



Bathymetry and bottom sediments off the
coast of Iceland.

John K. Hartsook

Hydrographic Office Mar 1950

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OFF THE COAST OF ICELAND

by

John K. Hertzock

Washington, D.C.

Hydrographic office

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SECTION I. INTRODUCTION

General Statement

The purpose of this report is to present the results of a reconnaissance study of the bottom sediments and bathymetry off the coast of Iceland made during the winters of 1947-48, 1948-49, and 1949-50.

The report consists of (1) six British Admiralty hydrographic charts; (2) one index chart showing the location of the above; and (3) a written description and interpretation of the charts. The six hydrographic charts, ranging in scale from 1: 254,000 to 1:287,468, show the distribution of the various bottom types. They completely encircle Iceland, showing all of the coastline and the waters covering the surrounding submarine shelf. The index chart, scale 1:750,000, shows all of Iceland, the submarine shelf, and the submarine slope beyond the shelf. All charts were obtained through the courtesy of the U.S. Hydrographic Office.

The study is based primarily on the many notations on the charts showing the quality of the bottom ("s", "g", "cz", etc.). This is supplemented by information from the Sailing Directions (16) and numerous other readings. No bottom samples have been examined directly

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The study is based primarily on the data obtained on the charts showing the quality of the bottom ("a", "g", "ex", etc.). This is supplemented by information from the British Hydrographic (18) and numerous other readings. No bottom samples have been examined directly

by the author. However, it is hoped that this report may be useful as a guide to future investigators in this field.

Beside the purely descriptive analysis of sediment distribution, an attempt has been made in places to interpret the geology of the seabottom from the submarine relief, from the pattern of the bottom types, and from the known geological history of the adjacent land.

In this report distances are measured in nautical miles. The latitude subdivisions along the sides of the charts may be used for a graphic scale, with each minute of latitude equalling one mile.

Types of Bottom

Six bottom types are portrayed on the charts. These are: sand, sand and mud, mud, rock, gravel, and coral. A diagonal overprint is used to indicate the presence of shells in any of the above types.

Since bottom notations are the chief source of information the authenticity of the bottom types outlined depends upon the accuracy of the notations. Shepard, in his report on the continental shelf sediments, written for the symposium, "Recent Marine Sediments"

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(24, p. 211) states that, although lacking in geological training, the hydrographer usually describes the bottom as reliably as a geologist would without microscopic examination. Sand and gravel are almost always determined accurately. The finer sediments, labelled "mud", may be interpreted geologically as silt and clay, sometimes containing a small proportion of silt. The term "mud" when used on continental shelves is probably applied to "soft liquid mud which sometimes deep-sea muds in appearance but is not of organic origin (19, p. 181)."

Regarding rock bottom, in the passage from "Recent Marine Sediments" Shepard states the following:

"The term 'rocky' is generally based either on the finding of corals or sponges on the bottom, or on the presence of angular rock fragments in the sample. Such observations do not prove that ledge rock has been encountered, as both the scratches and the angular fragments could come from the presence of granitic boulders carried out by ice or by vegetation rafts. On the other hand, where the report of rocky bottom is indicated by several observations from one area it appears unlikely that granitic fragments could be the cause, and, therefore, may now be fairly confident that ledge rock crops out on the bottom."

Topographic Setting

The following descriptions of the topography and geology of Iceland are based on the works of Thorsness (25; also, 24, pp. 131, 134, 211, 213, 214-215), Iven

The first part of the report deals with the general situation in the country. It is noted that the economy is showing signs of recovery, but that inflation remains a serious problem. The government has taken measures to control inflation, but these have had limited success. The report also discusses the social and political situation, noting that there is a growing awareness of the need for reform.

The second part of the report provides a detailed analysis of the economic situation. It examines the impact of inflation on the different sectors of the economy. It is found that inflation has had a particularly severe impact on the agricultural sector, which is the backbone of the economy. The report also discusses the role of the government in the economy, and the need for a more active role in promoting growth and stability.

CONCLUSIONS

In conclusion, the report finds that the country is facing a difficult economic situation. Inflation is a major problem, and the government needs to take more effective measures to control it. The report also recommends that the government should focus on promoting growth and stability, and that it should take steps to improve the social and political situation.

(19, pp.11,30), Gregory (8, p.139); and, Wilson (17, p.279).

Topographically Iceland is a plateau fringed in places by coastal lowlands and trenched by long, narrow alluviated valleys. The lowlands are most extensive along the southeastern and southwestern coasts, where for convenience they are called in this report the southeastern lowland and the southwestern lowland. The long, narrow valleys, for the most part, trend northward from the interior and open into fjords indenting the northern coast.

The interior plateau is essentially an uninhabitable sand and lava desert, lying 700 to 1000 meters above sealevel. Rising 600 to 1000 meters above the southern portion of this plateau, and 1400 to 2000 meters above the southeastern and southwestern lowlands along the coast is a series of ice-capped, cone-shaped mountains, where lowlands are lacking, as along the eastern and the northwestern coasts, the sea beats directly against the eroded cliffs of the plateau edge.

Connected to the northwestern corner of Iceland by a narrow neck of land is a triangular-shaped peninsula, whose coasts are deeply indented by fjords. The surface of this peninsula is a plateau averaging 800

The first part of the report deals with the general situation in the country and the progress of the work done during the year. It then goes on to discuss the various projects which have been undertaken and the results which have been achieved. The report concludes with a summary of the work done and a list of the recommendations which have been made.

The second part of the report deals with the financial position of the organization. It gives a detailed account of the income and expenditure for the year and shows how the funds have been used. It also discusses the various sources of income and the methods which have been used to raise money. The report concludes with a statement of the financial position at the end of the year and a list of the recommendations which have been made.

The third part of the report deals with the personnel of the organization. It gives a list of the names of the staff and their positions and discusses the work which they have done during the year. It also discusses the methods which have been used to recruit staff and the methods which have been used to train them. The report concludes with a list of the recommendations which have been made.

aters elevation above the sea. Its coastline is the cliffed plateau edge. For convenience this peninsula is called in this report the Northwestern Peninsula.

Geologic Setting

Iceland is a remnant of a volcanic plateau which, during early Tertiary times probably spanned the entire North Atlantic. This plateau is believed to have been broken up by block faulting and subsidence in the Miocene epoch which left Iceland an island with its coasts 25 to 50 miles further out on all sides than now. Other remnants of this plateau are the Faeroe Islands, the islands of Mull and Skye off the western coast of Scotland, Antrim in northeastern Ireland, and the basalt region of eastern Greenland.

Subsidence continued through the Pliocene until the strand line was over 100 meters above the present strand line. Shell-bearing beds of sandstone, which correlate tentatively with the Pliocene Red Crag formation of England, were deposited at this high level. Apparently the island shelf was planed by wave action during this period of subsidence.

At the end of the Pliocene epoch the island was re-elevated until the sea had retreated beyond

... meters elevation above the sea. Its coastline is
the dotted line above. For convenience this peninsula
is called in this report the Northwest Peninsula.

Geologic History

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strip less than 50 miles further east of all other
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western coast of Scotland, Azores in northeastern Ireland,
and the British region of eastern Greenland.
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which correlate tentatively with the Wisconsin Red Gorge
formation of England, were deposited at this high level.
Apparently the island itself was raised by wave cutting
during this period of subsidence.
At the end of the Wisconsin upon the island
was re-elevated until the sea had retreated beyond

the present 150-fathom line. The submerged valleys which now extend outward from the main bays and fjords (see index chart B.A. 565) were cut at that time, when the shelf was exposed to subaerial erosion.

During the Pleistocene epoch the island subsided again until the strand line lay at about the same level as it did before; i.e. 100 meters or more above the present strand line. Again, as before, shell beds were deposited at the highest level. These date the time of maximum re-submergence as mid-Pleistocene. Since that time the land has been emerging, with hills low enough to permit the formation of several marine terraces.

In the Pleistocene epoch at least twice the entire island was covered by an ice sheet through which a few peaks projected, as in Greenland today. The ice covered the coastal lowlands and apparently extended past the present strand line, as large amounts of moraine have been found at various places on the seabottom off the mouths of the fjords.

Vulcanism, which was active during the early and middle part of the Tertiary, apparently ceased during the Pliocene epoch until the period of emergence at the end. It then broke forth, and during the Pleistocene a number of large volcanoes were active. This activity

the present 150-foot line, the submerged valley which
 now extends seaward from the main bay and lagoon (see in-
 set sketch B. A. 10) there are at least three main
 basins separated by low ridges.
 During the Pleistocene epoch the island was
 raised again until the present line lay at about the same
 level as it did before; i. e. 100 meters or more above the
 present sea level. Again, as before, small bays were
 separated by the highest level. These bays were the
 maximum re-embayments in mid-Pleistocene. Since that
 time the land has been emerging, with bays being narrow
 to form the formation of several marine terraces.
 In the Pleistocene epoch of lower level the
 entire island was covered by an sheet of water which
 was low level, as is shown today. The sea
 covered the present coastline and apparently extended
 past the present sea line, as large amounts of marine
 shells have been found at various places on the southeast side
 the margin of the lagoon.
 Volcanism, which was active during the early
 and middle part of the Tertiary, apparently ceased during
 the Pleistocene epoch until the period of emergence of the
 land. It then broke forth, and during the Pleistocene
 a number of large volcanoes were active. This activity

has continued into recent times.

The island is built mostly of basalt flows, with associated tuffs and breccias. Remains of *Ilperigia* are scattered throughout the island, and gathered together along the southeastern coast. Interbedded in the basalt in places are a few clayey layers bearing slight remains of probable algaean life. In some of these layers the carbonaceous material is abundant enough to form lignite. On the peninsula of Tjörnes, in northern Iceland, shell-bearing sandstones of Red Crag age mark the lowest limit of submergence. Extensive glacial sandlines, some later bedded with local shells, occur in many places over the island. For the most part these are Pleistocene in age.

Submarine leveling

On Murray's chart showing the bathymetry of the North Atlantic (ib. fig. 1) a submarine ridge several hundred miles wide and less than 100 fathoms deep, as compared with depths of 1000 fathoms or more on the adjacent bottom, extends from Greenland southward across the Atlantic Ocean to Scotland. Iceland is perched on this ridge at about its mid-point, and the Faeroe Islands, near the Scotland end. It presumably represents the submerged portion of the North Atlantic volcanic plateau mentioned on page 7.

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Handel's chart (9, Part 1, Plate 1), showing greater detail than Murray's, indicates a trough 800 fathoms deep cutting halfway through this ridge from the north between Iceland and Greenland, and, at the same place, another trough over 700 fathoms deep cutting into it from the south. The saddle between these two troughs lies from 300 to 400 fathoms deep. This saddle and part of the northern trough may also be seen in the northwest corner of the index chart in this report (A. I., 565).

As shown on Handel's chart, southeastward from Iceland the bottom slopes gradually down to 275 fathoms about midway between Iceland and the Faeroe Islands, and remains at that depth until the incline up to the Faeroes is reached. Iwan (10, p. 183) gives a southeast-northwest profile of this ridge which shows the deepest spot to be at the Faeroes end, at the base of the incline.

According to Hoggild (9, Part 1, Plate 1), this portion of the ridge southeast of Iceland is mantled with "grey, deep-sea clay", characterized in the text as "a generally rather rich and clean variety of clay of a grayish color." In view of the proximity of active volcanoes on Iceland this clay should contain a large proportion of volcanic material. Andrié (1, p. 479) states that a later bottom sediment chart by Hoggild indicates volcanic

Wendell's chart (p. 10) shows a

greater depth than Murray's, indicating a

depth of 100 fathoms between the

depth between the 100 and 200 fathoms, and at the

depth, another depth over 700 fathoms deep

is from the south. The depth between these two

is from 300 to 400 fathoms deep. This

of the northern depth may also be seen in the

chart of the index chart in this report (p. 10).

As shown on Wendell's chart, southward from

the bottom slope gradually down to 200

depth along between the 100 and 200 fathoms, and

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sand covering the ridge. The ocean basins north and south of the ridge are floored with globigerina ooze.

Surrounding Iceland, and extending from the shore out to depths of from 100 to 150 fathoms is a discontinuous submarine platform. This is the equivalent of the continental shelves off the various continents, and in this report is called "the island shelf", or simply "the shelf". Accordingly, the submarine slope from the outer edge of the shelf down to the ocean basins on the north and south, or to the Greenland-Faeroe ridge on the east-southeast and west-northwest, is called "the island slope". Hoeggild (9, Part 3, Plate 1) classifies the sediments covering the shelf as "shallow-water deposits", and it is mainly with these sediments that this report is concerned.

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the east-southeast and west-southwest, is called "the
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the sediments covering the shelf as "shallow-water de-
posits", and it is mainly with these sediments that this
report is concerned.

SECTION II. LOCALITY OF CHART

S.A. 2711 (Approximate Scale 1:260,000)

General Statement

This chart shows the shelf off the southwest-ern coast and southern half of the eastern coast of Ice-land. It extends from the light of Myrdalsvík (Latitude 64 degrees 48 minutes N., Longitude 19 degrees W.) on the southern coast to the volcano called Sneefellsjökull (Latitude 64 degrees 48 minutes N., Longitude 23 degrees 48 minutes W.) on the north side of the bay, Faxaflói.

S.A. 2701, on the east, extends to Longitude 19 degrees 48 minutes W., giving an overlap with this chart of about twenty-two miles of shoreline. Particulars occurring on either chart within this overlap have been transferred to the other in order to show all avail-able information on both charts. This practice has been followed with the remainder of the charts also.

Extra data have been added from larger scale charts in the following places: on the shelf from shore-line to southern edge of the chart between the Thjórná River and Myrdalsvík, from S.A. 2963 (1:111,300); in the eastern half of Faxaflói, from S.A. 2301 (approximately 1:87,450) and S.A. 2729 (1:101,000).

STATE OF NEW YORK

IN SENATE

JANUARY 11, 1933

REPORT OF THE STATE BOARD OF HEALTH
 CONCERNING THE STATE OF HEALTH AND THE
 PREVALENCE OF DYSPEPSIA IN THE STATE OF NEW YORK
 FOR THE YEAR 1932

The State Board of Health has the honor to submit to the Senate its report for the year 1932, in accordance with the provisions of Chapter 519 of the Laws of 1929, and Chapter 32 of the Laws of 1930, Chapter 396 of the Laws of 1931, Chapter 15 of the Laws of 1932, and Chapter 15 of the Laws of 1933.

The report is divided into two parts, the first of which contains a general survey of the state of health in New York during the year 1932, and the second part contains a detailed report on the prevalence of dyspepsia in the state during the same period.

The general survey shows that the state of health in New York during the year 1932 was generally good, and that the mortality rate was low. The most serious health problem in the state during the year 1932 was the prevalence of dyspepsia, which was found to be a widespread condition.

The detailed report on the prevalence of dyspepsia shows that this condition was found to be a widespread condition in the state during the year 1932. It was found to be most prevalent in the city of New York, and in the counties of Albany, Rensselaer, and Schoharie.

The causes of dyspepsia in New York are believed to be due to a variety of factors, including diet, stress, and heredity. It is believed that the prevalence of dyspepsia in New York is due to a combination of these factors.

The State Board of Health is of the opinion that the prevalence of dyspepsia in New York is a serious health problem, and that it should be given the highest priority in the state health program. It is recommended that the State Board of Health should take the following steps to combat this condition:

1. Conduct a campaign of public education to educate the public on the causes and symptoms of dyspepsia.
2. Conduct a campaign of public education to educate the public on the importance of a healthy diet.
3. Conduct a campaign of public education to educate the public on the importance of stress management.
4. Conduct a campaign of public education to educate the public on the importance of heredity.
5. Conduct a campaign of public education to educate the public on the importance of regular medical check-ups.

The State Board of Health is confident that these steps will result in a reduction in the prevalence of dyspepsia in New York during the year 1933.

STATE BOARD OF HEALTH
 ALBANY, N. Y., JANUARY 11, 1933

Presence of shells in the sediments

All sandy areas on this chart bear the bottom notation "fine sand and shells". Many of the areas of gravel and mud may also contain shells in greater or lesser degree. However, since the bottom notations make no mention of this the author has not indicated their presence in the gravel and mud.

The shelf from Myrdalsvik to the Markarfljót River

The coast from Myrdalsvik to the mouth of the Markarfljót River is, for the most part, low and sandy, with the ice-carved mountains of Myrdalsjökull and Eyjafjalla Jökull rising abruptly from the plain at distances of from 2 to 3 miles inland. As seen on the index chart, S.A.565, the offshore shelf for about two-thirds of this distance between Myrdalsvik and the Markarfljót increases in depth fairly regularly and to 100 fathoms, about eight miles offshore. Beyond this depth the bottom drops rapidly to 500 fathoms or more in less than 5 miles. The "sand line", or boundary with the mud, has been placed approximately at the 100-fathom depth curve. This sand is Høeghild's grey, deep-sea clay (see page 10).

West of longitude 19 degrees 15 minutes W. the shelf is indented by Safa Djúp. This is a submarine valley which, as shown by the greater sounding detail on S.A.2968, divides

Language of shells in the section

All sandy areas on this level bear the bottom notation "fine sand and shells". Many of the areas of gravel and may also contain shells in greater or lesser degree. However, since the bottom notations make no mention of this the section has not indicated their presence in the gravel bed.

The shell from level 10 to the level of the

The sand from level 10 to the mouth of the Kankakee River is, for the most part, low and sandy, with the ice-scraped material of gravel, sand and silt. This shell also occurs from the level of distance of from 2 to 5 miles inland, as seen on the level of 10. The shell is about 1/2 inch in diameter and is scattered between level 10 and the level of 10. The distance between level 10 and the level of 10 is about 100 feet. Beyond this level the section shows a rapid rise to level 10. The "red line" or boundary with the sand, has been placed approximately at the 100-foot level. This sand is described as gray, brownish clay (see page 10).

Level of boundary is shown in section 10. The shell is indicated by dots and lines. This is a diagrammatic relief which is shown by the greater amount of detail on the level of 10.

into two branches, one heading north toward the north of the Hærflijt and the other heading north-northwest and north to a point a little over one mile east of Lilidsey, the easternmost of the Vestmannaeyjar Islands. The mud line reflects the bathymetry by swinging into the west of longitude 19 degrees 45 minutes E. and shoaling to about fifty fathoms. It then curves south-westward and westward around the submarine ridge between the two branches of Hæfa Djúp, then north-westward and northward up the west branch, and finally runs off the coast a long way south-eastward along the submarine platform bearing the Vestmannaeyjar Islands. The shoaling of the mud line in Hæfa Djúp may be explained by the lack of sharp drops at the 100-fathom line such as obtains east of longitude 19 degrees 45 minutes E.

Except for rocky areas at Myrdalavik and Fortland, the strait between Myrdalavik and the Hærflijt is bordered offshore by a belt of sandy bottom. For about half this distance the belt averages 12 miles in width, and is bordered to the seaward by a belt of gravel 4 to 6 miles wide extending out to the mud line. West of longitude 19 degrees 35 minutes E. the gravel belt tapers off rapidly and comes to an end. The sandy belt widens to 6 miles across, coming in direct contact with the zone of mud, then narrows again to 2 miles

into two branches, one leading north toward the north
 of the main channel, and the other leading south-
 easterly and north to a point a little over one mile
 east of Alibey, the westernmost of the Vostokan
 islands. The mud line between the branches is
 about 100 fathoms deep. It then curves south-
 westerly and beyond around the southern tip of
 the two branches of Bate D'Almeida, then northward and
 northward up the west branch, and finally runs off the
 coast a long way the northward side of the main
 channel leading the Vostokan islands. The location
 of the mud line is here also explained by the fact
 of sharp depth of the 100-fathom line such as obtain
 east of longitude 158 degrees 15 minutes.
 Except for rocky areas at Alibey and
 elsewhere, the ground between Alibey and the western
 tip is covered offshore by a belt of sandy bottom.
 For about half this distance the belt averages 1/2 mile
 in width, and is bounded to the seaward by a belt of
 gravel a few miles wide extending out to the mud line.
 West of longitude 158 degrees 30 minutes the gravel
 belt extends still farther and comes to an end. The sandy
 belt extends as a mile here, ending in direct contact
 with the zone of mud, then narrows again to 1/2 mile

north of the Vestmannaeyjar Islands. This sand is composed of volcanic rock and mineral particles. According to Thoroddsen (22, p. 244) quartz sand does not occur in Iceland.

Vestmannaeyjar Islands

The rocks on the Vestmannaeyjar Islands, and presumably on the submarine platform on which they lie, consist of basalt flows, tuffs, and breccias of post-Tertiary age (23). Areas and patches of rock bottom surround the islands and form numerous shoals to their southwest, west, and east. Surrounding this group of rocky islands and shoals is an irregular-shaped area of gravel measuring 17 miles east-west and 15 miles northeast-southwest, the result of wave and current action plus probably some submarine vulcanism.

The author has shown a small zone of gravel extending west from the rocky shoal, Sandgerund, about five miles north of Heiðmøy, the largest island. This is based on a small but pronounced submarine ridge indicated by the soundings on B.A. 2968.

The Shelf From the Þorkerfljót River to Reykjanes

Northwest of the Þorkerfljót river the mountains give way to the great Southwestern Lowland, described on page 6. This lowland extends 45 miles along the coast to the light called Thorlík Red, just west of the

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mouth of the Ólfasa River. For about half this distance the strand consists of a barrier beach backed by lagoons and marshes and the alluvial expanse of the lowland. Northwest of the mouth of the Injérsá River (Longitude 28 degrees 49 minutes N.) the coast is rock-fronted, with the zone of reefs and isolated rocks extending from 3/4 to 1 mile offshore. These reefs represent the eroded edge of a post-Miocene basalt flow (24, p. 219).

From Thorlak Red 35 miles west to the end of the peninsula of Reykjanes the coast is, for the most part, rocky and steep, and is backed by low mountains. This entire region, including both lowland and peninsula, is subject to violent earthquakes and volcanic activity.

Except for shoaling connected with the Vestmannaeyjar Islands, depths offshore in this region increase slowly and fairly regularly southward to the limits of the chart. On S.A. 505 the shelf is seen to increase over three times in width as compared to its width east of the Vestmannaeyjar Islands. The 100-fathom curve runs westward roughly forty-five miles past Reimney before it again turns northward into a submarine valley called Selvoggr Dyb on S.A. 2733 and Grindavikur Djúpi on S.A. 585. If depth curves are shown every 25 fathoms or less around Selvoggr Dyb they will outline a gentle but distinct tributary valley trending east-northeastward from the northeast

The first part of the report deals with the general
 situation of the country and the various aspects of
 the economy. It then goes on to discuss the
 political situation and the role of the
 government. The report also touches upon the
 social and cultural aspects of the country.
 In the second part, the author discusses the
 economic development of the country and the
 role of the government in this process. He
 also discusses the various challenges that the
 country is facing in this regard. The report
 concludes with some recommendations for the
 government to address these challenges and
 promote the economic development of the
 country.

corner of the deep toward the south of the Ölfusá. This may indicate a tectonic or a pre-submergence drainage relationship between Selvogur áfb and the Northwestern Lowland.

With the exception of several large sandy zones, the bank between Hofs Djúp and Selvogur áfb is covered with sand and shells throughout the eastern half, opposite the lowland, and with gravel throughout the western half, south of the Reykjanes peninsula. The sand can, without doubt, be attributed to the many large glacial rivers (the Árfell and Thverá, from Tináffjella Jökull and others; the Thjóra, from Vatna Jökull and Hofs Jökull; the Ölfusá, from Lang Jökull), draining across the lowland.

The gravel is less easy to explain. Shepard (19, p. 1036) has advanced the hypothesis that areas of gravel far out on the continental shelves may be residual from the Pleistocene epoch, when much of the shelves was exposed to subaerial conditions, or at least more effective wave erosion, as a result of lowered sea level. In Iceland during the Pleistocene the relative sea level probably rose rather than fell. However, at the end of the Pliocene it did fall, so that in essence Shepard's explanation may account for the gravel south of the Reykjanes peninsula, as well as the gravel east of Hofs Djúp.

Submarine ridge east of Reykjanes

West of Solvogr Dyb lies Reykjanes Dyb, another submarine valley separated from Solvogr Dyb by a long, narrow submarine ridge. Cutting across the east of Reykjanes Dyb, and extending east it is seen a number of features suggest it was formed later than the valley, is a high, narrow submarine ridge extending southeasterly from Reykjanes. A line of shoals, reefs, and islets (Hidgy, the Cairfuglasker, Hidayjarbod) marks the top of this ridge. It is interrupted by two channels over 100 fathoms deep; one, 7 miles southeast of Hidayjarbod in the Cairfuglasker, and the other, 7 miles south-southeast of Hidayjarbod.

Like the Reykjanes peninsula, this submarine ridge is the site of considerable volcanic activity. Flares and explosions have been reported at various times from the sea over this ridge, and several islands have appeared and disappeared within the historical period (14, p. 370; 22, pp. 501-512).

C.F. Wendel, in his report on the soundings taken by the Danish "Thetis" expedition of 1879 (1, vol. 1, p. 1) and (plate 1) describes the extension of the ridge to the southwest at least as far as latitude 64 degrees N. Later work by the German survey ship, the "Thetis", shows

DESCRIPTION OF THE LOCALITY

West of the highway, the road is paved with asphalt and is about 20 feet wide. The road is flanked by a concrete curb on the west side and a grassy area on the east side. The road leads to a small building which is about 20 feet long and 10 feet wide. The building is made of brick and has a gabled roof. The building is situated on a slight rise and is surrounded by a concrete foundation. The road is paved with asphalt and is about 20 feet wide. The road is flanked by a concrete curb on the west side and a grassy area on the east side. The road leads to a small building which is about 20 feet long and 10 feet wide. The building is made of brick and has a gabled roof. The building is situated on a slight rise and is surrounded by a concrete foundation.

in 1930, points toward the possibility of a connection between the Reykjanes Ridge and the middle Atlantic Ridge (6, p.348-349).

The author has shown gravel and sandy areas surrounding the reefs and islets and, to a great extent, covering the bottoms of the ridges. Much of the gravel is placed on theory only, with the 50-fathom depth curve chosen arbitrarily as the boundary. It is believed that, as in the Vestmannaeyjar Islands, waves raised upon the exposed reef plus submarine volcanic muds produce considerable amounts of gravel.

Mud covers the seabottom in Salvogr Dyb and Reykjanes Dyb, on the low, narrow ridge between them, on sediles in the ridge extending southeasterly from Reykjanes, and on the shelf as far as 10 miles north of Alseyjarsund. This is coralline's gray, calcareous clay.

Faxaflói. Bathymetry

Faxaflói is the wide, moderately deep bay between the Reykjanes peninsula on the south and the Snæfellsnes peninsula, which bears Húsavíkajökull, on the north.

The general slope of the bottom is from the north, east, and south toward Faxaflói lög (called Faxaflóiajúp on S.A.P.M.), the submarine valley which leads into Faxaflói from the west. In the southern

in 1930, points toward the possibility of a connection
between the pyramids and the other structures.

(p. 348-349)

The author also shows how the pyramids
surrounding the Great Pyramid are placed
covering the pyramid of the Great Pyramid.
is placed on the pyramid, and the pyramids
shown explicitly as the pyramids. It is
as in the pyramids, and the pyramids
shown how the pyramids are placed
considerable amount of detail.

and cover the pyramids in detail. The
pyramids are the pyramids, and the
on the pyramids in the pyramids, and
pyramids, and on the pyramids, and
pyramids. This is the pyramids, and

Pyramids

Pyramids in the pyramids, and
between the pyramids, and the pyramids,
on the north.
The general shape of the pyramids is
north, east, and south, and the pyramids
pyramids on the pyramids, and the pyramids
roads face the pyramids from the pyramids.

Half of Faxaflói the banks Vestfirðum, with least depth of 3 fathoms 1 foot (latitude 64 degrees 17 minutes N., longitude 22 degrees 11 minutes W.), and Sýðarfirðum, with least depth of 3 fathoms (latitude 64 degrees 24.21 minutes N., longitude 22 degrees 13 minutes W.), interrupt this general westward descent. In the northern part of the bay Svalgrunn, with least depth of 24 fathoms (latitude 64 degrees 24.3 minutes N., longitude 21 degrees 31.1 minutes W.), rises 10 fathoms above the surrounding seafloor. Numerous other shoals of small extent occur throughout the bay, imparting a differential relief of as much as 10 fathoms to the bottom. Two shallow fjords, Kvallfjörður and Burgarfjörður, indent the eastern shore of the bay.

Faxaflói represents a recently submerged low-land (S. 139; 17, pp. 270, 281). The 20-fathom depth curve outlines a shallow submarine valley, which commences 10 miles south of Sýðarfirðum, runs eastward and northwest past Sýðarfirðum, then turns westward and opens up north of Vestfirðum. Depth curves on S. 139 and S. 172 show smaller submarine valleys continuing outward from the small bays and fjords, which indent the coast, and entering this main submarine valley from the east. These are highly suggestive of a submerged stream drainage system which at one time emptied westward into Faxaflói Fyb.

half or less of the total amount, with some cases
 of 1/2 inch or less (included in degree 1) and some
 ranging to 2 degrees in diameter (1/2 inch diameter).
 with some cases of 1/2 inch (included in degree 1),
 diameter 1/2 inch, ranging to 2 degrees in diameter.
 This general statement is based on the material
 the day before, with some cases of 1/2 inch diameter
 and some cases of 1/2 inch diameter (included in degree 1).
 diameter 1/2 inch, ranging to 2 degrees in diameter.
 Numerous other cases of small diameter were observed
 by, including a differential of 1/2 inch or less
 between the bottom two angles of the vertical
 and horizontal, and the general shape of the
 vertical represents a recently submerged low
 level, p. 12, 13, 14, 15, 16, 17, 18, 19, 20, 21, 22, 23, 24, 25, 26, 27, 28, 29, 30, 31, 32, 33, 34, 35, 36, 37, 38, 39, 40, 41, 42, 43, 44, 45, 46, 47, 48, 49, 50, 51, 52, 53, 54, 55, 56, 57, 58, 59, 60, 61, 62, 63, 64, 65, 66, 67, 68, 69, 70, 71, 72, 73, 74, 75, 76, 77, 78, 79, 80, 81, 82, 83, 84, 85, 86, 87, 88, 89, 90, 91, 92, 93, 94, 95, 96, 97, 98, 99, 100, 101, 102, 103, 104, 105, 106, 107, 108, 109, 110, 111, 112, 113, 114, 115, 116, 117, 118, 119, 120, 121, 122, 123, 124, 125, 126, 127, 128, 129, 130, 131, 132, 133, 134, 135, 136, 137, 138, 139, 140, 141, 142, 143, 144, 145, 146, 147, 148, 149, 150, 151, 152, 153, 154, 155, 156, 157, 158, 159, 160, 161, 162, 163, 164, 165, 166, 167, 168, 169, 170, 171, 172, 173, 174, 175, 176, 177, 178, 179, 180, 181, 182, 183, 184, 185, 186, 187, 188, 189, 190, 191, 192, 193, 194, 195, 196, 197, 198, 199, 200, 201, 202, 203, 204, 205, 206, 207, 208, 209, 210, 211, 212, 213, 214, 215, 216, 217, 218, 219, 220, 221, 222, 223, 224, 225, 226, 227, 228, 229, 230, 231, 232, 233, 234, 235, 236, 237, 238, 239, 240, 241, 242, 243, 244, 245, 246, 247, 248, 249, 250, 251, 252, 253, 254, 255, 256, 257, 258, 259, 260, 261, 262, 263, 264, 265, 266, 267, 268, 269, 270, 271, 272, 273, 274, 275, 276, 277, 278, 279, 280, 281, 282, 283, 284, 285, 286, 287, 288, 289, 290, 291, 292, 293, 294, 295, 296, 297, 298, 299, 300, 301, 302, 303, 304, 305, 306, 307, 308, 309, 310, 311, 312, 313, 314, 315, 316, 317, 318, 319, 320, 321, 322, 323, 324, 325, 326, 327, 328, 329, 330, 331, 332, 333, 334, 335, 336, 337, 338, 339, 340, 341, 342, 343, 344, 345, 346, 347, 348, 349, 350, 351, 352, 353, 354, 355, 356, 357, 358, 359, 360, 361, 362, 363, 364, 365, 366, 367, 368, 369, 370, 371, 372, 373, 374, 375, 376, 377, 378, 379, 380, 381, 382, 383, 384, 385, 386, 387, 388, 389, 390, 391, 392, 393, 394, 395, 396, 397, 398, 399, 400, 401, 402, 403, 404, 405, 406, 407, 408, 409, 410, 411, 412, 413, 414, 415, 416, 417, 418, 419, 420, 421, 422, 423, 424, 425, 426, 427, 428, 429, 430, 431, 432, 433, 434, 435, 436, 437, 438, 439, 440, 441, 442, 443, 444, 445, 446, 447, 448, 449, 450, 451, 452, 453, 454, 455, 456, 457, 458, 459, 460, 461, 462, 463, 464, 465, 466, 467, 468, 469, 470, 471, 472, 473, 474, 475, 476, 477, 478, 479, 480, 481, 482, 483, 484, 485, 486, 487, 488, 489, 490, 491, 492, 493, 494, 495, 496, 497, 498, 499, 500, 501, 502, 503, 504, 505, 506, 507, 508, 509, 510, 511, 512, 513, 514, 515, 516, 517, 518, 519, 520, 521, 522, 523, 524, 525, 526, 527, 528, 529, 530, 531, 532, 533, 534, 535, 536, 537, 538, 539, 540, 541, 542, 543, 544, 545, 546, 547, 548, 549, 550, 551, 552, 553, 554, 555, 556, 557, 558, 559, 560, 561, 562, 563, 564, 565, 566, 567, 568, 569, 570, 571, 572, 573, 574, 575, 576, 577, 578, 579, 580, 581, 582, 583, 584, 585, 586, 587, 588, 589, 590, 591, 592, 593, 594, 595, 596, 597, 598, 599, 600, 601, 602, 603, 604, 605, 606, 607, 608, 609, 610, 611, 612, 613, 614, 615, 616, 617, 618, 619, 620, 621, 622, 623, 624, 625, 626, 627, 628, 629, 630, 631, 632, 633, 634, 635, 636, 637, 638, 639, 640, 641, 642, 643, 644, 645, 646, 647, 648, 649, 650, 651, 652, 653, 654, 655, 656, 657, 658, 659, 660, 661, 662, 663, 664, 665, 666, 667, 668, 669, 670, 671, 672, 673, 674, 675, 676, 677, 678, 679, 680, 681, 682, 683, 684, 685, 686, 687, 688, 689, 690, 691, 692, 693, 694, 695, 696, 697, 698, 699, 700, 701, 702, 703, 704, 705, 706, 707, 708, 709, 710, 711, 712, 713, 714, 715, 716, 717, 718, 719, 720, 721, 722, 723, 724, 725, 726, 727, 728, 729, 730, 731, 732, 733, 734, 735, 736, 737, 738, 739, 740, 741, 742, 743, 744, 745, 746, 747, 748, 749, 750, 751, 752, 753, 754, 755, 756, 757, 758, 759, 760, 761, 762, 763, 764, 765, 766, 767, 768, 769, 770, 771, 772, 773, 774, 775, 776, 777, 778, 779, 780, 781, 782, 783, 784, 785, 786, 787, 788, 789, 790, 791, 792, 793, 794, 795, 796, 797, 798, 799, 800, 801, 802, 803, 804, 805, 806, 807, 808, 809, 810, 811, 812, 813, 814, 815, 816, 817, 818, 819, 820, 821, 822, 823, 824, 825, 826, 827, 828, 829, 830, 831, 832, 833, 834, 835, 836, 837, 838, 839, 840, 841, 842, 843, 844, 845, 846, 847, 848, 849, 850, 851, 852, 853, 854, 855, 856, 857, 858, 859, 860, 861, 862, 863, 864, 865, 866, 867, 868, 869, 870, 871, 872, 873, 874, 875, 876, 877, 878, 879, 880, 881, 882, 883, 884, 885, 886, 887, 888, 889, 890, 891, 892, 893, 894, 895, 896, 897, 898, 899, 900, 901, 902, 903, 904, 905, 906, 907, 908, 909, 910, 911, 912, 913, 914, 915, 916, 917, 918, 919, 920, 921, 922, 923, 924, 925, 926, 927, 928, 929, 930, 931, 932, 933, 934, 935, 936, 937, 938, 939, 940, 941, 942, 943, 944, 945, 946, 947, 948, 949, 950, 951, 952, 953, 954, 955, 956, 957, 958, 959, 960, 961, 962, 963, 964, 965, 966, 967, 968, 969, 970, 971, 972, 973, 974, 975, 976, 977, 978, 979, 980, 981, 982, 983, 984, 985, 986, 987, 988, 989, 990, 991, 992, 993, 994, 995, 996, 997, 998, 999, 1000.

If 5-fathom depth curves are drawn on the bottom in the remainder of the shelf small submarine valleys appear. They are seen to continue outward from shore landward and open to the south and west toward Farewell Bend.

Bottom conditions in the shelf

West of longitude 23 degrees W. the bottom is covered by sand and shells, with a few scattered rocks and areas of gravel. East of longitude 23 degrees W. the pattern of sediment bases becomes more local. West of 23 degrees W. the predominant sediment is silt. However, a large irregularly shaped area of gravel lies northwest of the shelf, probably extending farther south than the author has shown to include the previously mentioned 10-fathom section. A second area of gravel, roughly rectangular in outline, covers Vestnes and Lyngnes. A third area of gravel, averaging 1 mile in width, commences about 10 miles southwest of Vestnes and extends one mile or two miles just offshore from the west end of the Cape York peninsula.

The southern end of the main submarine valley south and east of Lyngnes is filled with sand and silt about four miles northeast of that point. The southern boundary of this sand area has been shown tentatively at the 10-fathom depth curve. The edge of bottom between

The first part of the report is devoted to a description of the general situation of the country and the progress of the war. It is followed by a detailed account of the operations of the army and the navy, and a summary of the political and economic conditions of the country.

THE SITUATION IN THE EAST

The first part of this section is devoted to a description of the general situation of the country and the progress of the war. It is followed by a detailed account of the operations of the army and the navy, and a summary of the political and economic conditions of the country.

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this curve and the shore has been depicted as sandy on the basis of the sand-bottom symbols used on this chart and on B.A.3201.

East of longitude 22 degrees 21 minutes W. the pattern of sediment zones is exceedingly complex, reflecting the greater detail portrayed on the large scale charts B.A.3201 and B.A.2729. If the portion of Faxeflóí west of that meridian were shown on charts of comparable scale the pattern would probably be as involved as it is east of it.

An irregular belt of gravel 2 miles wide at its widest trends slightly east of north for 11 miles from latitude 64 degrees 3.5 minutes N., longitude 22 degrees 8 minutes W. past the mouths of Hafnarfjörður and Ókerfjörður to latitude 64 degrees 16 minutes N., longitude 22 degrees 4 minutes W. Here it joins at its midpoint a belt of gravel of similar width running east-west and lying partway across the mouth of Hvalfjörður. A similar belt of gravel runs directly across the mouth of Ókerfjörður. These three gravel belts may represent moraine material deposited by glaciers formerly occupying the fjords, possibly prior to submergence of the region. The areas covered by them are not notice-

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It is to be noted that the results of the investigation are only preliminary and that further work is necessary to confirm the results. The areas covered by them are not necessarily the same as those of the present report.

ally elevated above the surrounding bottom. However, the fact that the three settlements, Sparsdalur, and Húsavík are covered with gravel leads us to the probability the bottom of Faxarflói may once have been subject to glacial deposition from the east. The three banks could have been formed, in part at least, by the heaping together of debris from merging ice lobes, or by the deposition of debris from one or more lobes onto the sides and tops of pre-existing elevations. Following readvances, excess water would no doubt tend to scour out the finer constituents from the surface of the moraine keeps and leave gravel at the resistant points. According to the author's geological map (1972), glacial debris in the region surrounding Faxarflói all indicate ice motion from the north, east, and southeast into Faxarflói.

Glaciation may also be invoked to account for the overall complexity of patterns shown on B.A.3201 and B.A.2729, particularly north of Reykjavík (Latitude 64 degrees 4.7 minutes N., Longitude 21 degrees 16.7 minutes W.). Here the extremely varied and chaotic mixture of sand, gravel, silt, and rock conforms to the description of a typical restricted and a classified sort, as given by Shepard (26, p.225).

The first thing that I noticed when I stepped
 out of the plane was the humidity. It was
 sticky and oppressive, clinging to my skin
 like a second layer. The air was thick with
 moisture, and I could feel it seeping into
 my clothes. The humidity was a constant
 presence, a reminder of the tropical climate
 I was about to experience. It was a stark
 contrast to the dry, crisp air of my home
 country. The humidity was a challenge, but
 also a promise of a new adventure.

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The shoreline on the north, east, and south of Þorvaldi is fringed with reefs of basalt and dolerite, which rocks form the hills and mountains of the region. Even the narrow island northwest of Borgarfjörður is skirted by a line of reefs and rocky islets a mile wide. This same zone continues into Borgarfjörður along the northeast side for nearly half its length. It is enclosed on the southwest side by a similar zone, which extends into the fjord an equal distance.

Hvalfjörður, likewise, is fringed by rocky reefs. Unlike Borgarfjörður, however, which is sandy throughout its entire length and breadth, Hvalfjörður has a strip of mud bottom down its center from south to north. In the Swedish Directions (18, p. 295) the following description is given of Hvalfjörður:

"...There are a number of dangerous rocks in the fjord and in its approaches, particularly in the entrance and on the southern side of its outer stretch. Farther eastward the rocks lie close to shore. In the deeper parts of the fjord the bottom consists of sand and shells in the entrance and of mud farther in. In the shallower parts it is mostly rock, with mud, sand, and shells in some places."

The shoreline on the north side of the fjord is fringed with a belt of forest and vegetation which runs from the hills and mountains of the region. Given the marshy lowland character of the vegetation is skirted by a zone of rocks and boulders along the shore. This zone continues into the fjord along the northern side for nearly half the length. It is bounded on the southern side by a similar zone, which extends into the fjord an equal distance.

Hvalfjörður, likewise, is fringed by rocky reefs. Unlike Þorgerðarfjörður, however, which is empty throughout its entire length and breadth, Hvalfjörður has a strip of mud bottom down the center from mouth to head. In the sailing directions (18, p. 202) the following description is given of Hvalfjörður:

"... There are a number of boulders and rocks in the fjord and in the approaches, particularly in the entrance and on the southern side of the inner approach. They run seaward and toward the shore in the deeper parts of the fjord. The bottom consists of sand and shells in the entrance and of mud farther in. In the shallows there is a mixture of rock, with mud, sand, and shells in some places."

B.A. 2976 (Scale 1:287,418)

General Statement

This chart shows the shelf off the northern half of the western coast of Iceland, from Snaefellnes to the northernmost point of the Northwestern Peninsula, B.A. 2713, on the south, extends to latitude 64 degrees 50 minutes N., giving a 20-mile overlap with this chart. All pertinent data within this overlap, which consists of the northern half of Faxaflói, is portrayed on both charts.

Extra data from large scale plans have been made use of in the following places on the Northwestern Peninsula:

- Dyre Fjord, from B.A. 2998 (approximately 1:62,475)
- Hesteyri Fjord, a tributary to Ise Fjord and Fossá Fjord from the north, from B.A. 3000 (approximately 1:51,325)
- Ísfrá Fjord, from B.A. 2998 (this section 1:26,870)
- Sveinseyri anchorage, in Veikna Fjord, from B.A. 2999 (1:9,810)
- Flakseyri anchorage, in Brúdar Fjord, from B.A. 2999 (this section 1:12,035)
- Skutills Fjord, a tributary to Ise Fjord from the south, from B.A. 2999 (this section 1:13,570)
- Biludalsf anchorage, on the south side of Orreyri Fjord, from B.A. 2975 (this section 1:12,003)

Bathymetry in Hvaldí Fjord

This bay, roughly the same length from east to west as Faxaflói, and about two-thirds the width of

Saxafloði, lies between the long, narrow peninsula of
Laxafellnes, on the south, and the southern shore of
the Northwestern Peninsula, on the north. At its inner
end it divides into two branches, with a narrow channel at
the head of the southern branch and Gils fjord at the
head of the northern.

Like Saxafloði, Breiði Fjord is a submergent
lowland (6, p.139; 17, p.276). Submergence is due to un-
sidence, probably along peripheral fractures and the
intervening peninsulas of Laxafellnes representing a
surt, or essentially positive element (17, p.276; 18,
p.261).

According to the official directions (18, p.114),
the land in this region is rising:

"There is reason to suspect that depths
in Breiða fjord are decreasing, both in
the bay proper and in Kvegis fjord and
the northern branch fjord. The charts, which
are based mainly on surveys made between the
years 1896 and 1929, must not, therefore,
be entirely relied upon. It appears that
the land is rising, and in many places
depths less than those shown on the charts
may be found."

Wern also describes this recent rise of the land (17,
p.103), as shown by uplifted wave-cut terraces. He
points to evidence, likewise, of recent uplift to the
extent of 10 meters in the fjords of the Northwestern
Peninsula.

The following table shows the results of the analysis of the soil samples taken from the various points on the site. The results are given in the following table. The results are given in the following table.

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(103)

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(103)

In Králí Fjord bathymetric relief is greater and steeper than in Snæfells. For example: from the 100-fathom sounding at latitude 65 degrees 5.2 minutes N., longitude 23 degrees 11.2 minutes W. the bottom falls off northwesterly to 100 fathoms in 1-1/4 miles; from the 11-fathom sounding at latitude 65 degrees 17.2 minutes N., longitude 23 degrees 5.2 minutes W. the bottom falls off southeasterly to 70 fathoms in 1 1/2 miles.

Also, it shows a strong northwest-southeast alignment of relief elements not present in Snæfells. Kallukil, a comparatively narrow, steep-sided submarine valley opening to the southwest, runs up into Králí Fjord just northwest of Snæfellsjökull, at which point it reaches a depth of 100 fathoms. Twelve miles north of Snæfellsjökull the valley comes to an end. However, directly in line with it is a series of enclosed, linear-shaped submarine basins, with intervening ridges, continuing northeasterly into the northern branch of Králí Fjord. This zone widens rapidly until it includes practically all of Králí Fjord northwest of the 100-fathom depth curve off Snæfellsnes.

If 100-fathom depth contours are drawn throughout the fjord they will bring out the character and extent of these submarine basins and ridges. They are well-defined

In the first place, it is necessary to...
 and it is also necessary to...
 the first of these is...
 the second is...
 the third is...

It is also necessary to...
 the first of these is...
 the second is...
 the third is...
 the fourth is...
 the fifth is...
 the sixth is...
 the seventh is...
 the eighth is...
 the ninth is...
 the tenth is...

It is also necessary to...
 the first of these is...
 the second is...
 the third is...
 the fourth is...
 the fifth is...
 the sixth is...
 the seventh is...
 the eighth is...
 the ninth is...
 the tenth is...

at a much smaller scale of the basins and ridges occurring on the continental shelf off the coast of southern California. It is believed they, together with part of Hollisall, represent grabens and horsts, as do the California submarine basins and ridges. The remarkably close spacing and consistent parallelism of faults necessary to form such basins, 1 to 2 miles wide and 5 to 10 miles long, is known to exist on land in many parts of the South-western Lowland (17, p. 277; 25).

Southeast of the basin-ridge zone lies a shallow coastal shelf 3 to 4 miles wide, enclosed between the 20-fathom depth curve and the northern shore of the fjord. This coastal shelf extends from near Hollisallur (latitude 64 degrees 55 minutes N., longitude 23 degrees 53 minutes W.) to the mouth of Ivvanna fjord. It bears a number of shoals, reefs, and small islands, all completely lacking the linear character of the basins and ridges northwest of them. In Lock's gazetteer (13, p. 38) many of the islands and reefs are considered to be portions of submarine volcanoes.

Northwest of Hollisall and of the basin-ridge zone for as far east as longitude 23 degrees 55 minutes W. the bottom rises in a smooth, flat curve more than 20 miles northward to the strand line. West of that meridian a

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 governments have been in a state of constant
 tension since the outbreak of the Second World War.
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a shoal belt of reefs, islets, and generally level ground extends along the northern side of Breidá fjord to this fjord, bounded approximately by the isotherm depth curve on the south. The zone reaches a maximum width of over fifteen miles at longitude 22 degrees 50 minutes W.

From Gils fjord it extends along the southwest side of Breidá fjord's north branch to Svana fjord. Here it 'overflows' the eastern end of the coastal shelf of Husefjallanes and forms a bar across the south of Svana fjord which dries almost completely at low tide (pp. 328, 329).

The strait called Syd-Floi extends up the middle of the north branch of Breidá fjord, narrowing to a tortuous channel as it approaches Gils fjord at the head. The basin-ridge zone also continues up the north branch of Breidá fjord to the head. It has apparently widened enough to include: (1) some of the rocky, shoal belt along the southern side of the north branch; (2) Syd-Floi, with an isolated shoal area of reefs and islets in its middle (latitude 63 degrees 25 minutes N.; longitude 22 degrees 30 minutes W.); and, (3) much of the rocky shoal belt along the northern side of the north branch. In short, it covers nearly the entire north branch of Breidá fjord up to, and probably including, Gils fjord.

The first part of the report deals with the general situation in the country and the progress of the work of the various departments. It is followed by a detailed account of the work of the different departments, and a summary of the results achieved. The report concludes with a list of recommendations for the future.

The work of the different departments has been carried out in accordance with the programme of work approved by the Council of Ministers. The results achieved are as follows:

The Ministry of Education has continued its work on the reform of the educational system. It has succeeded in introducing a number of important reforms, and in improving the quality of education. The Ministry of Health has continued its work on the improvement of public health. It has succeeded in introducing a number of important reforms, and in improving the quality of public health. The Ministry of Agriculture has continued its work on the improvement of agricultural production. It has succeeded in introducing a number of important reforms, and in improving the quality of agricultural production.

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The linear shape of many of the reef and islet groups along the northern side of Breiddi Fjord indicates the basin-ridge zone approaches to within at least five miles of the shore. Another system of faults with different orientation is known to exist on the adjacent land. However, hydrographic information is too scanty to place exactly the boundary between the system on land and the system in the fjord.

Bottom Sediments in Breiddi Fjord

Along the entire southwestern coast of Iceland, including Faxaflói, the sandy areas without exception contain shells (see B.A. 2733), suggesting an environment favorable to the development of shell fish. This can probably be attributed to the ameliorating influence of the Inranger Current, a terminal branch of the Gulf Stream which flows westward along the south coast of Iceland, from about the longitude of the Vestmannaeyjar Islands, and northward along the west coast.

In Breiddi Fjord, however, from head to north and out to sea as far as the chart extends only a few shell areas are found. The largest of these is about ten miles long by three miles wide and lies along the meridian of longitude 23 degrees W. at about latitude 65 degrees 25 minutes N. The author can offer no expla-

The linear shape of many of the reef and
 flat groups along the northern side of the island
 indicates the basin-like shape approximated to within
 at least five miles of the shore. Another system of
 faults with different orientation is known to exist on
 on the adjacent land. However, geologic information
 is too scanty to place exactly the boundary between
 the system on land and the system in the lagoon.

Bottom Sediments in Fossil Lagoon

Along the entire southeastern coast of
 Iceland, including Faxaflói, the sandy areas contain
 exception certain shells (see p. 14, 15), suggesting
 an environment favorable to the development of shell-
 fish. This can probably be attributed to the weather-
 ing influence of the Fagradalsá River, a certain
 branch of the Gulf Stream which flows westward along
 the south coast of Iceland, from about the latitude of
 the Vestmannaeyjar Islands, and northwest along the
 west coast.

In Faxaflói, however, there have been no
 and out to sea as far as the chart extends only a few
 shells were found. The largest of these is about
 ten miles long by three miles wide and lies along the
 northern of latitude 65 degrees N. The other one either no larger
 65 degrees 30 minutes N. The other one either no larger

indication for this stream of shells, except to suggest the possibility of an influx of cold, fresh water from the land, such as occurs in the fjords of the Norwegian-ern Peninsula.

Sand is the dominant sediment off the mouth of Breiði Fjord. From the west edge of the chart eastward to longitude 24 degrees 8 minutes W. it covers the entire bottom except for a few scattered patches of corals and shells. The largest of these lies just west of the end of Sneefellnes.

In Breiði Fjord sand covers much of the bottom. However, between longitude 24 degrees 8 minutes W. and 22 degrees 30 minutes W. a large, irregular-shaped area of gravel, 12 miles wide from north to south, occupies the middle of the fjord, mantling basins and rising hills. There is nothing in the shape or location of this gravel area that is diagnostic of its origin. It may very well be marine gravel, as the land on all sides of Breiði Fjord has been glaciated.

The belt of foul ground (see page 29) which borders the shore in the north branch of Breiði Fjord and extends across the mouth of Snares Fjord is indicated at each bottom wherever rock symbols occur. The little indentation is shown on the chart, however, to assume that the entire belt is rocky. There must be some channels, such as

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Male Deep (Latitude 65 degrees 30 minutes N., Longitude 23 degrees 9 minutes W.), extending out from the wall fjords in the coast which would contain sand or mud. For example, the channel in which the island, Stager occurs (Latitude 65 degrees 22.5 minutes N., Longitude 23 degrees 54 minutes W.) probably contains sand at least as far north as a channel is indicated.

Syd-fjeld and the channel extending northward to Hils Fjord are also shown as containing sand, even though no bottom notations occur northeast of a line through the island, Stager (Latitude 65 degrees 11.5 minutes N., Longitude 22 degrees 50.5 minutes W.).

The coastal shelf off the north side of Husefjeldnes is largely mantled with sand and occasional patches of gravel. Moreover, many of the shoals, and all of the offshore reefs and islet groups are rock. Sand also fringes the shore in some places, as at Krosanes (Latitude 64 degrees 38.2 minutes N., Longitude 23 degrees 24 minutes W.) and Skallebukir (Latitude 65 degrees 8.7 minutes N., Longitude 23 degrees 10.5 minutes W.).

Grundir Fjord (Latitude 64 degrees 57 minutes N., Longitude 23 degrees 17 minutes W.) and Holgreif's Fjord (Latitude 64 degrees 57 minutes N., Longitude 23 degrees 8 minutes W.) contain mud in their central portions.

This deep (latitude 55 degrees 30 minutes N., longitude
 23 degrees 5 minutes W.), extending out from the shelf
 fjords in the coast which would normally be
 For example, the channel in which the fjord, the
 (latitude 55 degrees 30 minutes N., longitude 23 degrees
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 ward fjord also has a channel
 even though no bottom connections were indicated
 line through the fjord, depth (latitude 55 degrees
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 The channel itself is the channel
 channel is largely marked by a
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 of the offshore reefs and the
 also fringed the shore in some
 15 minutes N., longitude 23 degrees 25 minutes W.)
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 orange fjord (latitude 55 degrees 15 minutes N.,
 N., longitude 23 degrees 15 minutes W.)
 fjord (latitude 55 degrees 15 minutes N., longitude 23
 degrees 8 minutes W.) contains and in other

with the exception of a narrow belt of rock and sand along the shore, and some isolated rocky masses in the eastern part, Stegna Fjord is floored with sand.

The Vestfirðir, continuing

Between Stanbiorg Kuk (Latitude 65 degrees 17 minutes N., Longitude 21 degrees 12 minutes W.) and Pitt Kuk (Latitude 65 degrees 21.5 minutes N., Longitude 21 degrees 15 minutes W.) the western coast of the north-eastern peninsula is deeply indented by numerous fjords, which are known collectively as the "Vestfirðir" or "Northwest Fjords", according to the sailing directions (No. 278), the shores of these fjords "which run for considerable distances southward from their open mouths, are much indented by smaller fjords, composed of a series of low points, consisting of gneiss and sand, which are the remains of the terminal moraines of the Ice Age."

All of the Vestfirðir have submarine valleys leading out from their mouths. Most of these valleys end before the 100-fathom depth curve is reached. However, Víkurfjörður, and Stegna Fjord (or Stegnaárfjörður), and Sjófjörður, are the fjords (or fjörðararmar), both reach depths of nearly two hundred fathoms (see No. 278). The

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These valleys are believed to have been formed by subaerial erosion at the end of the Pliocene epoch, when the strand line was lower than at present. Björnåli, however, may owe some of its depth to the recession which outlines the fjord (10, p. 22; 17, p. 27; 18, p. 28).

Although in existence before Pleistocene glaciation commenced, the Vestfjord basins, like present fjords, are glacially raised ground. At that time, like all typical glacial valleys, the fjords are steep-walled and relatively flat-bottomed, some of them contain closed basins separated from the outer depths by thresholds and rock bars.

The two southernmost of the Vestfjords, Svalbardfjord and Tolmas Fjord, contain basins of over thirty fathoms depth behind a narrow threshold area of 10 fathoms. Inner fjord, northwest of Tolmas fjord, contains a steep-walled basin, reaching 60 fathoms, throughout much of its length; the threshold is 20 fathoms at its deepest. Outer fjord, northwest of inner fjord, likewise contains a basin, 27 fathoms at its narrowest. It is bounded on the eastern threshold. The deep in the fjord, the large part of the Vestfjords, reaches 60 fathoms; the southern end, 63 fathoms. Outer fjord, the fifth tributary of fjord, the mouth of the fjord, is 20 fathoms deep in its lower reaches but only 54 fathoms at its mouth.

The first part of the report deals with the general situation of the country and the progress of the work during the year. It is followed by a detailed account of the various projects and the results achieved. The report concludes with a summary of the work done and the plans for the future.

The work has been carried out in accordance with the programme of work approved by the Council at its meeting on 15th December 1954. The main areas of activity have been the study of the physical properties of the system and the investigation of the mechanism of the reaction.

The results of the work are presented in the following sections:

1. The physical properties of the system.

2. The mechanism of the reaction.

3. The effect of temperature on the rate of reaction.

4. The effect of concentration on the rate of reaction.

5. The effect of solvent on the rate of reaction.

6. The effect of catalyst on the rate of reaction.

7. The effect of inhibitors on the rate of reaction.

8. The effect of light on the rate of reaction.

9. The effect of pressure on the rate of reaction.

10. The effect of magnetic field on the rate of reaction.

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Rock bars are found across the mouths of Vestfjord, Hjøri Fjord, and Koylfjer Fjord, all tributaries of Ise Fjord. Sugsunds Fjord, just southwest of the mouth of Ise Fjord, has a shoal at its mouth which, according to Iwan (10, Figure 71), is an impassable rock bar.

Bottom Sediments in the Vestfirdir

Due to lack of data the author has theorized to a great extent in portraying bottom sediments in the Vestfirdir. However, enough notations and symbols are shown on the chart and large scale plans to permit outlining in some of the fjords a pattern very typical of fjord sedimentation --namely, a belt of mud along the deeper, axial portion, with belts of sand with some gravel and rock along the sides. Letria Fjord, Ise Fjord, and Hesteyri Fjord definitely show this pattern. Gyra Fjord also shows it; however, the very deepest part of its basin is floored with sand while only the inner half, which is somewhat shallower, is floored with mud.

The mud shown in Talska Fjord is based solely on the likelihood that the enclosed basin, 10 fathoms deeper than the surrounding bottom, should be the site of accumulation of finer sediments. The mud shown at the upper end of the fjord, southeast of Hvoinsayri, also is based on theoretical considerations. It is

The first section of the report is devoted to a description of the general geology of the district. It is shown that the rocks are of various ages and are separated into several groups. The most important of these are the Devonian, Silurian, and Cambrian rocks. The Devonian rocks are of the same age as those in the vicinity of the city of ... The Silurian rocks are of the same age as those in the vicinity of the city of ... The Cambrian rocks are of the same age as those in the vicinity of the city of ...

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believed the inner reaches of a fjord, even if not particularly deep, may be the site of mud deposition if (1) the configuration of the shoreline gives some protection from waves and currents, and if (2) streams entering at the head do not carry heavy loads of coarse sediments. For the same reason mud has been shown in Ömunder Fjord, northeast of Dyrø Fjord, even though no bottom notations appear on the chart or the large scale plan at that place. Mud is also shown in Sjuganda Fjord. In both this fjord and Ömunder Fjord a point of land or a shoal partially shuts off the inner portion.

Each of the mud zones described above in Talske Fjord, Ömunder Fjord, and Sjuganda Fjord may, of course, have greater or lesser extent than shown. For example, the mud line in the upper end of Ömunder Fjord is placed arbitrarily along the outer edge of the area of sandy (stippled) bottom; no such area, however, is shown in Sjuganda Fjord, so mud has been shown as flooring the entire fjord up to the head.

Arner Fjord has only one mud notation, located at its mouth. It is considered almost certain, though, that the mud zone extends throughout much of the fjord, flooring the steep-walled, branching deep that runs down its center.

Of the tributaries to Ise Fjord only the first, Skutla Fjord, contains enough data on the chart and plan to show the bottom with assurance. Lita Fjord, Reyda Fjord, and Nest Fjord are all unsurveyed, so no attempt has been made to outline the sediment pattern in them. It is quite probable that Nest Fjord contains considerable amounts of mud, since it is cut off from Ise Fjord by a short rock bar.

The deep basin in Skötu Fjord has been shown as floored with mud, although no sediment indications are present on the chart.

Mjóri Fjord, Reykjar Fjord, and the head of Ise Fjord are unsurveyed. Mjóri and Reykjar, like Nest Fjord, probably contain mud, since they have rock bars across their mouths.

Veidileysa Fjord, east of Hesteyri Fjord, is assumed to have a mud bottom, since no enclosed basin is present and there are no shoals or promontories of land to cut off one portion from the rest. Lóna Fjord, Krufas Fjord, and Látra Fjord, southeast of Veidileysa Fjord, are all unsurveyed.

On the shelf northwest of the Vestfirðir the predominant sediment is sand and shells. There

The first thing that I noticed when I stepped
 out of the plane was the cold, crisp air. It
 felt like a fresh blanket. The ground below
 was a mix of dirt and gravel, with some sparse
 vegetation. The sky was a pale blue, and the
 sun was shining brightly. I took a deep
 breath and felt a sense of relief. I had
 finally reached my destination.

The first thing I did was to check my
 bag. I had packed everything carefully, and
 I was glad to see that everything was in
 order. I then took a walk around the
 area. The landscape was beautiful, with
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 heard that the weather was perfect, and
 it was indeed true. I had found a
 great spot to stay.

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are, however, a number of oval-shaped patches composed of gravel. The position of the largest of these, opposite the mouths of Petrix Fjord, Falkna Fjord, and Lyra Fjord, and of a smaller one opposite the mouths of Gungur Fjord and Suganda Fjord suggests that they may be glacial moraines. However, like the gravel belts off the mouths of Hvallfjörður and Borgarfjörður in Faxaflói, these moraines have no control over the bathymetry.

Although positive evidence is scarce, it would appear that the bottom sediments of the Vestfirðir are essentially devoid of shells. An arbitrary line, based on bottom notations, has been drawn between shelly and supposedly non-shelly bottom. This line cuts directly across Lea Fjord at its mouth; it then continues west and south from Suganda Fjord to Petrix Fjord at a distance of from 2 to 6 miles out from the fjord mouths.

One reason for the absence of shells could be the discharge of cold, fresh water into the fjords from the streams at their heads. Iwan (19, p. 34) reports that the comparatively warm oceanic waters have little effect in the bays and fjords of the western coast of Iceland. Also, according to the Sailing Directions (16, p. 318), in some of the Vestfirðir the outgoing surface current of fresh water is sufficient to stop tidal

... however, a number of oval-shaped pebbles were seen
of gravel. The position of the largest of these pebbles
the mouth of Lavix fjord, Ullens fjord, and the fjord
and of a smaller one opposite the mouth of Lavix fjord
and suggests that they may be of local origin.
However, like the gravel beds off the coast of
Ullens fjord and Bergsjord in Westland, these pebbles

no control over the bathymetry.
Although positive evidence is lacking,

would appear that the bottom sediment of the fjord
are essentially devoid of shells. An extensive line of
on bottom relations, has been drawn between shells and
apparently non-shell bottom. This line runs directly
across the fjord at its mouth; it then continues west
and south from Ullens fjord to Lavix fjord at a distance
of from 2 to 6 miles out from the fjord mouth.

One reason for the absence of shells could
be the discharge of cold, fresh water into the fjord
from the streams of shell beds. Even if (A) reports
that the comparatively warm oceanic water had little
effect in the bay and fjord at the western coast of
Island. Also, according to the Journal of the
p. 338), in some of the Vestland the corals were
evidence of fresh water in Ullens fjord is seen.

currents 1 or 2 miles in from the mouth.

On the shelf outside the fjords shells are quite abundant. Attention is called to the numerous shell notations off the west end of the peninsula between Petrix Fjord and Breiddi Fjord; also, in the vicinity of Kitr Huk and Stromnes, north of the mouth of Ise Fjord. Thoroddsen (24, p. 244) mentions quantities of decomposed mussel shells occurring as calcareous dust along the coast of the Northwestern Peninsula.

Judging by bottom notations on this chart and on B.L. 2977, the region of abundant shells is bounded on the northeast by a line running from latitude 66 degrees 27 minutes N., longitude 22 degrees W. northwestward to the edge of the chart. This sudden cessation of shells in the sediments may be apparent rather than real, since the "Ingolf" (9, Part 3, p. 77) found a larger percentage of shells off the peninsula of Skagen (see B.L. 2977) than anywhere else in Icelandic waters except west from North Cape. The use of a different technique in sounding and sample collecting by the ships surveying the north coast, or even the presence of different personnel among the hydrographers, could conceivably be responsible for the change.

However, the cessation of shells may be real.

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 Rix Huk and Strømnes, north of the mouth of Is fjord.
 Thordsen (22, p. 211) mentions localities of *Belonoceros*
 mussel shells occurring as collections from along the
 coast of the Northwest coast.
 Urging by bottom notations on this coast and
 on BA. 2377, the region of abundant shells is bounded on
 the northeast by a line running from latitude 66 degrees
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 the "ingolf" (2, p. 77) found a larger percentage of
 shells off the peninsula of Svalden (see S.A. 2377) than
 anywhere else in Icelandic waters except east from North
 Cape. The use of a different sediment in sounding and
 sample collecting by the ships surveying the north coast,
 or even the presence of different material along the
 hydrographs, could conceivably be responsible for the
 change.
 However, the cessation of shells may be real.

If so, it could possibly be due to the temperature of the Læsinger Current falling below a certain critical point as it rounds the northwestern peninsula and sets to the east. Or, perhaps it could be attributed to the effect of drift ice from the Arctic Ocean. Quite often, in the spring of the year, this ice is carried by the East Greenland Current down to the vicinity of the Northwestern Peninsula. The main mass goes southerly through Denmark Strait, between Iceland and Greenland. Part, however, is frequently picked up by the Læsinger Current and carried eastward along the northern coast of Iceland.

The western boundary of the zone of shelly bottom is not known. It has been shown as extending out to the edge of the shelf, based on bottom observations.

Occurrence of Coral along the Northwestern Coast

The presence of coral in Isatrix Fjord, in Byre Fjord, and on the shell coast of Horns Fjor (latitude 66 degrees 35 minutes N., longitude 17 degrees 25 minutes W.) is noted by the author with particular interest. It is believed that there is living rather than fossil coral, even though it occurs, in the case, in cold fjord waters and, in the other, along a coast subject to severe ice blockages. Living forms of

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colonial coral have been found in the cold waters of the
Arctic sea along the Alaskan arc (15, p. 273), and also
in the North Atlantic off the coast of northern Norway (3).

It is, of course, very possible that the
Icelandic coral is, after all, fossil. If so, that occurring
in the fjords could be no older than Pleistocene, as the
fjords received their present forms then. The coral occur-
ing out on the shelf east of North Cape could be either
Pleistocene or late Tertiary.

colony coral have been found in the cold waters of the

ocean along the Atlantic coast (R.D.V.), and also

in the North Atlantic off the coast of Northern Norway (V).

It is, of course, very possible that the

colony coral is, after all, local. It is, that occurring

in the North Atlantic could be no other than Liliopsis, as the

forms received their present form then. The coral occurs

the out on the east coast of North Cape could be either

Liliopsis or late Liliopsis.

It is, however, very possible that the coral

is a new form of Liliopsis.

The present form of the coral is

found in the North Atlantic, in the

the present form of the coral is

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the present form of the coral is

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B.A.2977 (Scale 1:261,260)

General Statement

This chart shows the western half of the northern coast of Iceland, including part of the North-western Peninsula. It extends from North Cape to Siglu Fjord (Latitude 66 degrees 10 minutes N., Longitude 18 degrees 51 minutes W.). B.A.2976 on the west overlaps with this chart along a north-south strip 111 miles long by 13 miles wide. All data within this overlap is shown on both charts. Also, more detailed information has been added in Hruta Fjordur from chart B.A.931 (scale 1:100,000 for entire chart; 1:20,000 for inner half), in Skagastrand Harbor from plan B.A.3001 (scale approximately 1:10,000), and in Siglu Fjord from plan B.A.3001 (scale this section approximately 1:20,000).

Bathymetry Off the North Coast of Iceland

Off the northern coast of Iceland the bathymetry is characterized by a series of great north-trending deeps separated by banks which extend in places almost fifty miles out from the coast (see B.A.565). The deeps are continuous with fjords inland on the coast. The fjords, in turn, head in valleys which continue southward, trenching the interior highland (see page 6). The banks, outlined by the 100-fathom depth curve, lie off the peninsulas that separate the fjords.

THE HISTORY OF THE

REPUBLIC OF THE UNITED STATES

OF AMERICA

The history of the United States is a story of a young nation that grew from a small colony of settlers on the eastern coast of North America to a powerful republic that spans the continent. The story begins with the first European settlers in the early 17th century, who came to America in search of a new home and economic opportunity. Over the years, the colonies developed their own institutions and traditions, and they began to assert their independence from British rule. The American Revolution was a turning point in the nation's history, as the colonies fought for and won their independence from Britain in 1776. The new nation was founded on the principles of liberty, justice, and equality, and it has since become a model of a democratic republic. The history of the United States is a story of a nation that has overcome many challenges and has emerged as a global superpower.

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As shown on B.A.565 the deeps and banks from west to east are: Ströndegrund (Strands Grund on B.A.2977), Húnaflóa Djúp (Húnaflói Deep on B.A.2977), Skega Grund (Skega Grund on B.A.2977), Skegafjardardjúp (Skega Fjord Deep on B.A.2977), Flaðóla Grund (Strandnes Flak on B.A.2977), Eyjafjardarvíll (Eyja Fjarder Byr on B.A.2978), Grimseyjargrund (Grimsey Flak on B.A.2978), Tjöknesurund (na Eyja Flak on B.A.2978), Skarvfjardardjúp (Skarv Fjarder Byr on B.A.2978), Blöttagrund (Melrokk Flak on B.A.2978), Þrástílfjardardjúp (Þrástíll Fjarder Byr on B.A.2978), and Þrástílfjardar Grund (Kjólur Deep on B.A.2978).

The deeps of Svall Grounds, formed, at least as far east as Eyja Fjarder Byr, by movements sometime during the Pleistocene epoch (17, p.277). The deeps east of Eyja Fjarder Byr apparently are related to recent faulting to be described later. Some of the western deeps may have been subjected to glacial scour in their inner portions as their corresponding fjords show evidence of glaciation.

In the fjords much of the former depth has been filled in by sand and silt from the large rivers and streams entering at their heads (25). Numerous basins and thresholds, such as occur in the Vestfirðir and in the fjords of the east coast, are practically lacking

As shown on P.L. 262 the deeps and banks from

west to east are respectively (1) 17.0.277, (2) 17.0.278,

(3) 17.0.279, (4) 17.0.280, (5) 17.0.281, (6) 17.0.282,

(7) 17.0.283, (8) 17.0.284, (9) 17.0.285, (10) 17.0.286,

(11) 17.0.287, (12) 17.0.288, (13) 17.0.289, (14) 17.0.290,

(15) 17.0.291, (16) 17.0.292, (17) 17.0.293, (18) 17.0.294,

(19) 17.0.295, (20) 17.0.296, (21) 17.0.297, (22) 17.0.298,

(23) 17.0.299, (24) 17.0.300, (25) 17.0.301, (26) 17.0.302,

(27) 17.0.303, (28) 17.0.304, (29) 17.0.305, (30) 17.0.306,

(31) 17.0.307, (32) 17.0.308, (33) 17.0.309, (34) 17.0.310,

(35) 17.0.311, (36) 17.0.312, (37) 17.0.313, (38) 17.0.314,

(39) 17.0.315.

The deeps are fairly straight, formed by sand

on the west side of the river (17.0.277) and

during the Holocene epoch (17.0.277). The deeps

east of the river are formed by sand and silt

deposits which can be described as follows: some of the west-

ern deeps may have been subjected to glacial scour in

their former portions as their corresponding banks show

evidence of glacial scour.

In the Jordan bank of the former deeps has

been killed in by sand and silt from the large rivers

and has an amount of their heads (28). Enclosed herein

is a photograph, each as seen in the vertical, and in

the Jordan of the east coast, and possibly looking

in the fjords of the north coast.

Stranda Grund, Bathymetry and Bottom Sediments

The easternmost of the banks, Stranda Grund, extends slightly over fifty miles northeastward from North Cape. Along its northern edge it is covered with mixtures of mud, sand, and gravel. Between this outer zone and North Cape the chief sediment is sand, continuous with the sand covering the shelf off the western coast of Iceland.

The entire southeastern half of Stranda Grund, from the coast out to the northeastern end of the bank, is covered with gravel, forming a great irregular-shaped belt paralleling Sunaflið Deep. A 10 to 15-mile wide zone of rocky reefs and shoals, called Strandabrekar, extends almost completely across this gravel belt at its shoreward end.

Three shoal patches in the vicinity of latitude 66 degrees 21 minutes N., longitude 21 degrees 50 minutes W. bear much notations. The author believes these may be of glacial origin. The sinuous, ecker-like ridge at latitude 66 degrees 23 minutes N., longitude 22 degrees 2 minutes W. and the enclosed basin of Drungu All at latitude 66 degrees 27 minutes N., longitude 21 degrees 50 minutes W. likewise are features probably produced by glaciation.

is not known at the present time.

Geological History of the Area

The geology of the area is characterized by a sequence of sedimentary rocks of the Permian, Triassic, and Jurassic periods. The Permian rocks consist of sandstone and shale, and are overlain by the Triassic rocks, which are composed of sandstone, shale, and limestone. The Jurassic rocks are represented by the sandstone and shale of the ... The Permian rocks are ... The Triassic rocks are ... The Jurassic rocks are ...

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On the shelf just off the coast between North Cape and Steingrims Fjord there is not sufficient data to show the bottom sediments. It is, however, generally rocky and the coast is fringed with many reefs. The mud in Steingrims Fjord is based only on the presence of an enclosed basin reaching 81 fathoms in depth. It is not known whether this mud is continuous with the mud in Skagastrand Bay. Kolla Fjord, south of Steingrims Fjord, may very well contain mud also since it is nearly closed off by a rock bar across the mouth.

Hunafloei Deep, Bathymetry and bottom sediments

This great deep, lying between Stranda Grund and Skaga Grund, reaches depths of over two hundred fathoms near its outer end. The 100-fathom depth curve, bounding the deep, runs unbroken as far south as latitude 66 degrees N. while isolated basins over 100 fathoms deep continue 47 miles further south. An isolated submarine ridge, rising from 20 to 50 fathoms above the surrounding bottom, lies at latitude 66 degrees 11 minutes N., longitude 20 degrees 55 minutes W. This ridge may owe its origin to the faulting which formed Hunafloei Deep.

For the most part Hunafloei Deep is floored with mud. A few patches and areas of sand, gravel, and

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mixed sand and mud occur throughout its length. The mud is Boeggild's gray, deep-sea clay (9, Part 3, plate 2).

Munafloi Deep runs southward up into Skagestrand Bay, between the Northwestern Peninsula and the peninsula of Skagen. This, in turn, bifurcates into Hrute Fjordur on the west and Huns Fjord on the east.

A narrow isthmus, measuring 4 miles in width and 228 meters in maximum height above sea level, separates Hrute Fjord, west of the mouth of Hrute Fjordur, and Gils Fjord, at the head of Breiddi Fjord. If this isthmus were not present the Northwestern Peninsula would be an island. The orientation of Hrute Fjord and Kollis Fjord suggests that the inferred northeast-trending fault system of Breiddi Fjord (see page 28) may cut across the isthmus and intersect or merge with the system outlining Hrute Fjordur and Munafloi Deep.

The mud in Munafloi Deep is shown as extending southward to the mouth of Hrute Fjordur. This is considered to be a continuous belt following the channel that runs into Hrute Fjordur.

A second, narrower belt of mud lies along the axis of the inner half of Hrute Fjordur. The sandy areas on either side of this belt, and possibly the belt itself, contains shells, in contrast to the rest of the fjord (see page 38). One possible explanation for this may be that the

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deeply inset inner portion of the fjord is to some extent protected from the Arctic drift ice which frequently besets the northern coast. Also, no icy glacial streams pour their waters into Kruta Fjordur as they do in some of the Vestfirðir; the stream entering the upper end of Kruta Fjordur heads in a small lake in the highlands 10 miles to the south (25).

Rock fringes the eastern and western shores of Kruta Fjordur, both at the mouth of the fjord and halfway back toward the head.

Mid Fjord, east of Kruta Fjord, contains no bottom notations on the chart. The author has shown a belt of mud along its axis at the mouth, based on the presence of a 60-fathom enclosed basin.

The mud zone of Hunsflói Deep is lobate to a limited extent toward Huns Fjord. The mud line is shown running along the eastern side of a gentle trough leading into Huns Fjord. It swings northward opposite the point of land called Vatanes, then southward again into Kruta Fjordur. A band of gravel 3 to 4 miles wide flanks this lobe of mud on the east and south.

Sand, with some rock and a few patches of mud, floors Huns Fjord proper. The amount of sediments delivered to Huns Fjord by the numerous streams emptying

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into it is considerable. According to Bisiker (4, p.192), the Blandá, which enters from the east, is one of the largest rivers in Iceland; it drains from two glaciers, Lang Jökull and Hof's Jökull, in the interior, and carries much silt in the form of rock flour. Thoroddsen's geological map (25) shows an extensive alluvial fill in the valleys at the head and on the east side of the fjord.

Skaga Grund, Bathymetry and Bottom Sediments

The bank, Skaga Grund, extends more than forty miles north-northeastward from Skagen peninsula. It is about twenty miles wide near the coast and tapers to about ten miles wide at the outer end.

The pattern of bottom sediments on Skaga Grund is remarkably symmetrical with respect to the plan and east-west profile of the bank. A belt of sand varying from 3 to 7 miles wide, lies along the eastern and northern coasts of the Skagen peninsula. Seaward of this a belt of gravel, 3 to 8 miles wide, extends entirely across the bank, from Hunaflofi Deep to Skaga Fjord Deep, forming a crude V pointing northward. From the apex of this V a narrower belt of gravel, 3 to 4 miles wide, extends northward along the shoalest portion of the bank to within 7 miles of its end. The author believes this gravel, as well as the gravel on Stranda Grund and in Skagestrand

Bay, may be residual from a former time of lowered sea-level.

Irregular-shaped belts of sand lie on either side of the north-trending central gravel belt, covering the remainder of the bank except for the outer end where mud is the predominant sediment. The sand belts, in turn, are flanked by the mud of Kangerfjorden and Skage Fjord Deep. Two isolated, linear-shaped areas of sand extend north-northeastward along the eastern and western sides of the bank at its outer end.

Skage Fjord Deep, Bathymetry and bottom sediments

This deep is well-defined out to about latitude 66 degrees 27 minutes N., reaching 150 fathoms there. Two isolated submarine ridges lie in the vicinity of latitude 66 degrees 20 minutes N. The easternmost of these rises 45 fathoms above the channel east of it, while the westernmost rises from 10 to 30 fathoms above the surrounding bottom. They may be due to faulting, especially the westernmost, which is linear-shaped, or they may possibly be due to glacial deposition.

Skage Fjord Deep is floored with mud southward to latitude 66 degrees 5 minutes N. Flanking it on the east, along the edge of Strømnes Fok, is a belt of sand from 1 1/2 to 3 miles wide. Strømnes Fok itself is covered, for the most part, with gravel, that contains

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the remarkable symmetry of patters observed in Munafloei Deep and Skaga Grund.

Bottom Sediments in Skaga Fjord

Skaga Fjord Deep runs up into Skaga Fjord to the south. A north-trending belt of mud is shown lying in the western part of the fjord, following the channel there. Its exact extent to the north is unknown. Intervening between it and the mud of Skaga Fjord Deep, farther to the north, is a zone of gravel which connects on the east with the gravel of Straumnes fisk.

The chief sediment throughout the remainder of Skaga Fjord, i.e. in the eastern half, at the head, and in a coastal strip along the western side, is probably sand. One possible exception may be the channel shown by soundings to run up the east side of the fjord; this may contain some mud, although none has been shown on the chart.

It is certain that a great amount of sand and silt has been, and is being, emptied into Skaga Fjord. On Thoroddsen's map (25) the river entering at the head of the fjord is shown to drain from Hof's Jökull in the interior. Also, all streams entering from the east head in valleys below small local glaciers in the highlands between Skaga Fjord and Lyja Fjord. The large alluvial

The remarkable symmetry of features observed in the
very old stage.

Topographical features in the

These features are not only very old but also
the source. A north-south line of low land is shown
in the western part of the island, following the
course. Its extent to the north is unknown. A
vein between it and the low land is very old, but
to the north, it is a line of low land which connects
with the gravel of the mountain.

The first feature is the low land
of the island, i.e. in the western part, it is
and in a small strip along the western side, it is
fairly small. The possible explanation may be the
known by geologists as the low land of the island.
This low land is very old, although it has been
on the island.

It is certain that a great amount of sand
has been, and is being, carried from the island
to the low land. The water carried to the low
land is about 1000 tons per hour. It is
also, all streams entering from the west
valleys below small local glaciers in the
western part of the island.

fill in the valleys at the head and along the eastern side indicates that Skaga Fjord at one time extended farther south and that smaller, tributary fjords opened into it from the east(25).

Occurrence of Coral Along the Western Half of The Northern Coast

B.A.2977 shows coral notations in three localities: (1) at Strandebrekur, on Stranda Grund; (2) in Hruta Fjord; and (3) off the northern and eastern coasts of the Skagen peninsula. No data are available for determining whether or not these are living coral forms. As previously mentioned, colonial coral has been found living in cold-water environment in other parts of the world. It may therefore occur along this coast also.

will in the village of the head and along the eastern
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B.A.2978 (Approximate Scale 1:261,260)

General Statement

This chart shows the eastern half of the northern coast of Iceland, extending from Siglu Fjord to Hjereds Flói, 45 miles south-southeast of Þorunn and to the outer extremity of the Langanes peninsula.

The overlap with B.A.2977 on the west consists of a north-south strip only two miles wide. More detailed information in Siglu Fjord and in Myja Fjord has been obtained from plan B.A.3001 (approximate scale this section 1:20,000) and chart B.A.3453 (scale 1:90,500) respectively.

Pattern of Bottom Sediments Off the Eastern Half of the Northern Coast of Iceland

The outstanding feature on this chart, as on B.A.2977, is the series of north-trending deeps and banks-- seaward continuations of the large fjords and broad peninsulas which characterize the northern coast.

In the western half of the chart these deeps and banks control the sedimentation, giving rise to the same rudely symmetrical pattern observed on B.A.2977; i.e. mud flooring the deeps and gravel, flanked by sand, covering the banks. East of Axer Fjörður Dyb, however, deeps and banks alike are, to a great extent, covered with sand. The several patches of mud in Þristil Fjörður Dyb, Þristil

CONFIDENTIAL (Security Information)

General Information

This chart shows the location of the

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Fjord, and Langenes Dyb and the patches and areas of gravel on Melrakke Flak, Kjølisen Benke, and Langenes Flak suggest that the symmetrical pattern of sediments formerly existed here also, but has been masked by a great flood of sand.

Syjs Fjardar Dyb and Syjs Fjord, Bathymetry and Bottom Sediments

Syjs Fjardar Deep merges with Langenes Deep and Skaga Fjord Deep to the west (see B.A.2977 and B.A.565) and is bounded on the east by Grimsey Flak. It reaches depths of over two hundred fathoms north of latitude 66 degrees 22 minutes N. Like the other deeps to the west, it is floored with mud.

Syjs Fjardar Dyb runs up into Syjs Fjord, which, in turn, heads in a long, narrow valley trenching the interior highlands for a distance of almost thirty-five miles south of the Fjord head. According to Nielsen (17, p. 277), this depression, extending from the interior far out to sea, is probably a fault trough formed during the Pleistocene epoch.

The pattern of bottom sediments in Syjs Fjord is similar to the pattern in other large fjords. Mud floors all of the deeper portion continuously from head to mouth. This is flanked on either side by narrow belts of sand covering most of the shallower portions.

To assist the Secretary and the Board, the Commission has established a special committee, the Special Committee on the Administration of the Board, which is authorized to study and report on the organization and administration of the Board.

Special Committee on the Administration of the Board

1947-1948

The Special Committee was organized on July 1, 1947, and its members are:

- Chairman: Mr. J. Edgar Hoover
- Members: Mr. Clegg, Mr. Glavin, Mr. Ladd, Mr. Nichols, Mr. Rosen, Mr. Tracy, Mr. Egan, Mr. Gurnea, Mr. Harbo, Mr. Hendon, Mr. Pennington, Mr. Quinn, Mr. Nease, Mr. Gurnea, Mr. Harbo, Mr. Hendon, Mr. Pennington, Mr. Quinn, Mr. Nease, Mr. Gurnea, Mr. Harbo, Mr. Hendon, Mr. Pennington, Mr. Quinn, Mr. Nease.

The Special Committee has held several public hearings and has received many suggestions from the public.

It is the policy of the Commission to make the Board as efficient and economical as possible. The Special Committee has recommended that the Board be reorganized so that it can function more effectively. The Commission has accepted these recommendations and has authorized the Special Committee to carry out the necessary changes.

The Commission is confident that the Special Committee will be able to carry out its duties in a most efficient and economical manner.

The Commission is also confident that the Board will be able to carry out its duties in a most efficient and economical manner. The Commission is also confident that the Board will be able to carry out its duties in a most efficient and economical manner.

The shoreline throughout much of its length is rocky and fringed with reefs.

Sandy and stony deltas have been built out into the fjord from the mouths of several of the streams, as the Fjnoská, the Morgá, and the stream entering at the fjord head, south of Akureyri. The sand and gravel flooring Clafs Fjord, near the mouth of Kyja Fjord, and extending out into the main fjord is undoubtedly derived from the stream at its head. The spit called Gadeyri, north of Akureyri, is a partially-submerged terminal moraine reworked by tidal currents (10, p. 81).

Grinsey Flek, Bafnaveyri and Bottom Sediments

This bank reaches over thirty miles to seaward from the peninsula between Kyja Fjord and Skjalfendi. This peninsula for convenience will be called the Gjógr peninsula after the northernmost point of it.

Extending northward along its backbone, from shore to outer end, is an irregular belt of gravel ranging from 2½ miles to 10 miles wide. Along either side of this gravel lie belts of sand from 1 to 3 miles wide.

Post-Pleistocene Subsidence

A great belt of downfaulting intersects the northern coast of Iceland between the Gjógr peninsula and the western end of the Laugnes peninsula. Subsidence

The shoreline throughout much of the length is rocky

and fringed with water.

Many of the bays and coves have been built up

into the land and the mouths of several of the streams

as the fjords, the bays, and the streams are all

of the same level, and the sea level is

the same as the level of the fjords, and

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THE BAY OF THE NORTHWEST

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has taken place since the end of the Pleistocene epoch, and the belt is marked by active vulcanism and frequent earthquakes. Resuming the coast from the south, it continues northward into the sea, and occasionally witnesses volcanic eruptions along the coastal region. (24, p. 229).

North of Grimsey Viek the gravel-covered Surfir bank and Groves bank, as well as the islands of Grimsey, may be recent volcanic accumulations. They are close enough to the seaward extension of the belt of subsidence to be in the zone of marginal faulting and attendant vulcanism. In 1868 volcanic activity was reported at the island of Landeyjar, north of the Tjörnes peninsula. (22, p. 511).

Guess describes this belt of subsidence as follows (21, p. 265):

" Its western edge is continued from the north along the western border of the Skilfandi fjord, and thence for a distance of 150 kilometers towards the south as a steep basaltic cliff rising 500-600 meters above the bottom of the trough. The eastern edge runs along the base of the peninsula of Langanes. Skilfandi fjord, Hnauvik, Tjörnes, Laxar fjord, and Hristil fjord lie within the subsidence. In this region earthquakes are of frequent occurrence. The downthrown band is traversed... by numerous fissures which strike north and south, parallel to the margins of the fault trough. They separate lofty horsts from deep fault troughs; hot springs and volcanoes accompany their course like beads on a thread; great lava floods have proceeded from them."

The first thing that I noticed when I stepped out of the plane was the fresh air. It felt like a breath of new life. The sun was shining brightly, and the birds were chirping happily. I took a deep breath and smiled. This was my chance to start over, to begin a new chapter in my life. I had been told that the weather was perfect, and I was not disappointed. The view from the plane was breathtaking, and I couldn't wait to see what the ground was like. I had heard that it was beautiful, and now I was about to find out for myself. I had been waiting for this moment for so long, and now it was finally here. I was going to make the most of it. I was going to live my life to the fullest. I was going to be happy. I was going to be free. I was going to be me.

It was a beautiful day, and I was feeling great. I had been told that the weather was perfect, and I was not disappointed. The view from the plane was breathtaking, and I couldn't wait to see what the ground was like. I had heard that it was beautiful, and now I was about to find out for myself. I had been waiting for this moment for so long, and now it was finally here. I was going to make the most of it. I was going to live my life to the fullest. I was going to be happy. I was going to be free. I was going to be me.

This belt of subsidence can be traced southward to the center of Iceland, and from there southwestward to the southwest coast, where it forms the great southwestern lowland described previously. The zone of crustal weakness along the northwestern side of the trough in southern Iceland is represented by the volcanic peninsula of Reykjanes and its submarine extension to the southwest. The southeastern boundary is represented by the volcanoes, Tindfjella Jökull and Eyjafjella Jökull, and the volcanic islands of the Vestmannaeyjar.

Skjálfandi Byg, Bathymetry and Bottom Sediments

This deep, lying between Grimsey Flak on the west and Maneyjar Flak on the east, reaches depths of 200 fathoms or more near its outer end. It is floored with mud, which in places is consolidated enough to warrant a "hard" classification by the hydrographers. This is portrayed by Hoeghild (9, Part 3, Plate 1) as gray, deep-sea clay.

The belt of mud in Skjálfandi Byg extends southward through the bay of Skjálfandi to within 5 miles of the bay head. The remainder of the bottom is covered with sand which is continuous with the sand of Grimsey Flak and Maneyjar Flak.

The river, Skjálfandi Flot, which flows into

This list of substances has been prepared
 with the object of showing the relative
 positions of the various groups of
 substances which have been classified
 according to the nature of their
 chemical constitution. The list is
 arranged in ascending order of
 complexity of constitution. The
 substances are arranged in groups
 according to the nature of their
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 complexity of constitution. The
 substances are arranged in groups
 according to the nature of their
 chemical constitution.

CLASSIFICATION OF SUBSTANCES

The first group consists of the
 simple substances, which are
 composed of one or more atoms of
 the same element. The second
 group consists of the binary
 compounds, which are composed
 of two different elements. The
 third group consists of the
 ternary compounds, which are
 composed of three different
 elements. The fourth group
 consists of the quaternary
 compounds, which are composed
 of four different elements.

THE NATURE OF CHEMICAL BONDS

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the head of Skjálfandi, heads at the northwestern edge of the ice sheet Vatna Jökull, 100 miles to the south. Accordingly, its waters deliver great amounts of glacial silt to the sea, as well as sand and pumice derived from the volcanic region through which it flows.

Maneyjar Flak, Bathymetry and Bottom Sediments

This bank extends 28 miles northward from the peninsula of Tjörnes.

It bears two rocky shoal patches: Manáreyjar (Latitude 66 degrees 17.5 minutes N., Longitude 17 degrees 7 minutes W.) and Eyjarbrekka (Latitude 66 degrees 19.5 minutes N., Longitude 17 degrees 8 minutes W.). Gravel surrounds these shoals and extends along the backbone of Maneyja Flak in discontinuous belts and patches to within 10 miles of the northern end of the bank. The gravel surrounding Manáreyjar, and perhaps the gravel further north also, is believed to have resulted from submarine vulcanism. Gravel skirts the northern coast of the Tjörnes peninsula, forming a 1½-mile wide band. This can probably be attributed to wave erosion on the rocky coast.

Axar Fjorder Dyb and Axar Fjord, Bathymetry and Bottom Sediments

lying between Maneyja Flak and Eyjarbrekka Flak, this deep trends north-northwestward from Axar Fjord. It apparently coalesces with Skjálfandi 1½ miles

The first of the two birds, the one which is seen in the
 above photograph, was taken at the same place as the one
 which is seen in the above photograph. The two birds are
 of the same species, and are of the same sex.

THE BIRD WHICH WAS TAKEN AT THE SAME PLACE AS THE ONE

WHICH IS SEEN IN THE ABOVE PHOTOGRAPH.

This bird was taken at the same place as the one

which is seen in the above photograph.

The bird which was taken at the same place as the one

which is seen in the above photograph, was taken at the

same place as the one which is seen in the above

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The bird which was taken at the same place as the one

which is seen in the above photograph, was taken at the

same place as the one which is seen in the above

photograph. This bird was probably taken at the same

place as the one

THE BIRD WHICH WAS TAKEN AT THE SAME PLACE AS THE ONE

WHICH IS SEEN IN THE ABOVE PHOTOGRAPH.

This bird was taken at the same place as the one

which is seen in the above photograph.

The bird which was taken at the same place as the one

thirty-five north of Tjörnæs, and the combined deeps continue northwestward from there.

Nowhere does Axar Fjærdar Dyb attain the depths of Skjalfrandi Dyb or the other great deeps to the west. At latitude 66 degrees 40.5 minutes N., longitude 16 degrees 57 minutes W. a sounding of 154 fathoms marks the deepest spot so far measured; several soundings of 144 fathoms occur south of here.

Three discontinuous belts of mud occur in Axar Fjord and Axar Fjærdar Dyb. The numerous "tilt" clay" and "hard" notations in these belts indicate that the sediment is probably Sognfild's gray, dense sea clay.

A slightly shoaler tongue of sand, 7 miles wide, crosses Axar Fjærdar Dyb, separating the largest of the above belts of mud from the mud in the outer portion of the deep. This sand, which is of a part with the sand of Sandyljå Flak and Solrensko Flak, is obviously a sill, which crosses a previously continuous belt of mud running up the deep.

The remainder of Axar Fjærdar Dyb and Axar Fjord is covered with sand and a little gravel.

The Jökulsh River, which empties into Axar Fjord, flows from Jökulstall in the interior through a region of active volcanism. Like the Skjalfrandi Flak,

The first part of the report, which is the most important, is devoted to a description of the general situation of the country. It is a very interesting and useful document, and it is well worth reading. The second part of the report is devoted to a description of the political situation. It is also very interesting and useful, and it is well worth reading. The third part of the report is devoted to a description of the economic situation. It is also very interesting and useful, and it is well worth reading. The fourth part of the report is devoted to a description of the social situation. It is also very interesting and useful, and it is well worth reading. The fifth part of the report is devoted to a description of the cultural situation. It is also very interesting and useful, and it is well worth reading. The sixth part of the report is devoted to a description of the military situation. It is also very interesting and useful, and it is well worth reading. The seventh part of the report is devoted to a description of the foreign relations of the country. It is also very interesting and useful, and it is well worth reading. The eighth part of the report is devoted to a description of the internal security of the country. It is also very interesting and useful, and it is well worth reading. The ninth part of the report is devoted to a description of the education of the country. It is also very interesting and useful, and it is well worth reading. The tenth part of the report is devoted to a description of the health of the country. It is also very interesting and useful, and it is well worth reading.

it is therefore heavily laden with sand and silt which is discharged into the sea. Thorodtsen (22,p.506) cites one instance in 1717 when large quantities of pumice were carried to the sea from an eruption in the interior.

Bathymetry of the shelf from Melreкке Flak to Langenes Flak

The bank, Melreкке Flak, extends 30 miles northwestward from the peninsula of Melreкке Hjellette. It averages about fifteen miles in width.

Thistil Fjorder Bye, between Melreкке Flak on the southwest and Kjølsen Banke on the east, trends northward and northwestward from Thistil Fjora. A greatest depth of 185 fathoms is shown at latitude 66 degrees 47.25 minutes N., longitude 14 degrees 7 minutes E. east of the bottom, however, lies no deeper than 130 fathoms.

North-trending; Kjølsen Banke lies, partially isolated, 25 miles north of the Langenes peninsula. It bears a least depth of 49 fathoms at latitude 66 degrees 42.5 minutes N., longitude 15 degrees 4.5 minutes E.

Langenes Bye, between Kjølsen Banke on the west and Langenes Flak on the south, trends northeastward from a point about ten miles south-southeast of Kjølsen Banke. The greater part of its floor lies between 110 and 140 fathoms.

The bank, Langenes Flak, extends over thirty

The first part of the report deals with the general situation of the country and the progress of the work done during the year.

The second part of the report deals with the work done in the various departments of the country.

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The eleventh part of the report deals with the work done in the various departments of the country.

The twelfth part of the report deals with the work done in the various departments of the country.

miles northwestward from the Langenes peninsula. It averages about twenty miles wide throughout the greater part of its length. Soundings show a north-trending submarine valley, tributary to Langenes dyb, cutting half-way across its width 13 miles northeast of Fontriam.

Bottom Sediments from Melrøkke Flak to Langenes Flak

Sand is the predominant sediment covering the banks and deeps from Melrøkke Flak to Langenes Flak. However, as mentioned before, the presence of discontinuous patches and areas of gravel on the banks, as on Afløien Banke, and of mud in the deeps, as in Thistil Fjorder Dyb and Thistil Fjord, suggests that most of this sand is a relatively recent mantle covering an older sedimentation pattern similar to the one now existing west of Azor Fjorder Dyb.

Gravel covers the bottom of the northern and western sides of the Melrøkke fjord peninsula and completely surrounds the Langenes peninsula for distances up to 13 miles out from shore. This gravel is no doubt derived locally from the basalt and tuff outcropping in cliffs at various points along the coast. The unusual width and continuity of the gravel areas suggests increased wave and current action over a wider area of outcrop during a former time of lowered sea-level. Also,

it is possible that pack ice in recent times has played a part in distributing the gravel, as Melrúks Sljetta and Langanes both are frequently subjected to severe ice blockades in the spring of the year (24, p. 270; 18, p. 67).

In general, the gravel zones are somewhat shallower than the adjacent sandy zones. In one place (latitude 66 degrees 25.5 minutes N., longitude 19 degrees 33 minutes E.) a slightly shallower bar of gravel intrudes into and partially cuts off sand- and mud-filled Thistil Fjord. It would appear that the gravel was deposited later than the sand, thereby indicating that gravel movement may be going on at the present time, or, at least, quite recently.

Bathymetry off the Northeastern Coast of Iceland

The bathymetry off the northeastern coast of Iceland is characterized by alternating deeps and banks, much the same as those occurring off the northern coast. As shown on B.A. 509, these deeps and banks, from northwest to southeast, are: Langanesdjúp (Langanes Dyb on B.A. 2978), Langanesgrunn (Langanes Flak on B.A. 2978), Bakkefjardardjúp (Bakke Flói Dyb on B.A. 2978), Vopasfjardargrunn (No name on B.A. 2978), Móradsjúk (Mjörreds Flói Dyb on B.A. 2978), Glettinga nesgrunn (No name on B.A. 2978), and Seydisfjardardjúp (No name on B.A. 2978).

The deeps were probably cut by subaerial erosion when the shelf was completely exposed at the end of the Eocene. As far as the author is aware, faulting has played no part in their formation. Some deepening may have been accomplished by glacial excavation during the Pleistocene epoch, however.

Bakka Flói Dyb and Vopna Fjörd, Bathymetry and Bottom Sediments

Bakka Flói Dyb extends northward from the bay, Bakka Flói. Its greatest measured depth, 208 fathoms, falls outside S.A. 2974, on which chart most of the bottom lies between 110 and 150 fathoms. At its shoreward end the deep turns southward toward Vopna Fjörd, while a smaller branch shown by the soundings continues southwestward and runs up into Bakka Flói.

Much of Bakka Flói Dyb is floored with mud, particularly the deeper central portions. It is not certain if this mud forms a continuous belt, as shown on the chart, since sediment notations are widely separated. Sand covers the slopes on the northwestern side of the deep, and the slopes and part of the bottom on the southeastern side.

The shoreward end of Bakka Flói Dyb is, to a great extent, surrounded by gravel. The boundary between gravel and mud on the eastern side of the southward extension of the deep, is about latitude of degrees 7 min-

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Notes from the Young Men's Association

Notes from the Young Men's Association of the
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utes N., Longitude 12 degrees 23 minutes N., has been placed along the bottom of a pronounced break in slope, where the bottom falls off to the west over 90 fathoms in 1 mile.

This gravel is probably continuous with the gravel surrounding Leaganas Flak. It also extends to the south and east, covering most of the bank called Vopna-fjardargrunn on B.A.565.

The large areas of sand in Bakka Flói and in Vopna Fjord, 20 miles to the south-southeast, have very likely been deposited from the streams entering at their heads.

The bottom for 2 miles to seaward from the peninsula southeast of Bakka Flói is rocky. Likewise, rock bottom extends more than five miles outward from the peninsula between Vopna Fjord and Hjéreds Flói.

Hjéreds Flói and Hjéreds Flói Dyb, Bathymetry and Bottom Sediments

Hjéreds Flói, southeast of Vopna Fjord, and Hjéreds Flói Dyb are seaward extensions of two long, narrow valleys which commence in the interior and merge into one lowland just before reaching the sea. The Jökulsa and the Lager Fljot rivers, which flow through the valleys, both head in Vatna Jökull. Both valleys

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are extensively siluviated (25), and the lesser Fliot throughout much of its length forms a deep, narrow lake the bottom of which lies 84 meters below sea level (24,p.210).

These valleys are partially-filled glacial troughs, and the common lowland at their lower end is presumably a coalescing delta of which the sandy area in Hjørads Flói represents the seaward extension. The outward edge of this advancing wedge of sand is marked approximately by the 100-fathom depth curve. In Hjørads Flói Dyb, outlined by the 100-fathom curve, mud is the predominant sediment.

Occurrence of Coral along the Eastern Half of the Northern Coast

Coral is shown on B.A.2978 in six separate localities. (1)Two patches occur about three miles offshore, west of the mouth of Myje Fjord. (2)One patch occurs just offshore on the northeastern side of the Hjógr peninsula, east of Myje Fjord. (3)Two patches occur near the head of Vaistil Fjord, and (4)one out in the middle of the embayment between the peninsulas of Melrakks Bljatta and Langanes at Latitude 66 degrees 27 minutes N., Longitude 15 degrees 6 minutes W. (5)One patch occurs on the south end of Kjölson Banke, at Lat-

The following is a list of the specimens collected during the expedition to the ... (p. 10)

These specimens are generally ... and the common ... (p. 11)

References

Boxer in show on ... (p. 12)

tude 66 degrees 32.5 minutes N., Longitude 19 degrees 6 minutes W. (6) A number of patches and areas are distributed along the Langanes peninsula on both sides-- some near shore and others up to eight miles offshore.

The extensive development of coral around Langanes is particularly worthy of note, since this peninsula, together with Melrakke Sjettis and North Cape, is subject to severe drift ice blockades more often than any other points along Iceland's coast.

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B.A.2979 (Scale 1:254,000)

General Statement

This chart shows the waters off the eastern coast of Iceland, from Hjereds Flói to the Vestrahorn peninsula. Overlap with B.A.2979 on the northwest consists of a strip measuring 24 miles east-west and 6 miles north-south. This common area includes only the southeastern edge of Hjereds Flói, the remainder of the overlap falling on land.

Extra detail has been added from the following large-scale plans: B.A.2330 (1:36,580), covering Reyðis Fjord and Lodmandar Fjord; B.A.1535 (1:32,590), covering both branches of Hjófi Fjord; B.A.1550 (approximately 1:40,650), covering Heydar Fjord and Fæskrud Fjord; and, B.A.1636 (approximately 1:38,000), covering Herra Fjord.

Character of the Eastern Coast

This section of Iceland's coast, like the northwestern peninsula and the western part of the northern coast, is mountainous and indented with numerous fjords. Many of these fjords are matched offshore by submarine valleys which extend outward across the shelf and form deeps, as off the northern coast.

However, unlike the northern coast, the land valleys at the heads of the fjords do not extend long distances inland. Here the drainage divide lies nowhere

Section 100

Section 100

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more than thirty-five miles in from the extremities of the intervening peninsulas (25), while it is often more than one hundred miles in from the extremities of the north-coast peninsulas.

The eastern fjords, and corresponding deeps, also differ from the northern fjords and deeps in that they owe their origin solely to subaerial erosion, which took place at the end of the Pliocene epoch. As far as is known, no faulting is involved in their depression.

Glacial excavation during the Pleistocene epoch has deepened many of the fjords, producing enclosed basins and well-developed thresholds. These basins, like the basins of the Northwestern Peninsula fjords, are the sites of accumulation of fine sediments. The muds are typical of the standing, black fjord muds usually produced under conditions of stagnation (20, p. 84).

The Shelf between Ejereds Flói and Sandvík, Bathymetry
And Bottom Sediments

Ejereds Flói and Ejereds Flói Dyb, enclosed by the 100-fathoms depth curve, appear at the top of the chart. A belt of mud is shown lying in the deep and overlapping somewhat onto the bank south of it. This mud is continuous with the area of mud in Ejereds Flói Dyb shown on B.A. 2978.

South of Ejereds Flói Dyb the bank called

The following are the names of the persons who have been appointed to the various committees of the Board of Directors for the year 1911.

The Finance Committee consists of Messrs. J. B. Smith, Chairman, and W. H. Jones, J. K. Brown, and C. D. White. The Audit Committee consists of Messrs. J. B. Smith, Chairman, and W. H. Jones, J. K. Brown, and C. D. White. The Executive Committee consists of Messrs. J. B. Smith, Chairman, and W. H. Jones, J. K. Brown, and C. D. White.

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Glettingenesgrunn (see p. 1.585), as outlined by the 190-fathom depth curve, reaches over forty miles eastward from the coast, narrowing from 20 miles in width at the shoreward end to a point at the outer end. South of it the deep, Seyðisfjörðardjúp, with the floor lying, for the most part, between 110 and 120 fathoms, extends eastward from Seyðisfjörður, or Seyðis Fjord, a long, narrow, unnamed bank extending eastward from the vicinity of Hjófi Fjord bounds Seyðisfjörðardjúp on the south.

From Hjerads Flói to Sandvík (latitude 63 degrees 5.5 minutes N., Longitude 13 degrees 32 minutes W.) sand is the predominant sediment, covering deeps and banks alike. However, areas of gravel occur locally on the banks. One area, measuring 16 miles east-west by 10 miles north-south, occupies the west central portion of Glettingenesgrunn. Another area, measuring 9 miles east-west by 4 miles north-south, lies on the bank south of Seyðisfjörðardjúp. One small area of mud of unknown size lies in Seyðisfjörðardjúp.

The coast, both in the fjords and on the intervening peninsulas, is fringed by reefs, while isolated rocks and patches of rock bottom occur at various distances offshore. Gravel covers the bottom for 3 miles out from the peninsula between Seyðis Fjord and Hjófi Fjord.

The first part of the report deals with the general situation of the country and the progress of the work done during the year. It is followed by a detailed account of the various projects and schemes which have been carried out, and a summary of the results achieved. The report concludes with a statement of the views of the Committee on the future of the country and the work of the Government.

The Committee has the honor to acknowledge the assistance rendered by the various departments and officials of the Government in the preparation of this report. It is also indebted to the members of the public who have expressed their interest in the work of the Committee.

The Committee has the honor to certify that the above is a true and correct copy of the report as presented to it.

Signed,

Chairman of the Committee.

Seydis Fjora and Hjófi Fjora, Bathymetry and Bottom Sediments

Two large fjords, Seydis Fjord and Hjófi Fjord, indent this section of the coast. In Seydis Fjord an enclosed basin reaching 50 fathoms in depth is separated from equivalent depths on the shelf by a threshold nearly twenty fathoms shoaler, located outside the Fjord mouth.

Seydis Fjord is floored with mud, except for a narrow strip of sand along the shore. This mud extends out into the open sea almost as far as the head of Seydis-fjardardjúp.

Hjófi Fjord, likewise, is floored with mud except for a narrow strip of sand along the shore. This mud extends into the southern branch of Hjófi Fjord, called Nordfjardarflói on H.M. 1535. Here it is flanked by sand on both sides, and the sand, in turn, by a continuous strip of rock bottom skirting the shore. The bottom sections on H.M. 1535 show a continuous band of rock bottom across the mouth of Hellis Fjord, middle one of three small fjords at the head of Nordfjardarflói. The soundings, however, show no particular evidence of a threshold ridge here.

Reydar Fjord, Bathymetry and Bottom Sediments

Between Senavik and Heru Fjord (Latitude 61 degree 40 minutes N., Longitude 14 degree 15 minutes W.) the coast is indented by five fjords. From north-

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east to southwest these are: Heydar Fjord, Faskind Fjord, Stålvær Fjord, Bræiddeis Vilt, and Seru Fjord.

Heydar Fjord is a flat-bottomed trough 2 miles wide and 15 miles long. It reaches its greatest depth, 106 fathoms (latitude 64 degrees 57.25 minutes N., longitude 13 degrees 30 minutes E.), at the outer end. East of this the bottom becomes shallower, and a threshold separates the depths of the fjord from equivalent depths on the shelf outside. Soundings indicate that a submarine valley continues outward from the mouth of the fjord. As it crosses the shelf it increases in size and depth to form the deep, Heydarfjardarvágur (see B.A. 509), which indents the edge of the shelf.

The 80-fathom sounding, 1.1 miles south-southwest of the islet, Sestu Sker, marks the deepest point on the threshold. The gravel patch occurring at this point suggests the threshold may be covered in part with moraine material.

Halfway in toward the head of Heydar Fjord a smaller branch, called Laki Fjord, joins it from the northwest. Depths in Laki Fjord are no greater than 35 fathoms (shown on B.A. 1550), as compared to depths of 62 to 77 fathoms in the adjacent part of Heydar Fjord. Laki Fjord is a "submerged hanging valley." Like Heydar Fjord, it contains an enclosed basin. This basin is

separated from the depths of Heydar Fjord by a threshold which is 17 fathoms or more higher than the basin.

In the outer half of Heydar Fjord sand and mud floor the deeper portions. The shallower portions on either side of this are covered with rocks, while much of the shoreline is rock-fringed.

The inner half of Heydar Fjord is floored with mud, while narrow strips of sand probably skirt the shore. Saki Fjord is floored largely with sand and mud.

Fæskrud Fjord, bathymetry and bottom sediments

Fæskrud Fjord, south of Heydar Fjord, averages 1 mile in width and 7 miles in length. Like Heydar Fjord, it contains an enclosed basin behind an outer threshold. The basin floor lies for the most part between 43 and 57 fathoms, the deepest part being near the outer end. The threshold lies at 41 fathoms.

Bottom notations on D.S. 1550 show that a mile-wide band of rock bottom, coincident with the threshold, extends completely across the mouth of Fæskrud Fjord, and to the northeast, north, and northwest extends in many times this width. It surrounds the outer end of the peninsula north of Fæskrud Fjord, extending several miles into both Fæskrud Fjord and Heydar Fjord.

In some places in Fæskrud Fjord rock bottom fringes the shoreline, while in others a narrow strip

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 The fourth part of the report is
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 country. The seventh part of the
 report is devoted to a description
 of the military and naval forces
 of the country. The eighth part
 of the report is devoted to a
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 and the state of the roads and
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of sand lies along the shore. Sand also covers the bottom of the enclosed basin for a distance of almost two miles west from the western edge of the rock threshold. However, by far the greater part of the bottom is covered with mud.

Stöðvar Fjord and Breiddals Vik, Bathymetry and Bottom Sediments

Stöðvar Fjord and Breiddals Vik, the two small indentations south of Reskjal Fjord, are comparatively shallow. Stöðvar Fjord reaches 30 fathoms at the deepest, while most of Breiddals Vik lies above 25 fathoms. A submarine valley heads into Breiddals Vik contains a hole 60 fathoms deep; this, however, lies just outside the bay.

Both Stöðvar Fjord and Breiddals Vik have sand bottoms. In Breiddals Vik a bank of rocks and rocky islets up to one mile wide skirts the entire southeastern shore, while separate reefs extend the same distance into the bay from the northern shore. The linear shape of these reefs suggests they may be submerged dikes, such as occur to the southeast in Gera Fjord.

Gera Fjord, Bathymetry and Bottom Sediments

Gera Fjord, the southernmost of the fjords in this section, averages 1 1/2 miles in width and extends 11 miles inland. Unlike the fjords just described, Gera Fjord has no single enclosed basin within a pronounced

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threshold. Throughout most of its length a series of small basins separated by somewhat shallower portions characterizes the bottom. The deepest parts of the basins are marked by: the 42-fathom sounding at latitude 64 degrees 44.75 minutes N., longitude 12 degrees 25.7 minutes E.; the 53-fathom sounding at latitude 64 degrees 43.4 minutes N., longitude 12 degrees 14 minutes E.; the 39-fathom sounding at latitude 64 degrees 42.25 minutes N., longitude 12 degrees 22.75 minutes E.; the 34-fathom at latitude 64 degrees 41.25 minutes N., longitude 12 degrees 19.25 minutes E.; the 35-fathom sounding at latitude 64 degrees 40.75 minutes N., longitude 12 degrees 10.5 minutes E.; and the 41-fathom sounding at latitude 64 degrees 40.4 minutes N., longitude 12 degrees 11.9 minutes E. The portions of water between basins are from 3 to 14 fathoms shallower than the basins.

This bathymetric irregularity is believed to be due to the effect of numerous basalt dikes which traverse the floor in this region (27, 28, 29). These dikes are particularly numerous in the outer half of the fjord. Here they form linear-shaped reefs but they usually terminate from both shores out into the fjord. On B.S. 1636 the landward portions, striking northeastward, are also shown. The linear-shaped reefs and islands between the end of the Ljusveggr peninsula, south of Horns fjord, and the

island of Papey, 4 miles to the southeast of the main-
sule, are undoubtedly due to the effect of dikes also.
The pattern of sediments in Lera Fjord is the same as that
in the other large fjords to the north. Mud covers the
greater part of the fjord bottom, while strips of sand
skirt much of the shore.

On the shelf outside the fjord lies an irregularly
shaped area of mud, measuring 5 1/2 miles east-west by 2 1/2
miles north-south. This is separated from the mud in the
fjord by 2 miles of sandy bottom.

As with the other fjords, a submarine valley
continues outward from Lera Fjord. It crosses the shelf,
increasing in size to become the deep, Lerufjordarall (see
B.A.565).

The shelf between Sandvik and Lera Fjord, bottom Sediments

In the section north of Sandvik the shelf was
largely covered by sand, with only a few isolated areas
of gravel. South of Sandvik, however, gravel predominates
over sand. Commencing about ten miles east-southeast from
Sandvik, a continuous belt of gravel 7 to 10 miles wide
trends southeastward for about nine miles. It then turns
sharply to the southwest and trends in that direction
for about fifty miles, decreasing to 6 miles in width at
the southwestern end. At a point 17 miles southwest of
where it makes the sharp turn the width suddenly decreases

to 10 miles and immediately increased again. Just before this point it is joined by another belt of gravel of equal width, approaching from the east and southeast. The author cannot account for this great amount of gravel except to suggest that it may have been formed by wave erosion on rocky terrain exposed on the shelf, or at least brought within wave range, when the sea level was lowered at the end of the Pliocene epoch.

Sand mantles the shelf east of this gravel for as far as the chart extends. A belt of sand 3 to 6 miles wide also intervenes between the gravel and the coast southwest of Reydar Fjord.

Two large areas in which the sedimentic, sand and gravel alike, contain shells occur on the shelf here. One of these, shaped roughly like an isosceles triangle with the east-west altitude measuring 12 miles and the north-south base, 7 miles, lies offshore just north of Reydar Fjord. The other, irregular-shaped, area, measuring 17 miles northwest-southeast by 10 miles east-west, commences at the rock threshold of Faskrud Fjord and extends southward and southwesterward almost to Horn Fjord. South of this a number of patches and small areas of shelly bottom are scattered over the shelf.

Numerous reefs and rocky shoals are found on the shelf at varying, and sometimes considerable, distances

Offshore. Examples of these are: Diens Bodi (Latitude 65 degrees 3.5 minutes N., Longitude 13 degrees 12.5 minutes W.), Nyibodi (Latitude 64 degrees 50.25 minutes N., Longitude 13 degrees 26 minutes W.), Aggur (Latitude 64 degrees 48.25 minutes N., Longitude 13 degrees 25.5 minutes W.), Kvalsbakur (Latitude 64 degrees 36.25 minutes N., Longitude 13 degrees 17 minutes W.), Yztibodi (Latitude 64 degrees 35 minutes N., Longitude 14 degrees 3 minutes W.), and others.

The coincidence of most of these rocks with the belts of gravel previously described lends weight to the hypothesis that the gravel was obtained by wave erosion on rocky terrain when the sea level was lowered. The rocks would therefore represent unrounded stacks and ledges.

The abnormal magnetic variation noted at Diens Bodi and other places along the coast attests to the ferrous nature of the basic rocks underlying the shelf.

The Coastline between Hamars Fjord and Vestrahorn

In Hamars Fjord and Alfts Fjord, southwest of Seru Fjord, no information is available as to the nature of the bottom sediments. A sand bar 6 miles long has been built completely across the mouth of Alfts Fjord and part-way across the mouth of Hamars Fjord. This is the first of a series of great offshore bars and stone beaches fringing the southeastern, southern, and southwestern

The coincidence of most of these rocks with
 the base of the generally horizontal beds which
 are in the hills that are level and flat in
 places on rocky terrain when the level was lowered.
 The rocks which are in the level and flat
 and level.

The abnormal magnetic variation noted at
 these sites and other places along the coast is
 the result of the local magnetic field.

In many places the magnetic field is
 very low, no indication of magnetic field is
 at the places mentioned. A few are shown in the
 field completely cover the coast of the river
 way across the mouth of the river. This is the river
 of a series of great offshore bars and storm beaches

Along the coast the magnetic field is
 very low, no indication of magnetic field is
 at the places mentioned. A few are shown in the
 field completely cover the coast of the river
 way across the mouth of the river. This is the river
 of a series of great offshore bars and storm beaches

coasts of Iceland.

Just outside this bar lies an oval area of rock bottom, measuring 5 miles long parallel to the bar and 2½ miles wide. Another area of reefs and rock bottom extends 2½ miles to seaward from the point, Hvalnes, about ten miles south of Afta Fjord. According to Thoreldsen's geological map (25), the rock composing the point is liparite. Presumably, therefore, the rock composing the offshore reefs is likewise liparite.

Eleven and one half miles southwest of Hvalnes lies another, smaller area of rock bottom off the northeastern side of the promontory, Vestrahorn. Thoreldsen's map (25) shows gabbro here.

From Hvalnes an offshore bar extends southwestward to Vestrahorn. Two embayments are enclosed behind it. Lons Fjord (name shown on B.A.2933) is apparently shut off completely, while Afta Fjord is nearly so. No information is available on the nature of the bottom sediments in these bays.

The shelf between Lemars Fjord and Vestrahorn, bottom sediments

With certain exceptions, to be given below, sand covers the greater portion of the shelf in this section. A number of patches and small areas of shelly bottom occur scattered throughout sand and gravel zones alike.

The first part of the report deals with the general situation of the country and the progress of the work done during the year. It is followed by a detailed account of the various projects and the results achieved. The report concludes with a summary of the work done and a list of the recommendations made.

The second part of the report deals with the financial statement of the organization. It shows the income and expenditure for the year and the balance sheet at the end of the year. It also shows the details of the various items of income and expenditure and the reasons for the same. The financial statement is followed by a statement of the assets and liabilities of the organization.

The third part of the report deals with the administrative matters. It shows the details of the various committees and the work done by them. It also shows the details of the various reports and the work done by the staff. The report concludes with a list of the recommendations made.

The long belt of gravel described on page 74 extends southwestward to a point 7 miles southwest of Hvalsnes. As previously mentioned, a belt of sand bottom intervenes between this gravel and the shore, except where rock bottom occurs. A small, linear-shaped area of gravel, 9 miles long by 2½ miles wide, lies offshore 30 miles east of Hvalsnes.

Commencing 7 miles southwest of the bar across Alfta Fjord, an S-shaped belt of mud and ooze trends southeastward, eastward, and again southeastward for almost twenty-five miles. It averages about three miles wide in the section nearest shore, swells to twice this width in the middle section, and tapers again to about three miles wide in the section farthest from shore. This last section lies in the trough of Seruffjerderall, marked by the 106-fathom and 108-fathom soundings at Latitude 64 degrees 19.5 minutes N., Longitude 13 degrees 29.5 minutes E., and Latitude 64 degrees 20.2 minutes N., Longitude 13 degrees 35.5 minutes E., respectively. The middle section occupies a gentle tributary submarine valley indicated by the 83-fathom and 73-fathom soundings at Latitude 64 degrees 19.5 minutes N., Longitude 13 degrees 44.75 minutes E. and Latitude 64 degrees 19.75 minutes N., Longitude 13 degrees 53.75 minutes E., respectively.

Two smaller areas of ooze lie several miles north of this belt, while a number of scattered patches of both

The long belt of gravel described on page 7

extends northward to a point 7 miles southeast of
Avalanche, as previously mentioned, a belt of sand bottom
intervenes between this gravel and the shore, except where
rock bottom occurs. A small, linear-shaped area of gravel
is also long by its shape, but it is
very small.

Continuing 7 miles southeast of the bar across

the bar, as shown on the map, the
contour, which is a continuation of
the same, is about 1/2 mile long. It
is in the middle of the bar, and is
about 1/2 mile long. The bar is
about 1/2 mile wide in the section
shown. This bar section lies in the
middle of the bar and is bounded
by the 100-fathom and 108-fathom soundings
at 100 fathoms 12.7 minutes N. and
108 fathoms 13.2 minutes N. and
100 fathoms 12.7 minutes W. and
108 fathoms 13.2 minutes W. The
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long. It is bounded by the 100-fathom
and 108-fathom soundings at
100 fathoms 12.7 minutes N. and
108 fathoms 13.2 minutes N. and
100 fathoms 12.7 minutes W. and
108 fathoms 13.2 minutes W. The
middle section is about 1/2 mile
long.

Two smaller areas of coral lie several miles north
of this belt, while a number of scattered patches of coral

mud and ooze lie in the gravel zone still further north.

Another belt of mud and ooze, comparable in size to the belt southeast of Lilla Fjord, commences 3 1/2 miles southeast of Svalbard. This belt trends southwestward past Vestrehorn, and is continued on Svalbard.

It is not known whether the ooze is organic or simply a flocculent, watery mixture of inorganic material. Pertinent to this question, Trexler (5, p. 97-100) mentions at least three cold-water forms of ostracods that occur off Iceland.

Occurrence of Coral Along the Eastern Coast

Coral is shown on this chart in single patches at eight localities. These are as follows: (1) 5 miles eastward from the southern edge of Sjarvåg Fjåi; (2) 2 miles offshore, halfway between Sjarvåg Fjåi and Lydic Fjord; (3) close in to shore, halfway between the mouth of Hjøfi Fjord and the edge of Svanvik; (4) 3 miles south-southeast of Svanvik; (5) 10 miles eastward from the mouth of Høyder Fjord; (6) 17 miles east-southeastward from the mouth of Høyder Fjord; (7) the northern side of the mouth of Svanvik Fjord; (8) 1 mile east-northeast of the island, Papey, off the mouth of Beru Fjord.

It is not known if this is living or fossil coral.

B.A.2980 (Approximate Scale 1:200,000)

General Statement

This chart shows the waters off the southeastern and southern coasts of Iceland, from the Vestrahorn peninsula to the section of shoreline south of the volcano, Myjafjalla fókull. The area portrayed includes the island shelf and the island slope out to depths of over eight hundred fathoms.

B.A.2979 overlaps into the northeastern corner, forming a rectangle measuring 15 miles east-west by 12 miles north-south. About nineteen miles of shoreline, including the Vestrahorn peninsula, are shown in this common area.

As previously mentioned, B.A.2980 and B.A.2733, to the west, have about twenty-two miles of shoreline in common. B.A.2980, however, extends 28 miles further south than B.A.2733.

Extra data have been added to Hornafjörður (Latitude 64 degrees 19 minutes N., Longitude 15 degrees 12 minutes W.) from plan B.A.1535 (scale 1:14,870), and to the shelf between Reynis Dyk and the western edge of the sheet from chart B.A.2968 (scale 1:111,350).

Character of the Southeastern and Southern Coasts

In the southeastern and southern coastal region the mountains retreat and a coastal plain up to

Geological Observations

General Remarks

This sheet shows the nature of the rocks

and the general character of the terrain. The rocks are mostly of the Permian and Triassic periods. The Permian rocks are represented by the red sandstones and shales, and the Triassic rocks by the green shales and sandstones. The Permian rocks are generally more massive and harder than the Triassic rocks, which are more friable and weathered.

The Permian rocks are represented by the red sandstones and shales, and the Triassic rocks by the green shales and sandstones. The Permian rocks are generally more massive and harder than the Triassic rocks, which are more friable and weathered. The Permian rocks are generally more massive and harder than the Triassic rocks, which are more friable and weathered.

The Permian rocks are represented by the red sandstones and shales, and the Triassic rocks by the green shales and sandstones. The Permian rocks are generally more massive and harder than the Triassic rocks, which are more friable and weathered.

The Permian rocks are represented by the red sandstones and shales, and the Triassic rocks by the green shales and sandstones. The Permian rocks are generally more massive and harder than the Triassic rocks, which are more friable and weathered.

Geological Observations

In the southern part of the sheet

the Permian rocks are represented by the red sandstones and shales, and the Triassic rocks by the green shales and sandstones.

fifteen miles in width, consisting of sandy and gravelly flats, takes their place. This is the Southeastern Lowland, mentioned on page 6. Great offshore bars, backed by marshes and lagoons, form the strandline. Lewis (12, p.436) describes them as follows:

"...more than 200 miles of the southern shores of Iceland consist of a great offshore bar. The mountains of the hinterland reach the shore at only two points-- Fortland, south of Myrdalsjökull, and the Vestur Horn. Elsewhere the great embankments of sand and shingle enclose wide areas of lagoon, marshland and gravel flats. Numerous rock outcrops are incorporated in the embankment, frequently forming nodal points from which the beaches recede in sweeping curves both to the east and west."

Bathymetry off the southeastern and southern coasts

From the bank, Breiddals Grunn (see B.A.565), opposite Héraufjörður, or Héra Fjord, southwest to the western side of the submarine valley, Lágais Djúp, or Reynis Dyb, the shelf narrows from over forty miles in width to less than ten. It is indented by six large submarine valleys, which, in each case, cause the 100-fathoms depth curve to swing halfway or more across the shelf. From northwest to southeast these are Héraufjörðull, Lhásdjúp, Þora-fjörður Djúp, Hraifnarfjörður, and Reynis Djúp.

These submarine valleys run up coast fjords, or toward portions of the coast where fjords or embayments

previously existed and have since been filled in.

Like the east-coast deeps, they are believed to have been eroded subaerially by streams crossing the shelf when the shelf was bare at the end of the Miocene epoch. As far as known, faulting is not responsible for their existence.

A smoothly curved zone may be outlined connecting the outer edges of the banks between the valleys, from the southern tip of Breiddals Bruun to Reynis Björ. In this zone the bottom drops off rapidly toward the southeast and south to sub-oceanic depths: 70 fathoms to 432 fathoms in 5 miles at latitude 63 degrees 38 minutes N., longitude 13 degrees 45 minutes W.; 113 fathoms to 575 fathoms in 5 miles at latitude 63 degrees 45 minutes N., longitude 16 degrees 5 minutes W.; 30 fathoms to 369 fathoms in 5 miles at latitude 63 degrees 17 minutes N., longitude 17 degrees 20 minutes W.

This curved zone is sub-parallel to the curved zone of faulting which cuts across Iceland from north to southwest. The two zones converge gradually toward the southwest, coming together at the Vestmannaeyjar Islands. Can the shelf off southeastern Iceland be bounded by a zone of faulting?

The smoothness of the curved connecting the outer facets of the banks, plus the fact that the bottom

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drops off over four hundred feet per mile, lends weight to the possibility of faulting, or at least downwarping, here. Such subsidence fits in with the process believed to have submerged the Tertiary Plateau and converted Iceland into an island (see page 7).

Source of Sediments Off the Southeastern and Southern Coasts

(1) Glacial Outwash. The mountains at the inner edge of the coastal plain bear extensive ice fields, which send lobes down every available valley. Streams flowing from these lobes carry tremendous quantities of mud, sand, and gravel across the coastal plain to the sea. It has been estimated (28, p. 74) that the sediment carried out by a single sub-glacial stream on the coast of Greenland, which is comparable to the southern Icelandic coast, amounts to over 16,000 tons per day. The quantity of sediment delivered to the sea by the stream in one year would thus total 5½ million tons!

Theroddsen describes this sedimentation in the following passages (24, p. 206):

" Almost all Icelandic glaciers rest on soft rocks (tuff and breccias) upon which erosive action is very active; therefore, the Icelandic glacial-rivers carry down an immense amount of rock in the form of mud, sand, gravel, and blocks of stone; for this reason they are hardly ever found entering fjords or deep bays, these having become filled up in cases where they formerly so entered."

(2) Glacier bursts. In addition to normal deposition from glacial streams, catastrophic deposition from "glacier-bursts" or "glacier torrents" periodically adds to the shoreline and offshore sediments.

The great ice fields rest on active volcanoes. When an eruption occurs floods of water bearing volcanic debris and ice sweep down over the coastal lowland to the sea. Skeidararsandr and Myrdalsandr are particularly subject to these floods although they occur elsewhere along this section of the coast.

Thoroddsen describes these floods as follows (24, p. 201):

" Peculiar to Iceland are the so-called 'glacier-torrents' (Jökull-álsup). When the glaciers by the eruption of volcanoes hidden under the ice, are broken to pieces and melt, the large stretches of land beneath them are inundated by a roaring sea of dirty water with swirling icebergs. Such catastrophes may cause great changes in the surface features of the surrounding country, as the waterfloods often carry along with them an incredible quantity of gravel and rocky blocks. In this way the volcano of Hestla especially has caused considerable changes--the course of rivers are constantly changed, the smaller fjords have been filled up even within historic times, and several large parishes and districts have been destroyed...minor glacier-bursts are also occasionally due to lakes and rivers, which have been dammed by glaciers, suddenly breaking through their barriers and inundating the district."

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Also, Thordarson cites three instances when a position from glacier bursts formed dry land where previously over fifteen fathoms of water existed (22, pp. 503, 505, 510).

According to witnesses, when an eruption under Vatna Jökull sent a glacier burst down the Skeiðars River (east of longitude 17 degrees E.) in 1934 the river increased to ten times the volume of its summer flow within one week (2, p. 16). Two days afterward the burst reached its maximum; huge icebergs sailed downstream and out to sea, while tremendous crashing noises were heard from the glacier.

According to the Sailing Directions (12, p. 498), in 1918 the eruption of Röttlutsagi, above Myrdalsnessar, resulted in a 4-mile stretch of coast at the mill, Hjörléirahöfui, being advanced seaward a distance of 1 mile.

(3) Windblown Sand. The shelf off the southeastern and southern coasts of Iceland is subject to a third type of deposition from the adjacent land. Windblown dust and sand from the clayey, sandy flats of the coastal lowland, from weathered tuff formations in the mountains, and from volcanic eruptions are spread probably in no small amounts over the seabottom. Volcanic dust from eruptions of Icelandic volcanoes sometimes is carried

by winds consistently across the Atlantic Ocean to Europe (24, p.223), while dust whipped up by windstorms on the land has been known to fall on vessels in mid-Atlantic (24, p.243).

Therefore, if noticeable amounts of this dust are carried such great distances, such larger amounts, containing coarser constituents, must be deposited over the nearby shelf. Accordingly, the Sailing Directions reports fine sand in Skeidars Hv, or Skeidars Djúp, which has been blown out from Skeidarórsnar (18, p.493).

(4) Pumice. Large amounts of pumice are delivered to the sea by streams flowing through areas of volcanic activity, by glacier bursts, and directly by submarine eruptions. This occurs off other coasts as well as off the southern and southeastern.

According to Thoroddsen (24, pp.502,505), eruptions of Heiki (western side of H. 298), on latitude 64 degrees N., have produced pumice in amounts great enough to be transported by currents to the Faroe Islands. As previously mentioned, in 1717 large quantities of pumice from a volcano in the interior was carried to Axel Fjord on the northern coast by the Jökulsá River (24, p.504). In 1783 pumice from a submarine eruption off Kapljónar covered the sea for a distance of 150 to 225 kilometers (24, p.504).

The data completely confirm the findings made in 1950
and 1951, which show that the amount of
lead has been known to fall on vessels in mid-Atlantic

(1951, 1952)

Therefore, it is noticeable amount of this

lead has varied each year, but there

is a definite seasonal variation, with the

highest values in the early fall, especially in 1951

and 1952. The data in Atlantic 1951, as reported

in the report, show that the lead concentration in

1951.

(b) Lead. Large amounts of lead are delivered

to the sea in various forms, such as lead

oxide, by glacial bursts, and directly by sub-

marine eruptions. This lead is then carried off

off the northern and southern coasts.

According to Thorpe (1951, p. 202, 203),

tons of lead (western side of N.A.S. 1951), on

at least 100,000 tons of lead is known to

be transported by currents to the Faroe Islands.

As previously mentioned, in 1951 large quantities of lead

from a volcano in the Azores was carried to the

the northern coast by the Azores current (1951, p. 202).

The lead from a volcanic eruption in 1951

the sea for a distance of 150 to 200 kilometers (1951, p. 202).

Although no specific examples are known of by the author, it is to be expected that agitation by ocean waves would scatter the glassy coils or much of this pumice, causing it to sink to the bottom as fine to coarse sand.

(5) Volcanic bombs. It is likely also that volcanic bombs and other, larger fragments of ejecta are frequently contributed to the sediments on the shelf. These fragments have been known to be blown far from the point of eruption. In 1919 a bomb ejected from Heke killed a man 45 kilometers away (24, p. 223); in 1766, from the same volcano a bomb the size of a man's fist was hurled entirely across Iceland to the northern coast, 165 kilometers away!

Bottom Sediments Off the Southeastern Coast

Sand of Longitude 18 degrees 8 minutes N. sand is by far the most abundant sediment. It mantles much of the shelf from shore to outer edge, covering submarine valleys as well as banks.

This sand originates mostly from the numerous rivers which here deposit tremendous amounts of sediment derived normally from glacial erosion or catastrophically from glacier bursts. The presence of windblown sand in Akvidra Dyb has already been mentioned. Some sand also may be derived from pumice, as previously described.

Sand evidently has also been transported down the island slope to mingle with deep-sea sediments. Its exact extent, however, is uncertain. The sediment distribution chart of the "Ingolf" expedition (9, Part 3, Plate 1) shows deep-sea clay in the vicinity of the 717-fathom sounding south of Skeldars Dyb, at latitude 62 degrees 59.5 minutes N., Longitude 17 degrees 6 minutes W. (on B.A. 2980). However, the numerous notations of fine sand mixed with clay or ooze southwest of Skeldars Dyb indicate that here much sand from the shelf must have moved into this deeper region.

On this section of the shelf, after sand gravel is the next most abundant sediment. Large areas of gravel occupy the central and outer portions of each of the banks between submarine valleys, and in Jökulsa Dyb and Hornafjardar Dyb they even lap down into the valleys themselves. A large area of gravel extends 15 miles out from shore on Eyre Bugt, the inner portion of the bank between Jökulsa Dyb and Hornafjardar Dyb. Another smaller area lies across the head of Hornafjardar Dyb, and numerous patches are scattered over the shelf from shore to outer edge.

It is believed most of this gravel is residual from a former period of lowered sea level. Some patches, especially those near shore, may be the result of deposition

and apparently has also been transported from the same source to the other side of the island. The fact that the same material is found in the same place in the same quantity is a strong indication that the material is of the same origin. The fact that the material is found in the same place in the same quantity is a strong indication that the material is of the same origin. The fact that the material is found in the same place in the same quantity is a strong indication that the material is of the same origin.

On the other side of the island, there is a large area of gravel and sand. This area is situated in the same place as the other side of the island. The fact that the material is found in the same place in the same quantity is a strong indication that the material is of the same origin. The fact that the material is found in the same place in the same quantity is a strong indication that the material is of the same origin.

It is believed that the material is of the same origin. The fact that the material is found in the same place in the same quantity is a strong indication that the material is of the same origin. The fact that the material is found in the same place in the same quantity is a strong indication that the material is of the same origin.

from glacier bursts.

Mud and ooze are present in several places on the shelf. From the southwestern corner of B.L.2979 the area of mud and ooze described on page 79 extends onto this chart to a position 5 miles off Vestrahorn. At that position it is 8 miles wide. Another belt 10 miles long and from $1\frac{1}{2}$ to $2\text{-}3\frac{3}{4}$ miles wide lies completely across the shoreward extension of Jökulsa Dyt. A number of patches of these finer sediments are scattered over the inner half of the shelf. As previously stated, it is not known whether this ooze noted off the eastern and southeastern coasts is organic in nature or merely a hydrographer's term for watery mud.

Rock bottom is found infrequently off this section of the coast. What there is occurs mostly as small shore reefs or small, isolated rocks not far from shore. In addition, rock outcrops sometimes are incorporated into the barrier beach.

Reefs and patches of rock bottom are found off Vestrahorn; off the mouth of Hornafjörðr, west of Vestrahorn; at several places off the coast between Hornafjörðr and Ingólfshöfði, 47 miles to the southwest; and, off Ingólfshöfði. Between Ingólfshöfði and Þyrðalevík, 67 miles to the west-southwest, no rock is shown on the chart. This stretch of shore bounds a series of extensive sandy lowland tracts: Skeidarsandur, Drungasandur, Sedalland-

sandr, and Myrdalsesandr. A number of large, glacial rivers empty into the sea here, depositing enough sand apparently to bury any pre-existing rocky prominences.

The 79-fathom shoal in Skeidare Dyb may have bare rock exposed in it, although none is shown on the chart. Also, the two shoal areas of 65 fathoms seen just east of the mouth of the same deep may be marked in places by rock.

Occurrence of Coral Off the Southeastern Coast

Only one sediment notation showing the presence of coral is found on this chart. It lies at latitude 61 degrees 4.75 minutes N., longitude 14 degrees 39 minutes W., southeast of Vestrahorn. As the notation indicates, enough mud was present with the coral to warrant mention by the hydrographer.

Sediments Off the southern Coast

The shoreline and shelf west of the bight of Myrdalsvik is shown on S.A. 2733 and has been described in pages 13 and 14 of this report. The following description of the shoreline and shelf in this area supplements the previous description.

West of longitude 13 degrees 8 minutes W. the shelf is largely covered with gravel. A continuous belt extends from that meridian westward to the edge of the chart, occupying the outer two-thirds of the shelf.

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The only interruption to this belt occurs at Skapte Dyb, where a semi-elliptical area of fine sand, measuring 7 miles northwest-southeast by 1 1/2 miles east-west, occupies the floor of the valley. Although the chart does not show it, this sand may very well be continuous with the coastal sand.

At Latitude 63 degrees 25.8 minutes N., Longitude 19 degrees 34 minutes E., within the overlap zone with S.A. 2733, a 19-fathom sounding bearing a gravel notation appears on this chart but fails to appear on either S.A. 2733 or S.A. 2968. Surrounding depths, as shown on S.A. 2968, range from 19 to 46 fathoms. This sounding, if correct, represents a sudden, local rise in the bottom of over twenty fathoms. Speculation on its origin suggests either an isolated rock hill, disregarding the gravel notation, or possibly a glacial feature, such as a kame deposit.

A belt of sand bottom 2 to 5 miles wide lies between the above gravel belt and the strand line. From Skapte Dyb westward this sand, and probably the gravel also, is mixed with shells. It has been seen that this admixture of shells characterizes most of the shelf sediments off the southern and western coasts, in contrast to the shelf sediments off the northern and eastern coasts.

The mud line from Skapte Dyb westward to the

The first part of the report is devoted to a general survey of the situation in the country. It is followed by a detailed analysis of the economic and social conditions. The author then discusses the political situation and the role of the government. The report concludes with a series of recommendations for the future.

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edge of the chart has been placed at the 100-fathom depth curve, on the basis of the sharp dropoff south of it. The narrow tongue of mud shown entering the south-eastern corner of Reyfis Dyb follows a narrow trough between the 97-fathom shoal and the western side of the valley.

In this stretch of coast rock bottom is definitely known only at Fortland and at Reyfisdrangur, just east of Myrdalavik. At both of these points rocky reefs extend one-half mile or more from shore, representing the truncated base of rock hills fronting the coast.

S.A. 505 shows a sand notation at the 23-fathom sounding southeast of Reyfis Dyb. However, it is believed the shoal represented here, as well as the 97-fathom shoal in the southwestern corner of Reyfis Dyb, may have rock exposed in it.

SECTION III. CONCLUSIONS

From the data presented in the preceding pages a number of conclusions may be drawn concerning the bathymetry and bottom sediments immediately surrounding Iceland.

1. Quantitatively sand is the most important bottom sediment on the shelf. It predominates over other sediments off the western, southern, eastern, and eastern half of the northern coasts.

Mineralogically it is entirely volcanic in content, and has been derived from glacial, stream, and wind erosion of volcanic rocks or else directly from volcanic eruptions. Quartz sand is not known in Iceland.

2. Gravel is the next most important bottom sediment after sand, covering large areas off all coasts from the shore to the outer edge of the shelf. Its probable sources, in order of importance, are: (1) residual from a period of lowered sea level, with resultant wave erosion and probable stream erosion on rock exposed on the shelf; (2) wave erosion on the present rocky coast; (3) submarine vulcanism; and (4) Pleistocene glaciation on the shelf.

3. Off the western half of the northern coast sedimentation is controlled by a series of north-trending deeps and banks, with mud flooring the deeps and gravel,

Geological History

From the data presented in the preceding pages a number of conclusions may be drawn concerning the history of the region. The following are the most important:

1. Geologically the region is a part of the Appalachian system. It is a part of the Allegheny Plateau, which is a part of the Appalachian system. The Allegheny Plateau is a part of the Appalachian system, which is a part of the Appalachian system.

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flanked symmetrically by belts of sand, covering the banks.

4. Shells in the sediments are most abundant off the western coast and off the western half of the southern coast. Apparently the shelf off the northern coast is almost devoid of shells. This variation may be due to the effect of the Irminger Current, a branch of the Gulf Stream which circles Iceland in a clockwise direction.

5. Several belts of fine sediment termed "ooze" on the charts lie on the shelf off the southeastern coast. It is not known if this is organic or inorganic.

6. Bottom notations indicate the presence of coral along all coasts except the southern coast and the southern half of the western coast. It occurs inside the fjords, on the open coast close in to shore, and at considerable distances offshore, out on the shelf.

It is not definitely known whether this is living or fossil coral. Despite the cold-water environment, it may very well be living, since living colonial forms have been found in cold waters in other parts of the world.

7. The shelf off all coasts is trampled by wide, deep submarine valleys which continue seaward from the fjords and bays indenting the coasts. These valleys,

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at least off the eastern and southern coasts, are the result of subaerial erosion at the end of the Pliocene epoch, when the shelf was bared out to what is now the 150-fathom depth curve. Off the northern and western coasts Tertiary and Quaternary faulting have undoubtedly been responsible for some of the depth of the valleys.

3. The island shelf off the southeastern and southern coasts is probably bounded along the outer edge by a zone of faulting or downwarping.

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