of cores from the Western Atlantic Valley terrigenous deposits were found below several metres of purely pelagic sediment. The terrigenous deposits consist of cross-bedded sandy silt with chlorite and are rich in plant remains such as bark, wood, cuticula, root-fibres, spores, sporangia of pteridofyta, and pollen. This formation looks very like distal delta sediment.

Virgin Islands - Bay of Biscay : Manganese crust resting on rock breccia in Puerto Rico trough, where trawling also brought up a great many manganese nodules. Very tough calcium carbonate oozes on the Atlantic ridge. Northernmost cores fairly rich in marine humus and traces of scavengers. Glacial layers contain gravel and sand, transported by icebergs.

The brief regional characteristics given above are of necessity very superficial and only a few of the numerous interesting features have been given.

The sediment cores collected total approximately 1 650 metres.

Of great geological interest are the seismic measurements made by Dr. W. Weibull's reflection method, which have very often revealed secondary reflection surfaces at various depths in the sediment. Some of the results from the Atlantic Ocean and the Mediterranean have already been published : Weibull, W. and Pettersson, H. : *The Thickness of Ocean Sediments measured by a Reflexion Method :* Medd. fr. Oceangr. Inst. i Göteborg, 12 : 1947.