Håkon Mosby

THE CRUISES OF THE "ARMAUER HANSEN". No. 1

BJØRN HELLAND-HANSEN AND *FRIDTJOF NANSEN*

THE EASTERN NORTH ATLANTIC

WITH 19 FIGURES IN THE TEXT AND 71 PLATES

FOREWORD

In this treatise we have tried to collect and utilize the results of all investigations hitherto made by ourselves and by others in the eastern part of the North Atlantic. An understanding of the circulation in this area is naturally of signal importance in determining our view of the "Gulf Stream" west of Europe. It appears, too, that there are problems here whose solution would greatly facilitate our study of the general conditions prevailing in the Ocean.

The present treatise must be considered chiefly as an attempt to define the conditions. It makes no claim to have reached definite conclusions in regard to a number of highly important questions; for in spite of the very ample material in the form of observations there are still great gaps, and far more complete and systematic investigations will be needed before the problems can be definitively solved. We are fully prepared for the eventuality that our representation of the current-system as given in the charts of these regions may be substantially modified as a result of further investigations. We hope, however, that this treatise may serve to state the various problems in a useful way, and to indicate the direction in which continued researches should be prosecuted. Preferably the researches should be carried on by several cooperating vessels, as the observations from a single vessel would not satisfy the requirements of synchronism.

In a later paper in "Geofysiske Publikationer", we hope in the near future to return to the conditions in the eastern North Atlantic, and we shall then deal with several questions which have not been discussed in the present treatise, especially the very interesting conditions near the banks and the edges of the continental shelf.

We desire to acknowledge our indebtedness to the Committee of the "Dana" Expedition and Dr. Johs. Schmidt, of Copenhagen, for having placed at our disposal the unpublished observations from 10 stations in 1922.

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THE EASTERN NORTH ATLANTIC.

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(Manuscript received by The Geophysical Commission 28 October 1925).

I. **Cruises in the Eastern North Atlantic.**

During a series of years at the beginning of this century, systematic investigations were made in order to study the oceanographic conditions in the Norwegian Sea, especially by means of the S/S "Michael Sars", under the leadership of Dr. Johan Hjort. Amongst others, the branch of the Atlantic current flowing northwards in the eastern part of the Norwegian Sea was studied in a comparatively thorough manner [cf. Helland-Hansen and Nansen 1909]. Different results were arrived at, which made it very desirable to undertake a closer investigation than hitherto of the currents in the northern part of the Atlantic Ocean south of the Shetland—Færœ—Iceland ridges. Such investigations have been carried out by various Norwegian expeditions in the following years.

In 1910 the expedition with the "Michael Sars" to the North Atlantic took place under the leadership of Dr. Johan Hjort and Sir John Murray. The chief aim of the expedition was to study the fauna of the North Atlantic Ocean by means of new methods of research, but at the same time there was a good opportunity of collecting very valuable materials in the form of oceanographic observations [Helland-Hansen 1912, 1926]. In the same year, 1910, Nansen made observations in the North-eastern corner of the Atlantic Ocean between the British Isles and Iceland, during a cruise in the "Frithjof", a vessel belonging to the Norwegian Navy [Nansen 1913], and concurrently Roald Amundsen, during an experimental cruise with the "Fram", made investigations in the regions immediately westward of the British Isles [Helland-Hansen and Nansen 1912, Nansen 1913]. All these investigations contributed valuable additions to our knowledge of the oceanographical conditions in the North Atlantic, but in consequence a series of new questions were raised which made it especially desirable to carry on continued and more extensive studies of the great Atlantic current off Europe.

In 1913 the M/S "Armauer Hansen" was built for the oceanographic researches of the Biological Station belonging to the Museum at Bergen. In 1918 this ship was placed under the administration of the Geophysical Institute of Bergen. The "Armauer Hansen" is a small vessel of 58 tons' burden, 24 meters' length, 6 m. beam, and a little more than 3 m. draught. The vessel has a yawl rig, and is driven by the sails alone, without making use of the motor, when the wind is favourable. The engine is a 40 HP Bolinder motor which gives the vessel a speed of 6—7 knots in calm weather. The winches for oceanographical research are worked by the motor. Owing to its special construction the ship is easily manœuvered in such a manner that the line along which the oceanographic instruments are suspended, remains in a vertical position throughout the time of obser-

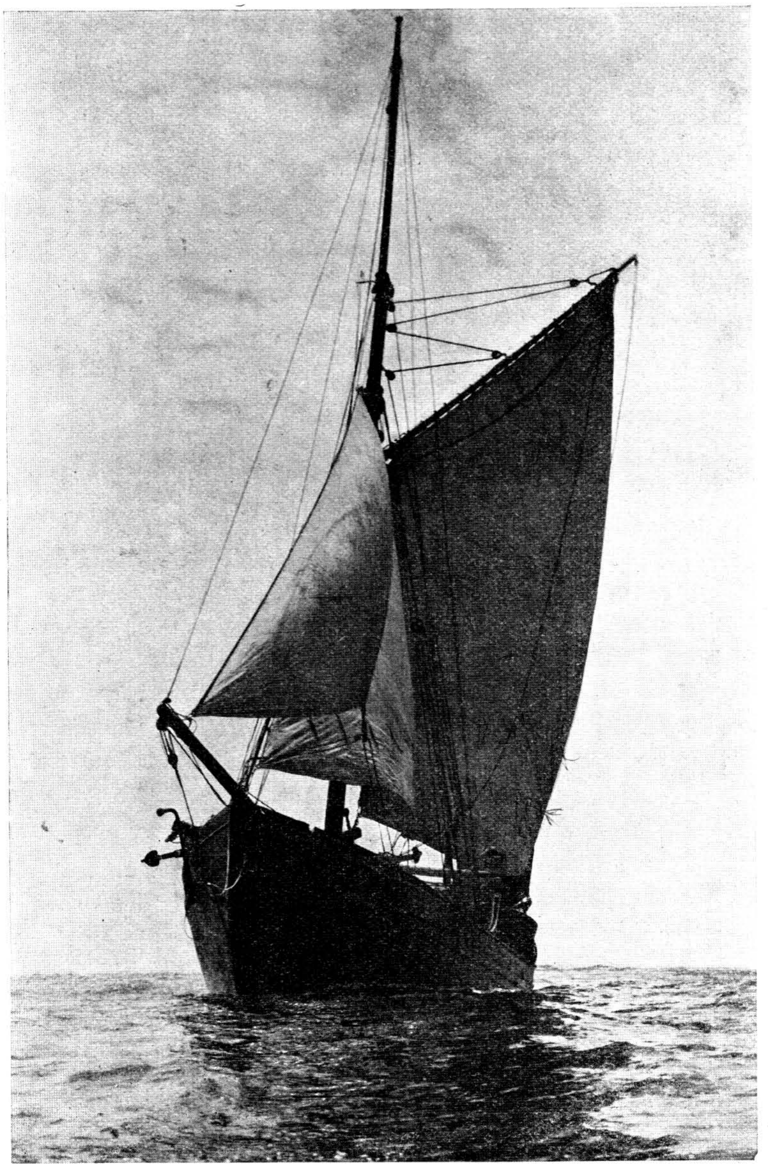


Fig. 1. The "Armauer Hansen".

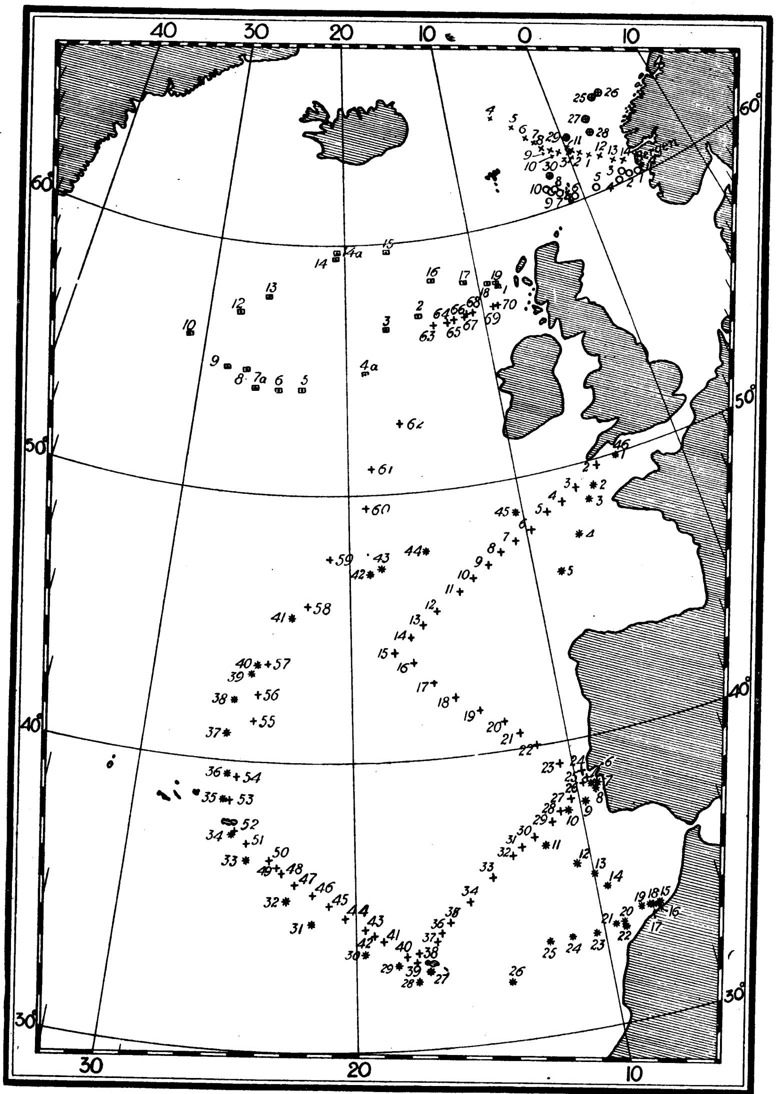
vation, even if there is a strong drift caused by wind or current. Care has always been taken to make sure of the vertical position of the sounding line, and the determination of the depths may therefore be regarded as very trustworthy. The construction and outfit of the vessel is more fully described in other publications, *viz.*: Helland-Hansen 1914, Bergens Museums Aarsberetning 1912, 1913—1914, and 1921—1922.

The oceanographic investigations made during these cruises with the "Armauer Hansen" to the northern and eastern parts of the North Atlantic form the basis of the present paper.

In July—August 1913 investigations were made west of the British Isles as far as 31—32° West Longitude. The aim of this cruise was to take oceanographic observations and to collect zoological material, the latter being for the most part gathered for the benefit of The Natural History Museum in Karlsruhe. The Baden Government and the Society for Natural History in Karlsruhe jointly contributed to meet the expenses, and Professor Auerbach was a member of the expedition. The oceanographic observations on board were made by the meteorologist, Mr. B. J. Birkeland, and by Helland-Hansen, who was the leader of the expedition.

In the following year, 1914, the "Armauer Hansen" undertook a second cruise to the eastern part of the North Atlantic, where, from May to July, extensive oceanographic observations were carried on in a region bounded by Madeira to the south, the latitude of Rockall to the north, and as far as the Azores to the west. Nansen obtained from the Fridtjof Nansen Fund for the Advancement of Science (in Oslo) a sum which might be used to cover any expenses of the expedition in excess of those ordinarily provided for by the annual grant of the Norwegian Government to the "Armauer Hansen". The work in 1914 was limited solely to physical and chemical oceanography; the members of the expedition being Helland-Hansen, Nansen, and Messrs. T. Gaarder, Klaus Grein, B. J. Birkeland, and Kaare Nansen.

In 1922 a third cruise was made to the region of the Atlantic Ocean which lies between Europe and the Azores. An extra grant was then given by Belgian Funds in order to enable Professor Dr. D. Damas, of Liège, to take part in the cruise and obtain zoological collections. A grant was also made by Professor Kr. Birkeland's Fund for Geophysical Research which permitted the installation of new equipment, part of which was a complete radio outfit. The oceanographic observations were limited chiefly to a study of the upper water-layers combined with extensive meteorological observations, in order to obtain the detailed material necessary for an exhaustive study of the interaction between ocean and atmosphere. The results of the meteorological observations will be published separately. The oceanographic observations which were taken by Helland-Hansen and Mr. O. Aabrek furnish a gratifying addition to the observations made in these regions in 1914.



"ARMAUER HANSEN" STATIONER ▫1913 +× 1914 ✱1922 ⊕1923 ○1924

Fig. 2. Stations of the Cruises of the "Armauer Hansen" in 1913, 1914, 1922, 1923, 1924.

The observations on distribution of oxygen and hydrogen ion concentration from the cruises in 1912 and 1914 have been entrusted to Dr. T. Gaarder and will be published in the "Geofysiske Publikationer", Vol. IV, Nos. 3 and 4.

In order to obtain a more perfect picture of the physical conditions in the eastern North Atlantic we have considered, in addition to our own observations, all the data recorded by other expeditions in these same regions, provided that the methods they employed were modern. Chart Pl. 2 gives the position of all the stations, the observations from which furnish the material for the present discussion. We have distinguished the stations of different expeditions on the charts showing the distribution of temperature, salinity, density etc. (Pls. 36—71), by means of various signs similar to those employed on the station-chart, Pl. 2. On each chart these signs indicate the places where direct observations have been made or interpolated values found at the level of the chart. The places of observations may thus be easily seen on all charts except in the Cadiz-Bay region where there were so many stations that only some of them could be marked on the charts.

Observations taken in the same regions and at the same depths, but in different years and by different expeditions, generally agree so remarkably that they obviously can be used in combination with our own observations from 1913, 1914, and 1922 as a trustworthy basis for the construction of the charts given here. This is especially the case with depths greater than 200 meters. At depths between 200 meters and the surface the seasonal variations have naturally to be considered. For these upper water-layers, therefore, we have taken into account only those observations which have been made during the summer season. A comparison of the many observations from different years quite clearly proves that the variations in the distribution of the water-masses from one year to another are of little importance in this part of the sea, as compared with the local variations.

II. Instruments and Methods.

The Nansen Reversing Water-bottle.

All water-samples, except those from the surface and all samples from Stat. 1 in 1914[1], were collected with a reversing water-bottle constructed by Nansen. It consists of a brass tube, tinned inside, about 46 cm. long, with a diameter of 5·8 cm., and holding about one liter of water. At both ends it is provided with stop-cocks (Fig. 3, *c*), which have sufficiently broad oblong apertures to give free passage to the water when they are open during the lowering of the bottle. The instrument is fixed to the sounding-line by a screw (at Fig. 3, *a*) at one end. When it is made ready for lowering the other end is lifted and attached to the line by a fixing arrangement (Fig. 3, *b*), which is released when struck by a messenger lead, as will be seen in Fig. 3 *B*. The water-bottle is then reversed, and the stop-cocks, which were opened by lifting the bottle, are now closed by turning it upside down. After having released the upper end of the open water-bottle the messenger lead continues its way to the fixing arrangement at the lower end (Fig. 3 *C*) and there releases (by pressing down the lever *e*) a new messenger which starts downwards for the next water-bottle. Each instrument has two brass-tubes for reversing thermometers (Fig. 3, *k*).

The weight of the whole instrument is about 2·5 kilograms. Owing to the lightness of the instrument a considerable number of such bottles may be attached to the line for different depths. We generally used about six to eight in each haul, but have occasionally used as many as ten.

After the instruments were lowered to the desired depths we always allowed an interval of at least three minutes to elapse in order that the thermometers might adjust themselves to the temperature at any given depth before they were reversed by the release of the water-bottles.

When the line was hove in, the water-bottles were quickly removed as they came to the deck and placed successively in a stand which was fitted with hooks for twelve bottles. Next water-samples were collected for the determination of salinity, oxygen and hydrogen ion-concentration and immediately afterwards the thermometers were read.

The water-bottles almost always worked in a very satisfactory manner; the stop-cocks closed perfectly water-tight, a detail which was always checked. These instruments have the important advantage that when a set of them is used simultaneously the time needed for the work at a station is substantially reduced from that which previously was required. A series of observations at 14 different depths down to 2 000 meters were

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[1] The observations at Stat. 1, 1914, were made by means of the automatic water-bottle constructed at the International Central Laboratory for the Study of the Sea [Ekman, 1905].

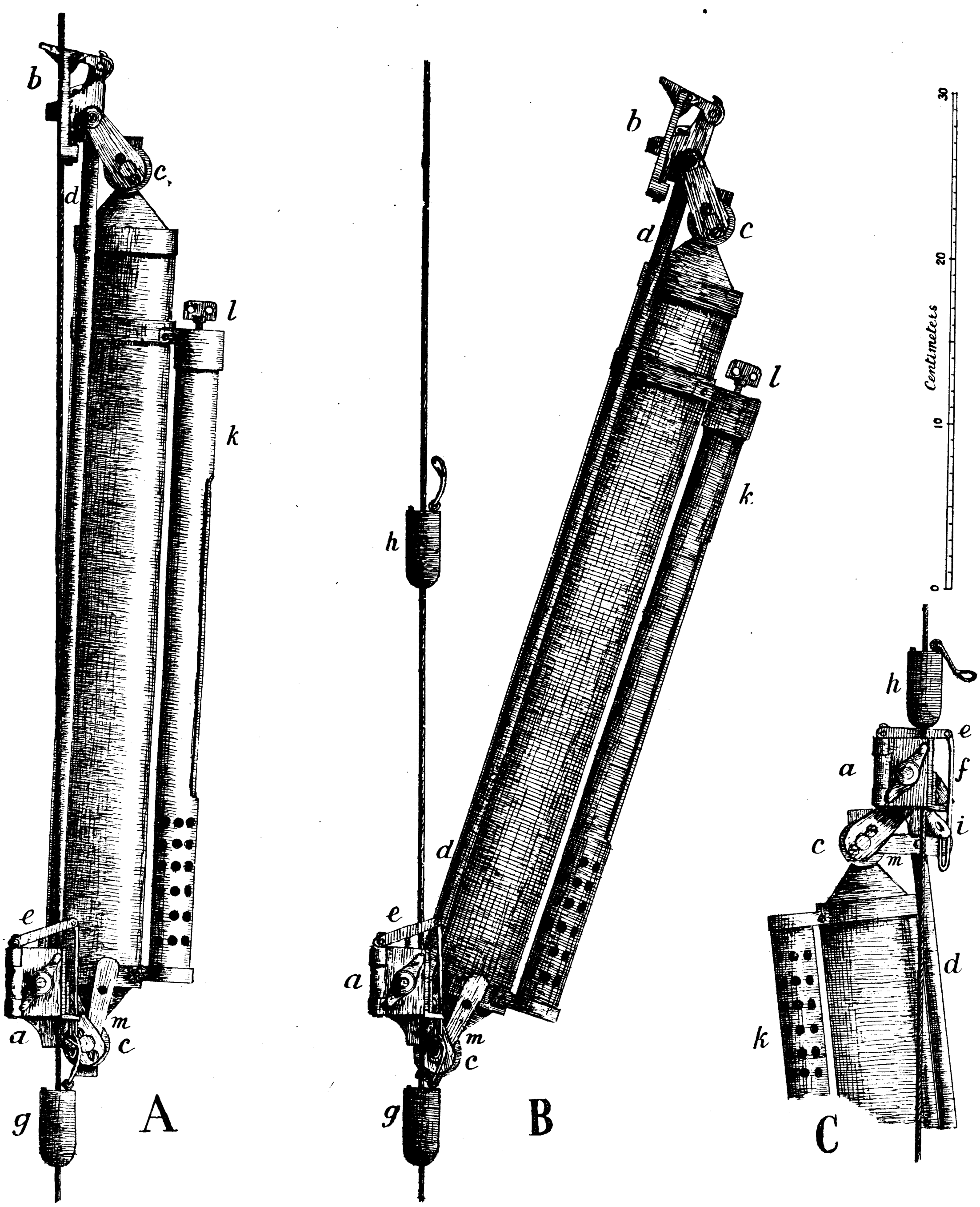

Fig. 3. The Nansen Reversing Water-bottle.
A attached to the line and ready to go down. *B* just released by the messenger lead *h*.
C after having been reversed.

taken in about one hour and twenty minutes, while with our earlier methods a similar haul using only one water-bottle would have required at least five hours.

The only accidents we had with these water-bottles were that in a few cases they reversed the wrong way after having been released, as will be discussed in Chapt. III, but the possibility of such accidents in the future may easily be avoided by means of a simple device,

Thermometers.

The subsurface temperatures were always measured by reversing thermometers of the modern (Richter) construction, which had been manufactured by the three Berlin firms: C. Richter, Schmidt & Vossberg, and Vereinigte Fabriken für Laboratoriumsbedarf. The length of the degree Centigrade was eight or more usually ten millimeters. The instruments had been tested at the Physikalisch Technische Reichsanstalt (Charlottenburg) and the freezing point was repeatedly checked. Most of the instruments were several years old, and gave perfectly trustworthy readings. When the water-bottles came on deck the water-samples (for salinity, oxygen, etc.) were collected first in order to give the thermometers time for adjustment. In most cases two reversing thermometers were attached to each water-bottle, and the readings were taken with a reading-lens. The mean error probably does not exceed $\pm$ 0·01° C.

The surface-temperatures were taken by thermometers with a scale divided into 0·1° C., and on which the length of a degree Centigrade was 10 mm. The surface-water was brought on deck by means of a dip bucket.

The Depths of Observation.

Observations in the majority of cases have been taken at the surface, 10, 25, 50, 75 and 100 meters, and every hundred or two hundred meters down to 1200 or 1600 meters, while below this latter level the interval between observations is still greater. Observations in 1914 were as a general rule, extended to 2000 meters. In 1913 and 1914 the deeper strata were only occasionally penetrated, in 1922 not at all.

For a systematic treatment of oceanographic observations it is convenient to refer the various data to certain standard depths. With regard to the North Atlantic and the great oceans in general, the following standard depths are suitable: 0, 10, 25, 50, 75, 100, 150, 200, 300, 400, 500, 600, 700, 800, 900, 1000, 1200, 1400, 1600, 1800, 2000, 2500, 3000, 4000 etc. meters. As observations are only rarely taken at all these depths some values will be lacking and will have to be found by interpolation. Our tables have been completed for all the "Armauer Hansen" stations, the interpolated values having been found from curves drawn on millimeter-paper with the depth-scale along the ordinate (1 millimeter corresponding to 5 meters) and the scales of temperature (1 mm. per 0·05° C), salinity (1 mm. per 0·01 ‰) and density (1 mm. per 0·01 of σ_t) along the abscissa. The interpolated values of the three latter elements must of course be in mutual agreement, in accordance with Knudsen's Tables. The values found in this way may on the whole be regarded as pretty accurate, the errors hardly exceeding appreciably those which occur in the direct observations.

Determinations of Salinity, Oxygen, and Hydrogen Ion-Concentration.

The water-samples for salinity determinations were collected in glass-bottles with carefully examined patent stoppers. The salinity of all samples was determined in the usual manner by *titration* with standard water. With very few exceptions the subsurface salinities were determined by two titrations of each water-sample and in some cases even by more repetitions. In 1913 and 1914 the determinations were made at the laboratory in Bergen after the cruises were ended. During the cruise of 1922 nearly all water-samples were first titrated on board shortly after having been collected; and after the end of the cruise they were titrated once more in Bergen. As a rule the two determinations of each sample agreed very well, but in all cases where the difference was greater than 0·02 ‰ salinity a third titration was made.

In addition to the determinations by titration the salinity of a great many water-samples from 1914 was determined by the Löwe-Zeiss *Interferometer* with glass chambers especially made for our purpose according to proposals resulting from careful experiments made by Nansen. Some determinations of this kind were made on board during the cruise, but most of them were made by Nansen's assistent Mr. A. Øyan at the Oceanographic Institute of the University in Oslo. The observations with the Interferometer were very accurate. On the whole, they agreed very well with the results of the titrations.

During the cruises in the above mentioned three years, water-samples were collected for determination of oxygen (Winkler's metod) at nearly every station. In 1913 and 1914 observations on the hydrogen ion-concentration were also made, by the Sørensen-Palitzsch method. The results of these investigations are discussed in the above mentioned papers by Dr. T. Gaarder.

Dynamic Calculations.

For dynamic purposes we have computed the observations from all our own stations, and also from a great number of stations taken by other expeditions, according to the method of V. Bjerknes [1910]. The computations were made by means of Hesselberg and Sverdrup's tables [1915]. We have calculated: the pressure and the density *in situ* including compression, at standard dynamic depths, the depth in dynamic meters from the sea-surface to the standard isobaric surfaces, and the specific volume including compression at these surfaces. The results for our stations are given in Table II where the said values of pressure, specific volume and dynamic depth are recorded as anomalies, *i. e.* the differences between the actual values and the values which would have been found if the temperature had been 0° C and the salinity 35 ‰ at all depths from the surface downwards.

By means of the values thus obtained the difference between the mean velocities at different depths may easily be computed, except for the pure wind-current in the surface-layers. These computations are most simply performed by means of the formula:

$$v - v' = \frac{\Delta D}{(2\,\omega \sin \varphi)\, L}$$

where v and v' are the average velocity-components (in centimeters per second) at right angles to the sectional line between two stations, at the upper and lower isobaric surfaces examined; ΔD the difference (in dynamic meters) in the thickness of the water-layer between the two surfaces at the two stations; L the distance (in kilometers) between these stations; ω the angular velocity of the earth; and φ the geographical latitude.

A number of dynamic charts are given in Pls. 62—71. The curves in these charts are drawn for equal dynamic depth (thickness) of the water-layers between two isobaric surfaces. Most of our charts show the variations in the dynamic distance between several selected standard isobaric surfaces and the surface of 2000 decibars. If there is no motion along the latter surface, the curves will be stream-lines for the convectional currents at the other surfaces, provided that the accelerating force due to friction is negligible. For the construction of the curves we have used the anomalies of dynamic depth mentioned above (see the last column in Table II of the "Armauer Hansen" observations). The curves are drawn for intervals of 0·025 dynamic meters, and the figures give the values of the anomalies represented by the curves. These values decrease towards the left hand side of the currents, provided the motion at about 2000 meters is nil; otherwise the curves will show the direction of the current along the upper surface relatively to the current at this depth, with decreasing values towards the left if the velocity decreases downwards, but with decreasing values towards the right if the velocity increases downwards. The relative velocities may be computed directly from the charts. The formula previously given furnishes a means of determining the values of the differences between the velocities at any given depth and those at about 2000 meters. Provided the distance between two of our curves is equal to one degree of latitude (60 nautical miles or 111·1 kilometers) we have:

$\varphi =$	30°	32°	34°	36°	38°	40°	42°	44°
Δv (in cm/sec.) =	3·1	2·9	2·8	2·6	2·5	2·4	2·3	2·2
$\varphi =$	46°	48°	50°	52°	54°	56°	58°	60°
Δv (in cm/sec.) =	2·1	2·1	2·0	2·0	1·9	1·9	1·8	1·8

The difference of velocity is inversely proportional to the distance between the curves. *E. g.* if the distance between two successive curves be one tenth of 60 nautical miles the difference of velocity will be 10 times as great as the difference given in the Table above.

Correlation between Temperature and Salinity.

In Fig. 4 we have marked all the values of temperature and salinity observed simultaneously at the different depths from 100 meters downwards, during the "Armauer Hansen" cruises in 1913, 1914 and 1922. We have used different signs for the three different years and for three different intervals of depth (100—500 meters, 600—1400 meters, and the depths greater than 1400 meters). The temperature is marked along the abscissa and the salinity along the ordinate. Most of the marks, it will be noted, are concentrated along a curve drawn in the figure. They are from all three cruises and from all depths, and this curve represents the normal relation between temperature and salinity in the true Atlantic water in the eastern part of the North Atlantic.

There are a great many marks above this curve, especially for temperatures below 12° C. All these marks indicate high salinities as compared with the temperatures. Nearly all of them represent observations from 1914 and 1922, and upon a closer examination these observations prove to have been taken chiefly in the south eastern and eastern part of our area of investigation, while there are only very few observations in 1913 which show any considerable departure from the normal relation. By far the most numerous departures at temperatures between 12° C. and 7° C. were observed at depths between 600 and 1400 meters, exactly corresponding to the levels where there is an appreciable admixture of Mediterranean water. The greatest departures are at temperatures about 11° C., and at depths of 1000 and 1200 meters in the south-eastern region, an area which exhibits a distinct maximum of admixed Mediterranean water at such depths. The diagram demonstrates that the departures generally decrease with decreasing temperature, regardless whether such a decrease of temperature be due to greater depths or to the more northern or western positions of the stations. The manner in which departures of salinity decrease with increasing depth below the 1200 meter level may be seen in Fig. 13. These conditions are also clearly demonstrated by the sections and charts for anomaly of salinity, Pls. 29—33 and 55—59.

The anomalies of salinity represented in these charts and sections as well as in Fig. 13 are computed by means of a normal curve based on all the observations (from depths greater than 100 meters) made during the cruise of the "Michael Sars" in 1910, which comprised the eastern as well as the western part of the North Atlantic, not including regions with extreme conditions, *e. g.* the Labrador Current, [Helland-Hansen

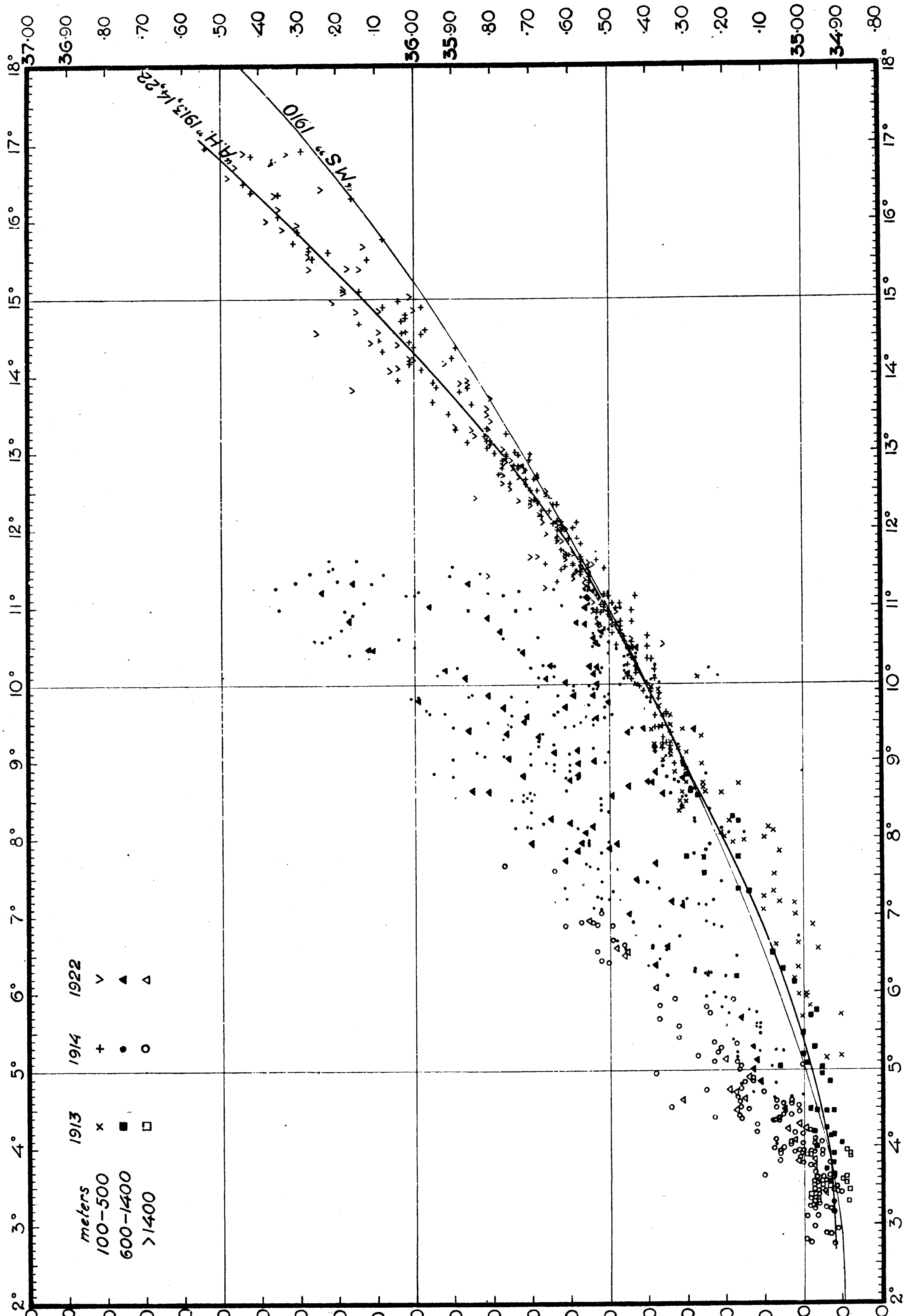

Fig. 4. Correlation between Temperature and Salinity.

1916, 1926]. This curve is introduced in Fig. 4. At temperatures higher than 12° C. it differs somewhat from our normal curve based on the observations from the eastern North Atlantic, the difference increasing with increasing temperature. This is probably due to the fact that the upper water-strata of the Atlantic Current are cooled on their way eastwards, while the salinity is not changed to the same degree.

This method of determining the anomalies of salinity may obviously be used with advantage for comparing the water-masses of the different regions of the sea and for tracing their origin. As a general rule the salinity will be high in relation to the temperature (*i. e.* great positive anomalies) where there is an excess of evaporation as *e. g.* in the Mediterranean, while it will be relatively low (great negative anomalies) where admixture of fresh water (direct rainfall, river water, or melting water) is in excess of the evaporation, as *e. g.* in most coastal waters, and in Polar water.

Sections and Charts.

The final results of our observations are demonstrated graphically in our sections and charts, Pls. 4—71. As mentioned on p. 5—6 we have also included the presumably reliable observations made by other expeditions in the same regions. In these graphical representations we have had to disregard the possible vertical oscillations which will be dealt with in Chapt. IV.

For the construction of the charts we have in some regions a net of stations sufficiently densely situated to indicate clearly the probable course of the curves. In other regions the stations are so wide apart or the conditions so complicated that the construction of the curves has been attended with considerable difficulties. In these cases we have had to study carefully the transition of the various conditions from level to level as they are demonstrated by the charts for the levels above and below that examined, as well as by the vertical series of observations.

For the construction of that part of the curves in the vertical sections that lies between the stations we have taken into careful consideration the conditions demonstrated by the charts. In this manner we have arrived at many details in the shape of the curves in our sections which otherwise would not have been detected, and a logical correspondance between the representation of the conditions in the horizontal and vertical planes has been attained. As an example we may mention the isohalines and isotherms in Section VII A (Pl. 12—13) between Stats. 40 and 42. Here the isohalines and isotherms intersect each other and form striking bends, in a manner which could not have been traced if only the observations at the stations of the section had been taken into account. Many most interesting features of the horizontal movement of the different water-masses will thus be exhibited by the vertical sections as well as by the charts.

III. **Abnormal Densities Observed at Certain Depths about 1600—2000 Meters.**

At many of our stations in 1914, the observations give quite unexpectedly high salinities with comparatively low temperatures, at depths between 1600 and 2000 meters. The corresponding densities at those depths (*e. g.* in some cases $\sigma_t = 28{\cdot}54$ and $28{\cdot}52$) are apparently so absurdly high that one might be tempted to reject them as being erroneous. It was difficult, however, to understand how errors of this kind could occur with the instruments and the methods employed by us. It is most improbable that they could be due to erroneous determinations of the salinities, as these have been determined several times with practically identical results. There can have been no abnormal relation between the percentage of chlorine and the total salinity, as the high values of the latter were found by titration as well as by means of the interferometer. The glass-bottles in which the water-samples were brought home, have been carefully examined, but no possibility of evaporation or leakage was discovered.

The temperatures were in many cases determined by two reversing thermometers and are considered quite reliable. It is impossible to believe that the water-bottles were reversed at too shallow depths because the temperatures registered are too low to accord with those generally prevailing in the upper levels; and such a state, moreover, would make the resulting values of density, if they had occured in the shallower depths, appear still more absurd. It is not possible that the water-bottles could have leaked while they were being hauled up, if they were properly reversed and closed at the recorded depths, as in all other cases they proved perfectly reliable, and they were repeatedly examined and found absolutely tight. It is worthy of note that the abnormal values of salinity were found from samples taken in different water-bottles.

The only possibility of an error connected with these abnormal observations is, as far as we can see, that the water-bottle when it was made to reverse by the messenger-lead, turned the wrong way, towards and past the sounding-line, instead of reversing in the regular manner away from the line (as illustrated in Fig. 3 *B*). This might be possible especially if the sounding-line had a sloping position owing to a drifting movement of the vessel. If such a thing happened and if the strain of the line were not too tight, the water-bottle might, by its fastening to the line, be able to bend this so much when it turned over, that the bottle would hang downwards in a sloping position. The reversing thermometers would then register the temperature *in situ*, while the stop-cocks of the bottle would remain open. During the hauling up the water-bottle may be raised now and then by sudden jerks in the line, caused by the rolling of the vessel, and thus finally be thrown over on the other side of the line; the bottle may then be reversed iu the regular way, the stop-cocks be closed, and a water-sample be taken at the depth where this happens to occur. But the reversing of the bottle would be too rapid to alter the original reading of the reversing thermometers. So far as we can see, this is the only manner in which errors during the collecting of water-samples could have occurred with our instruments. Such accidents being possible it is obvious that they may be more liable to take place near the lower end of the line, where the strain is less than higher up — a fact which agrees with the depths of 1600 to 2000 meters, to which the abnormal values of salinity are always confined.

This coincidence tends to indicate that the abnormal values of salinity are erroneous and possibly due to an accident of the kind mentioned above. Additional evidence supporting the suspicion that there has been some faulty operation of the deepest water-bottles may be found in the fact that in all such cases it is the salinity which is abnormal, and not the temperature. Moreover, the salinity is always too high and consequently we always obtain extraordinarily heavy, but never extremely light water in such cases.

On the other hand, it is a noteworthy fact that all these abnormal values have been found inside the region where the Mediterranean water is especially distributed, while they were never found at our numerous stations outside this region.

There is frequently, also, a striking agreement between certain stations in the different sections along our route. We may mention Station 13 in Section VIII (Pl. 14) and Station 16 in Section X (Pl. 17). These stations were situated near each other, and along a direction which may be expected to coincide approximately with that of the current. At 2000 meters there was observed: at Station 16 3·79° C. and 35·28 ‰ Salinity (σ_t = 28·05) and at Station 13 3·72° C. and 35·30 ‰ Salinity (σ_t = 28·07). At 1600 meters there was found at Stat. 16 5·34° C. and 35·17 ‰ (σ_t = 27·79) and at Stat. 13 4·87° C.

and 35·13 ‰ Salinity ($\sigma_t = 27·815$). Hence the difference between the value of σ_t at 1600 and 2000 meters was found to be the same at both stations; the difference was 0·26 at Stat. 16 and 0·255 at Stat. 13. The departures of the salinity (see p. 10) are very much the same at both stations; they were found to be: at 2 000 meters + 36 at Stat. 16 and + 38 at Stat. 13, at 1600 meters + 16 at Stat. 16 and + 15 at Stat. 13.

Something similar to this was found in the Rockall-Channel during the cruise with the "Frithjof" in 1910 [Nansen 1913]. At "Frithjof"'s Stat. 4, depth 2000 meters, the observations were: $t = 5·41°$ C., $S = 35·38$ ‰, $\sigma_t = 27·97$, and at Stat. 5, 1900 meters, $t = 4·83°$ C., $S = 35·31$ ‰, $\sigma_t = 27·98$. Here there was evidently an abnormal increase of salinity and density from the above-lying water-layers; there cannot possibly be any mistakes in these cases, and the observations must be taken as perfectly trustworthy.

During the cruise with the "Armauer Hansen" we found no such great abnormal increase in the salinity and density towards the bottom in the Rockall-Channel; but at all deep stations (five stations) there was a slight, but certain, increase in salinity towards the bottom from a minimum at 1800 or 2000 meters, and there was a sudden increase in the density, considerably greater than might be expected at these depths. These features are obviously of the same exceptional nature as those which were found during the cruise of the "Frithjof". It is also of interest in this connection that at the "Fram" Station 13, of 1910, in the southern entrance to the Rockall-Channel, a relatively high salinity was observed at 2000 meters (35·06 ‰, 3·71° C., $\sigma_t = 27·87$). At the "Armauer Hansen" Stat. 6 (1913), to the west of this "Fram" Station, a minimum salinity of 34·88 ‰ was observed at 1600 meters, while at 2500 meters the salinity was 34·99 ‰, and close to the bottom, at 3368 meters, 34·98 ‰.

Though it seems to us probable that the absurdly high salinities and densities observed at certain depths during our cruise in 1914 are partly erroneous and due to accidents with the reversing water-bottles, of the kind mentioned above, still we think that in some cases where we found abnormal conditions — for instance comparatively heavy above lighter water — there is a certain system in the distribution of the abnormally heavy water found at about the same depths at neighbouring stations, which seems to indicate that these extraordinary features are genuine.

We may mention as an example the conditions in the region near our Stations 27 and 28 (Section XII, Pl. 19) in 1914, south-west of Lisbon. At depths of 1400 to 2000 meters the values of salinity and density are abnormally high at these two stations. If we look at the density-chart for 1400 meters (Pl. 51) we see, however, that at the "Michael Sars" Station 17 (1910), north-east of our Station 27, the density at 1400 meters is equally high. In fact, the chart nowhere shows densities as high as in this region. The values of σ_t found at the three stations at 1400 and 1600 meters are the following:

Stations	MS 17	AH 27	AH 28
1400 meters	27·90	27·91	27·91
1600 »	·92	·90	·95

At our Station 27 observations were also made at 2000 meters and gave $\sigma_t = 28·03$. Hence there is every reason to assume that our observations at these depths are trustworthy, representing the real conditions. This is confirmed by the observations made at higher levels, which also demonstrate a maximum of density in this area. Near our Station 28 (1914), there is also an "Armauer Hansen" Station 10 (1922) where observations were made at depths between the surface and 1000 meters (Sect. XIII, Pl. 20). The values of σ_t found are as high as those observed at the same depths at Station 27 and 28 in 1914.

It is a striking fact that all these high values of density were observed only in those regions where there is an appreciable admixture of Mediterranean water. The farther away we come from these regions the more regular and normal becomes the vertical as well as the horizontal distribution of salinity and density in our sections and charts.

It is, however, difficult to understand how water *e. g.* with a value of $\sigma_t = 28{\cdot}22$ at Stat. 20, 2000 meters ($t = 4{\cdot}02°$ C, $S = 35{\cdot}52$ ‰), or even with a value of $\sigma_t = 28{\cdot}54$ at Stat. 34, 2000 meters ($t = 4{\cdot}86°$ C., $S = 36{\cdot}03$ ‰), can be found in the Ocean. The heavy water must have been formed by a mixture of the comparatively warm and very salt water from the Mediterranean and the much colder and less saline water from the Atlantic. The water which runs out from the Mediterranean along the bottom of the Straits of Gibraltar has a temperature slightly below 13° C., a salinity of about 38·4 ‰ and σ_t above 29·0. During its further outward flow this heavy water is gradually mixed with Atlantic water, and masses of water are thus formed with a temperature of about 10°—11° C., a salinity a little above 36 ‰ and a density which causes them to sink to and be distributed at depths of about 1000 meters. During an exceptionally great outflow the heavy Mediterranean water may of course occasionally break through the normal layers of mixed waters and sink to greater depths, were exceptionally salt and heavy water may thus be produced as the remains of such "floods". In this manner a great many of the abnormities mentioned above may probably be explained. But it seems to us inexplicable how heavy water like that observed at 2000 meters at Stat. 20, (and at Stat. 34) could have been formed in this manner. It had a temperature of 4° C. and a salinity of 35·52 ‰. It could have been formed only as the result of a mixture of still colder water and warmer and salter water which came more or less directly from the Mediterranean. Colder water than about 3° C. can, however, not be expected in this region, and the highest salinity which this water could possibly have had would be about 34·94 ‰; let us assume 35 ‰ as the maximum. If we suppose that the admixed warmer water had a temperature of not more than 10° C., we see that one part of this water and 6 parts of the cold water (of 3° C.) would be required to produce a mixed water whose temperature would be about 4° C. Hence the warm water of 10° C must have had a salinity of 38·64 ‰ in order to give the mixed water a salinity of 35·52 ‰; but water of 10° C. with anything like such a high salinity does not exist in the sea. If we suppose the admixed warmer water to have had a temperature higher than 10° C. the salinity required must also have been higher, and the conditions become more improbable. To explain the still heavier water which we found at 2000 meters at Stat. 34 will naturally be even more impossible.

In cases of the above mentioned kind where our actual observations would give such inexplicable densities, we have assumed that the determined values of salinity are erroneous (see above) while the observed values of temperature are correct. As the vertical distribution of density is generally so very regular we can estimate its probable value at the different depths within narrow limits. New values of salinity have accordingly been computed, based upon a regular normal distribution of density and observed temperatures, and introduced in our Tables. The original values of salinity obtained are, however, given in the foot-notes. Corrections of this kind have been made in the Tables for the following stations: Stat. 7 (1600 meters), Stat. 13 (2000 meters). Stat. 16 (2000 m.), Stat. 20 (1600 m. and 2000 m.), Stat. 22 (1600 m. and 1800 m.), Stat. 31 (1400 m.), Stat. 33 (1800 m.), Stat. 34 (2000 m.), Stat. 45 (2000 m.), Stat. 56 (2000 m.).

Our determinations of oxygen and hydrogen ion-concentration give us a possibility of corroborating the correctness of our rejection of the originally obtained abnormal salinities at the above mentioned stations and depths. Let us, as an example, take the alterations made at Stat. 20. The originally secured salinity at 1600 meters, giving an abnormal density ($\sigma_t = 27{\cdot}95$), would agree with the salinity which probably existed at about 300 meters. This indicates that the water-sample was probably collected at this depth by the final reversal of the water-bottle. The ion-concentration observed ($P_H = 8{\cdot}13$) at 1600 meters does not fit in at this depth, but agrees exactly with the probable value at 300 meters. The observed amount of oxygen (5·18 cc) also agrees with the probable amount at 300 meters. In the other cases mentioned above there is as a rule a similar relation between the values (of salinity, oxygen etc.) observed.

According to our observations heavier water was lying above lighter water at certain depths at some few stations where we can see no reason to believe that the water-bottles worked unsatisfactorily. In these cases the value of ion-concentration and the amount of oxygen observed are just what might be expected. If the observations of salinity are correct, the conditions were labile, and capable of being changed by turbulent motion effecting a mixture and an indifferent equilibrium. As is well known, the compression of the water is of very little importance in considering the stability; it decides the difference between the real temperature *in situ* and the potential temperature which has to be used for the computation of the stability; but this difference is very small compared with the difference of pressure which we here have to deal with. In most cases one can study the stability with sufficient accuracy directly by means of the values of σ_t. There may possibly be a fairly considerable lability in stratified water, provided that there is practically no relative movement between the water-strata, — else turbulent motion would arise and the lability would be released.

In the atmosphere the adiabatic temperature-gradient is, as we know, 1° C. per 100 meters (dry air). But in perfectly calm air the decrease of temperature per 100 meters upward may become much greater before the lower masses of air begin to rise solely owing to their own buoyancy. The lability may continue until the temperature-gradient reaches 3·4° C., when it must cease, even if there is no wind or other external impulse causing vertical motion, for in that case the actual density *in situ* begins to be higher above than below, (cf. Hann, Lehrbuch der Meteorologie, 1901, p. 751—753).

In the exceptional cases mentioned above, the conditions have been far from the limit where the actual density *in situ* (including the compression) decreases downwards, cf. the values of σ_t and σ_{tp} in our Tables. We may conclude that at the local depths where the above-mentioned conditions have been found, the movements of the water have been non-turbulent, *i. e.* without any relative displacement of the particles in the volumes of water in question. In that case it would be a necessary condition either that there was no current in the different layers, or that the current had the same velocity and direction in all layers.

If we compute (by means of Bjerknes's circulation theorem), the average difference between the velocities at various levels in the exceptional cases now dealt with, we find values amounting to no more than a few millimeters a second per 100 meters vertical distance. These differences of velocity are probably too small to cause any immediate stirring of the viscous water-masses which may maintain the state of lability for some time. We have found such conditions only at stations where there is an appreciable admixture of Mediterranean water, and not at stations with ordinary Atlantic water at all depths.

IV. **Vertical Oscillations.**

By earlier investigations we have found that there are probably considerable vertical oscillations of the water-layers in various regions of the Ocean. Hence the occasional vertical series of observations cannot be expected always to represent the average conditions at any particular station. It is therefore of great importance for the discussion of the general conditions in a sea-area on the basis of the observations made, to study how far these actual observations at the different stations and different depths may be regarded as representative.

At Stat. 23 in 1914 (June 13th), immediately off the banks to the north-west of Lisbon, we stopped for some time in order to make current-experiments at various depths while the "Armauer Hansen" drifted, and at the same time to study the question of the vertical oscillations of the water-layers. A complete vertical series of temperature-observations and water-samples was taken early in the morning, at 7^h 12^m and 8^h 15^m a. m. Afterwards ten drift-anchors were lowered by means of a warp in order to make the drift of the vessel as regular as possible[1]. The wind was blowing from N 5°—10° W (true). In the morning the wind velocity was about 3 Beaufort. The wind increased steadily to about 5 Beaufort at 16 o'clock. During all this time the ship had an almost constant bearing towards N 10°—20° E (true). Later on it turned a little. to about N 30° E.

The observations of temperature and salinity at 50, 100, 400, 800, 1200, 1400 and 1600 meters were repeated at 11^h 42^m, 16^h 21^m, and 20^h 25^m. All observations in each series were made simultaneously (in one haul), except the first observations in the morning (in two hauls, see above). The repeated measurements exhibited considerable variations and are of great interest. The results are illustrated by Fig. 5, the depth being plotted out along the ordinate and the time along the abscissa. The different curves in the diagram

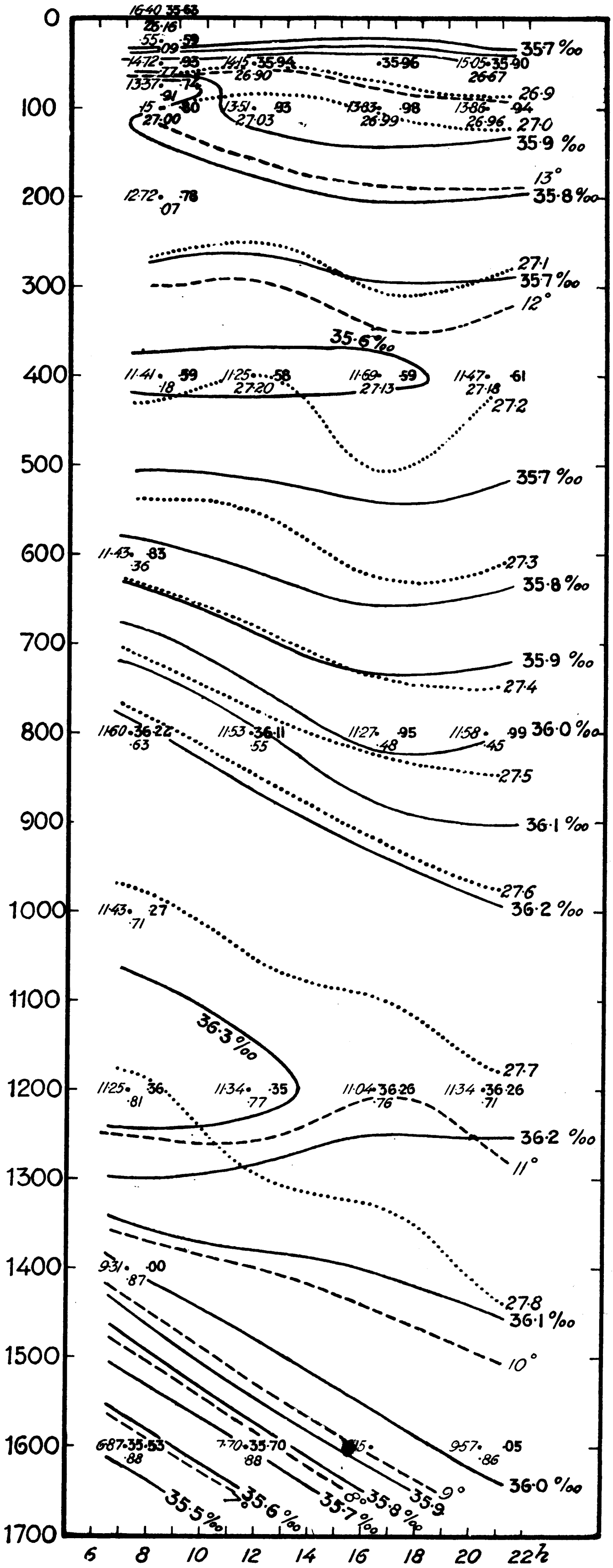

Fig. 5. Observations at Stat. 23, 1914.

[1] The drift-anchors were made of an iron ring 1 meter in diameter, and a bag of canvas.

slope very considerably. It is specially interesting to notice that the isopycnals show such a striking degree of obliquity, indicating that the water-layers were at very different depths at the different times of observation. It is therefore important to discover the reason of these variations. There are two main possibilities: there may have been strong horizontal currents, which have caused a sloping of the water-layers, observed by us owing to the drift of the ship, or the variations observed, may have been due to horizontal or vertical oscillations of some kind.

Let us first examine the former possibility. It may be that the said obliquity of the isopycnals corresponds to a more or less permanent sloping of the water-layers, which becomes apparent in our observations owing to the ship having moved some distance between each series. From this obliquity we may compute the differences between different levels, of the velocity components at right angles to the straight line between the places of observation, provided that the distance between these places be known. By means of some current measurements we may form an approximate estimate of this distance. At $15^h\ 5^m$ and $18^h\ 46^m$ (June 13th, 1914) the current meters registered at 2000 meters 26·8 and 19·3 cms. per sec. If we assume that the horizontal movements of the water at 2000 meters are insignificant and may be left out of account, the velocities found by the current meters would represent the drift of the ship, which in this case was towards S 37° E. If the average drift-velocity be estimated at as much as about 25 cms. per sec. the distance between the places where the first and the last series of observations of temperature and salinity were made would be about 12 kilometers. By means of this distance and the difference of density between the two series we have computed the following components of velocity, the velocity of the water at 2000 meters being taken as = 0:

at	100	400	800	1200	1600 meters
	108	101	71	24	3 cm/sec.

These components of velocity are so great that it seems out of the question that they actually existed. If the distance between the two series had been greater the velocities would have been correspondingly less, but it is impossible to suppose that the ship drifted so much that we could obtain reasonable results in that way. Our current measurements did not give any indication of such great velocities, nor did the ship's reckoning. Hence it seems very unlikely that the obliquity of the isopycnals is due, in any essential degree, to a sloping of the layers induced by horizontal currents.

We may therefore assume the chief cause of the variations in the depth of the isopycnals to have been oscillations of the water-masses, which would have made themselves felt even if the ship had not drifted at all. In other words, the variations seem to be a function of time rather than of place.

It does not seem probable, however, that these oscillations have been primarily or exclusively horizontal, carrying successively waters of different character to our place of observation, for the possible variations of density in horizontal direction are obviously too small to explain the considerable differences observed by us. It is more probable that the oscillations have been vertical, for in that case material variations of density may be produced by comparatively small displacements. Of course vertical oscillations will in most cases be accompanied by horizontal motions.

On the supposition that the variations observed are due to vertical oscillations we have illustrated in Fig. 6 the vertical displacements which would correspond to the variation of density observed at 100, 400, 800 and 1200 meters. The time is laid off along the abscissa and the depth along the ordinate. We have constructed a curve representing the vertical distribution of densities as found by the first complete series of observations which were taken at 7^h 12^m at depths of 600 meters and deeper, and at 8^h 15^m at smaller depths. We have then fixed the points on this curve which correspond to the observed values of density during the later series of observations. In this way we can find out where these values originally belonged. The rings in Fig. 6 indicate the depths where similar densities existed when the first morning observations were made. The arrows show the probable vertical displacement of the water-layers at the depths in question. Curves are drawn representing the approximate depths were the water-layers, which were at 100, 400, 800 and 1200 meters during the first morning observations, have probably been later on.

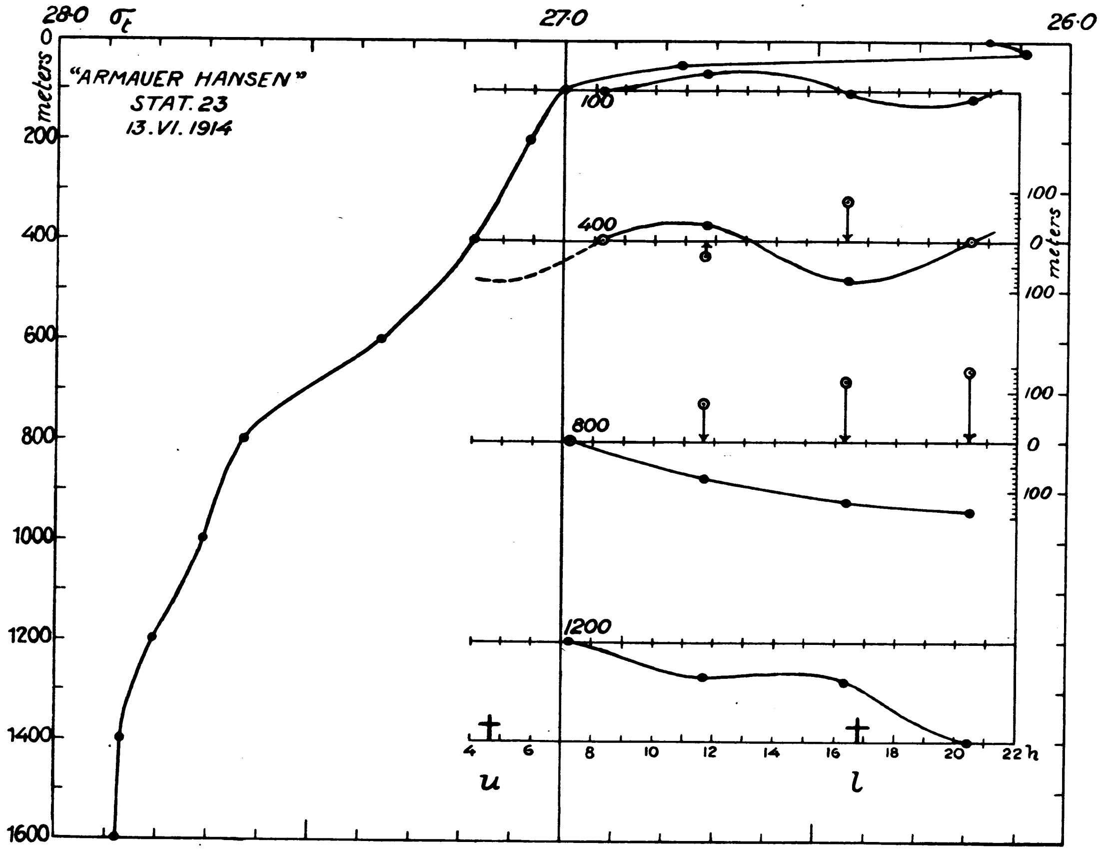

Fig. 6. Variations in σ_t at 100, 400, 800, and 1200 Meters, at Stat. 23, 1914. The crosses at *u* and *l* indicate the Upper and Lower Passages of the Moon.

The curve for *400 meters* seems to indicate a periodic oscillation of a little more than 12 hours (the same density is, *e. g.*, found at 8^h 15^m and 20^h 25^m) which would closely correspond to a tidal period. The curve for *100 meters* may show a similar but less pronounced periodic oscillation, possibly with a displacement of phase relative to 400 meters. At 100 meters, however, the variations are so small, in relation to the vertical differenses of density, that the results are very doubtful.

The curve for *800 meters* exhibits a continuous fall, though with a curvature which might indicate a regular periodic oscillation with a period of a full lunar day and night (25 hours) or more. In this case the vertical movement should have been very considerable (almost 150 meters in a little more than 13 hours). But of course the determination of depth cannot claim to be accurate.

The curve for *1200 meters* indicates a still greater amplitude (the water-layer sinking about 200 meters during a little more than 13 hours). Here also, there seem to be indications of a shorter period with smaller oscillations, which period would probably correspond to the period at 400 meters but with the oscillations in the opposite direction (a difference of phase of about 6 hours).

The observations with which we are dealing indicate, then, that considerable vertical oscillations occurred in this region (Stat. 23), and that these oscillations were possibly connected with the tidal phenomenon.

We arrive at similar conclusions if we examine the variations of temperature instead of density at the various depths. Fig. 7 *A* demonstrates the variation of temperature at 100, 400, 800, 1200, and 1600 meters, and Fig. 7 *B* represents the curve illustrating the

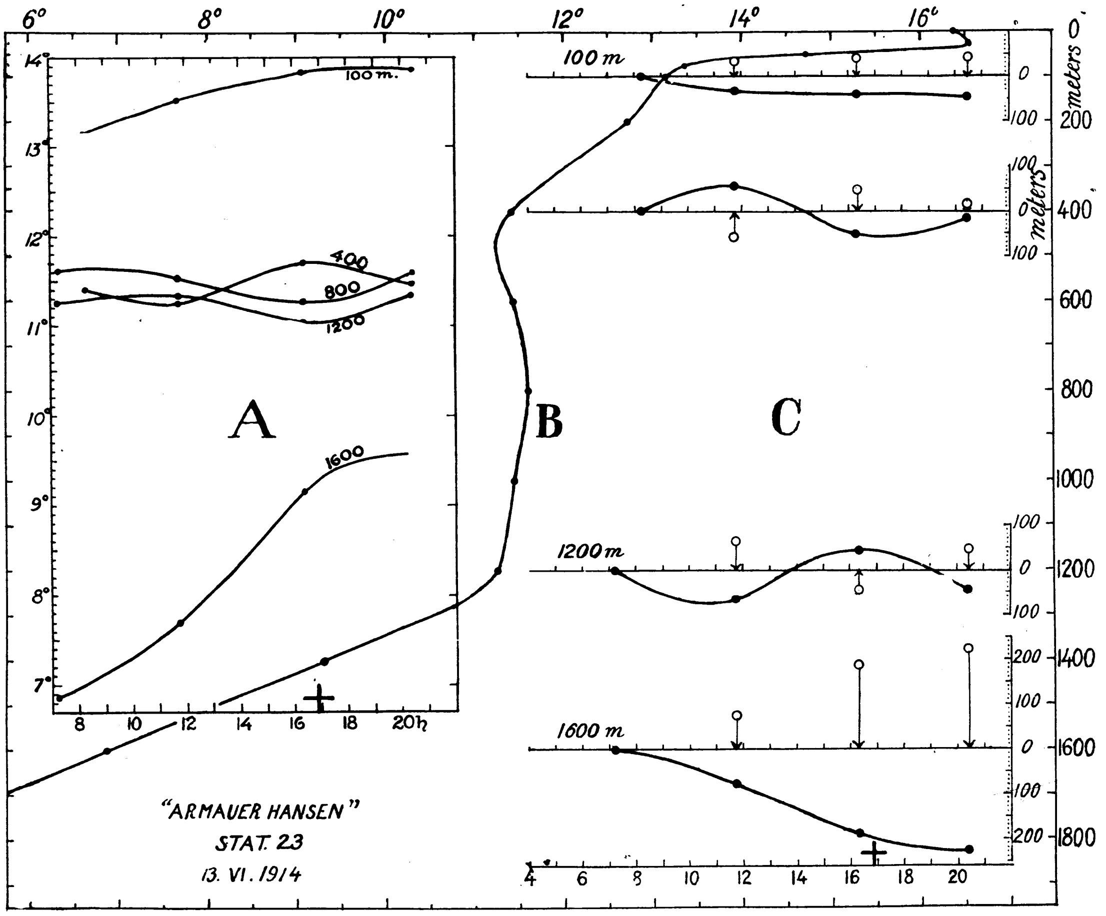

Fig. 7. Variations In Temperature at 100, 400, 800, 1200, and 1600 Meters, at Stat. 23, 1914.

vertical distribution of temperature at the time of the morning series of observations. In Fig. 7 *C* we have tried to demonstrate the actual vertical movements of the water-layers as indicated by the variations of temperature, according to the vertical distribution shown by the curve Fig. 7 *B*. These curves indicate vertical oscillations similar to those shown by the curves in Fig. 6; but they may be less trustworthy than the latter, as the vertical distribution of temperature may be less regular than that of density if the waters be more or less heterogeneous.

The variations of temperature did not enable us to construct the curve of depth-variations at about 800 meters because, as Fig. 7 *B* shows, there was a slight secondary maximum of temperature near this level and it was therefore impossible to decide whether the variations of temperature indicated upward or downward movements. The curve for 800 meters in Fig. 7 *A* shows variations that have a striking resemblance to those at 1200 meters and are inverse to those at 400 meters, but from these variations we can conclude nothing as regards the directions of the vertical oscillation at about 800 meters.

The curve for *100 meters* does not exhibit the semi-diurnal period shown by the corresponding curve in Fig. 6. The disagreement may in this case be due to differences in the relation between temperature and salinity in neighbouring water-masses at about the same depth, not affecting the densities.

The semi-diurnal vertical oscillations indicated by the curve for *400 meters* in Fig. 7 *C* are almost the same as those indicated by the corresponding curve in Fig. 6.

The curve for *1200 meters* in Fig. 7 *C* shows semi-diurnal oscillations inverse to those at 400 meters. They are considerably greater than the semi-diurnal oscillations indicated by the curve for the density at 1200 meters (Fig. 6); but the temperature-curve gives no indication of the diurnal period indicated by the latter. It is worthy of note that at 1200 meters we are near the nucleus af what we may call the "Mediterranean water", with great variations of the salinity-anomaly, *i. e.* as regards the relation between temperature and salinity. There may be heterogeneous waters, and comparatively small horizontal displacements may produce different variations in temperature, salinity, and density.

The curve for *1600 meters* in Fig. 7 *C* indicates remarkably great vertical oscillations possibly with a diurnal period; the total amplitude may have been more than 200 meters. These great oscillations are also indicated by the curves in Fig. 5. It is a note-worthy resemblance between the temperature-curve for 1600 meters in Fig. 7 *C* and the density-curve for 800 meters in Fig. 6; the similarity between the vertical oscillations at these levels is also demonstrated by Fig. 5. Below 1400 meters the density is almost uniform, and even great vertical oscillations may therefore occur without being indicated by noticeable variations in the values of density observed.

The time of the upper and lower passage of the moon is marked with crosses at the bottom of Figures 6 and 7. There are certainly much too few observations for a detailed study of the variations, and the curves may be drawn in different ways, our representation and the following discussion may therefore be considered merely as an experiment. If the shapes of our curves in Fig. 6 be approximately correct, the minimum of density in the *semi-diurnal* period at 100 meters occurred about two hours after the (lower) passage of the moon while the minimum at 400 meters occurred almost simultaneously with the passage. By direct current-measurements from anchored ship at the Ling Bank in the North Sea in 1906, it was found that the phases of the rotating tidal currents occurred about one hour earlier at 50 meters than at depths between the surface and 20 meters [Helland-Hansen 1907, p. 17].

At 800 and 1200 meters the minima of density in the *diurnal* period seem to have occurred some time after the lower passage of the moon, and so does also the maximum of temperature in the *diurnal* period at 1600 meters (Fig. 7).

Before we leave these observations at Stat. 23 from 1914, we may mention that at Cape Carvoeiro on the Portuguese coast due east of our station, high water occurs about 3 hours after the passage of the moon. At our station out in the deep sea high water must obviously occur earlier, the difference probably being one or two hours. On June 13th, 1914, we should therefore have had high water at about $18^h\ 30^m$ which is nearly the time of the minimum of density at 100 meters, or perhaps a little earlier. If we assume that the depression of the water-layers is due to an increase of the current, increasing the slope of the water-layers, this would agree with the generally acknowledged assumption that the strongest tidal current occurs at high water or a little later in the open sea near the Continents.

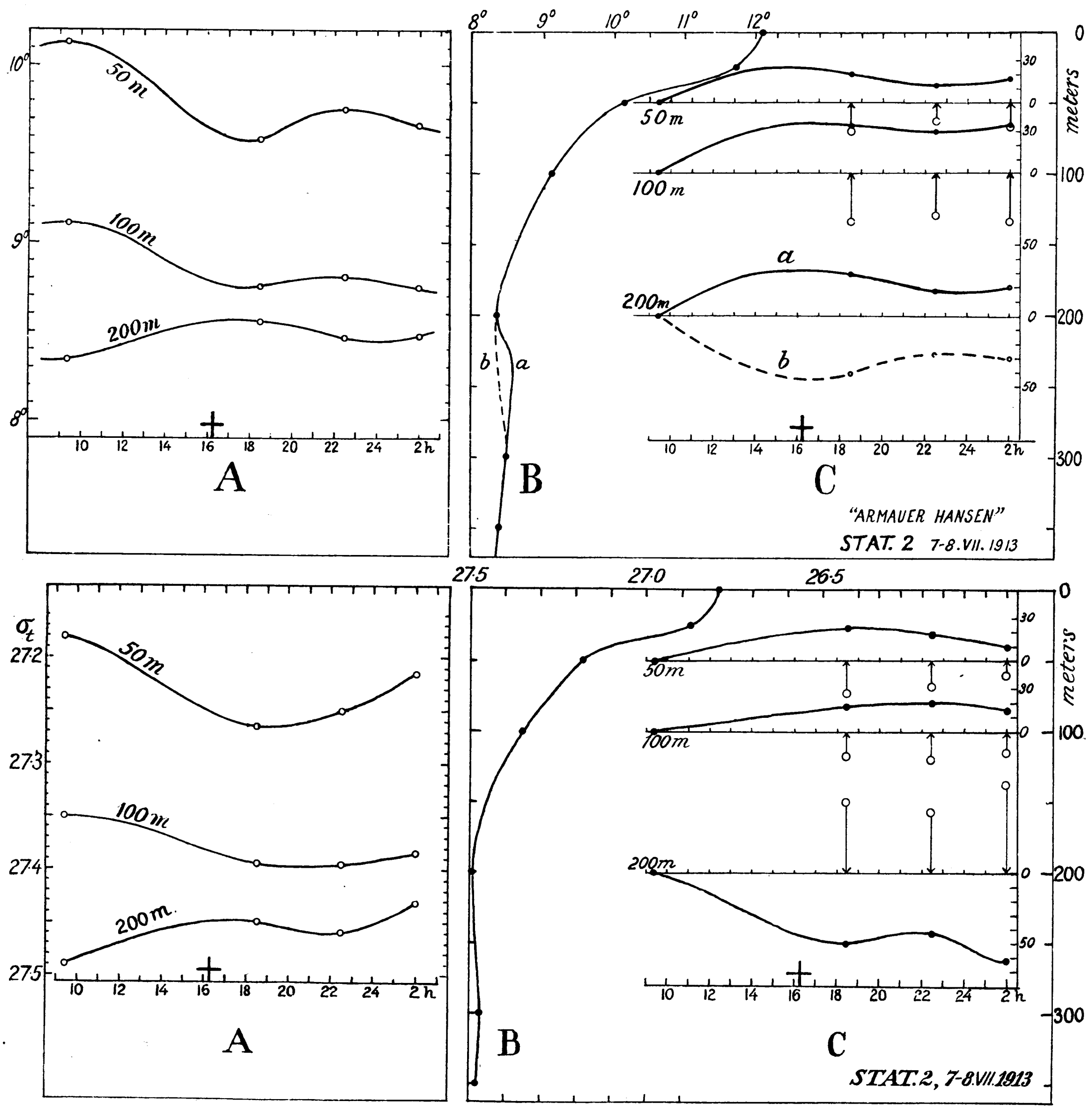

Fig. 8. Stat. 2, June 7—8th, 1913. *A* Curves showing the Variations in Temperature (upper curves) and σ_t (lower curves) at 50, 100, and 200 Meters. *B* Curves showing the Vertical Distribution of Temperature (upper curve) and σ_t (lower curve). *C* Curves showing the Vertical Displacements of the Water-layers which would correspond to the variations in temperature (upper curves) and σ_t (lower curves) if the relative vertical distribution of temperature and σ_t remained chiefly the same as shown by the *B*-curves, during the whole period of observation. The *Cross* indicates the Lower Passage of the Moon.

In 1913 (July 7th and 8th) we made some similar observations at Stat. 2 on the western slope of the Rockall Bank (see Table II). At 9^h 25^m, July 7th, a series of observations were taken down to 350 meters, the depth at the bottom being 370 meters. The temperature observed at 200 meters was lower than at 300 and 350 meters while the salinity was relatively high, so that the density had a maximum value at 200 meters. It may be a question worthy of note whether a state of lability is likely to occur at the slope of banks or shelves, giving rise to an effective mixture of the water-masses. After the first series of observations some biological work was done while the ship moved slowly towards the north-east. In the afternoon we sounded 320 meters; then the life-boat was lowered and tightly anchored fore and aft with steel-wire and grapnels. A series of current-measurements was made from the life-boat; the observations with the current-meter will be discussed in Chapt. VII. We shall here only mention that they showed distinct rotatory tidal currents. While these observations were made the "Armauer Hansen" kept near the life-boat and took during this time three series of temperature-observations and water-samples from 0, 50, 100, and 200 meters, at $18^h\ 30^m$, at $22^h\ 30^m$ and at $2^h\ 0^m$ (July 8th).

The results of the observations of temperature and density at Stat. 2 are illustreted in Fig. 8. The upper part of the figure illustrates the variations in temperature, the lower in density. The curves *A* show the variations in the values directly observed, the time being laid off along the abscissa. We have combined the first series of observations with the three later ones, in spite of the fact that the ship had moved some nautical miles between 10^h and 15^h. The curves *B* show the vertical distribution of temperature and density according to the first series of observations. Finally, in the curves *C* we have illustrated the vertical displacements of the water-layers corresponding to the variations in temperature and density, provided that the relative vertical distribution of both elements all the time remained chiefly the same as shown by the *B*-curves.

The curves Fig. 8 *A* and *C* exhibit considerable variations in temperature and density at 50, 100 and 200 meters. The greatest variations oceur, however, from the first to the second series of observations when the vessel changed position, as mentioned above. These variations go in the same direction at 50 and 100 meters, and in the opposite direction at 200 meters. If the variations represent local differences due to an obliquity of the water-layers it would mean that the forces alter their direction somewhere between 100 and 200 meters. This would, further, imply one of two alternatives: either a current more or less towards the north-west with a minimum of velocity at about 150 meters, or a current more or less towards the south-east with a maximum of velocity at this depth. It is not excluded that one of these alternatives covers the actual conditions. It is, in fact, impossible to decide whether the variations from the first to the second series of observations are due to an obliquity of the water-layers, or to vertical oscillations, or to both.

The temperature-curve Fig. 8 *B* can only be considered as approximate as the observations on which it is based are too few; it is especially doubtful how it should be drawu for the depths between 200 and 300 meters. In the figure we have indicated two different shapes of the curve. In one case (the broken line *b*) the shape of the curve implies that a possible oscillation would have gone in a direction opposite to that of the oscillations at 50 and 100 meters, in the other case (*a*) the oscillations may have taken place in the same direction at all three depths. The density-curve for 200 meters, Fig. 8 *C* indicates that the former case is most probable.

The different curves, Fig. 8 *A* and *C*, seem to indicate vertical oscillations, even if allowance is given for a possible sloping of the water-layers between the two first vertical series of observations. If there is a connection with the tides, the diurnal period was obviously predominating, but with fairly strong indications of a semi-diurnal period too at 200 meters. At this station, however, we have evidently also had an influx of a new kind of water towards the end of the observations. While the salinity remained almost constant in the three first series of observations, it became less (in all layers) in the last series. This explains why, at this end, there is some discrepancy between the curves of temperature and density while otherwise the accordance between the curves would have been perfect.

The time of the lower passage of the moon (on the 3rd lunar day after new moon) is marked by a cross at the foot of the upper and the lower figures. It occurred shortly before a minimum of temperature or a maximum of density (corresponding to the top of a wave) at 50 meters. This is less conspicuous at 100 meters, and at 200 meters it seems to have occurred shortly before a secondary maximum of temperature or secondary minimum of density (corresponding to the valley of a semi-diurnal wave).

During the Danish and Norwegian investigations in the Faeroe-Shetland Channel in 1910, a great many vertical series of observations were successively taken at two fixed stations. These observations demonstrated the occurence of distinct variations in the temperature, salinity, and density at the different depths, showing semi-diurnal and diurnal periods which were obviously connected with the tidal phenomenon [Knudsen 1911, Helland-Hansen 1912].

The observations described above, in connection with similar earlier observations [cf. *e. g.* Helland-Hansen and Nansen 1909, pp. 89 ff.] prove in our opinion definitely that considerable and highly interesting vertical oscillations of the various water-strata may occur in the sea. These oscillations have to a great extent periods which seem to connect

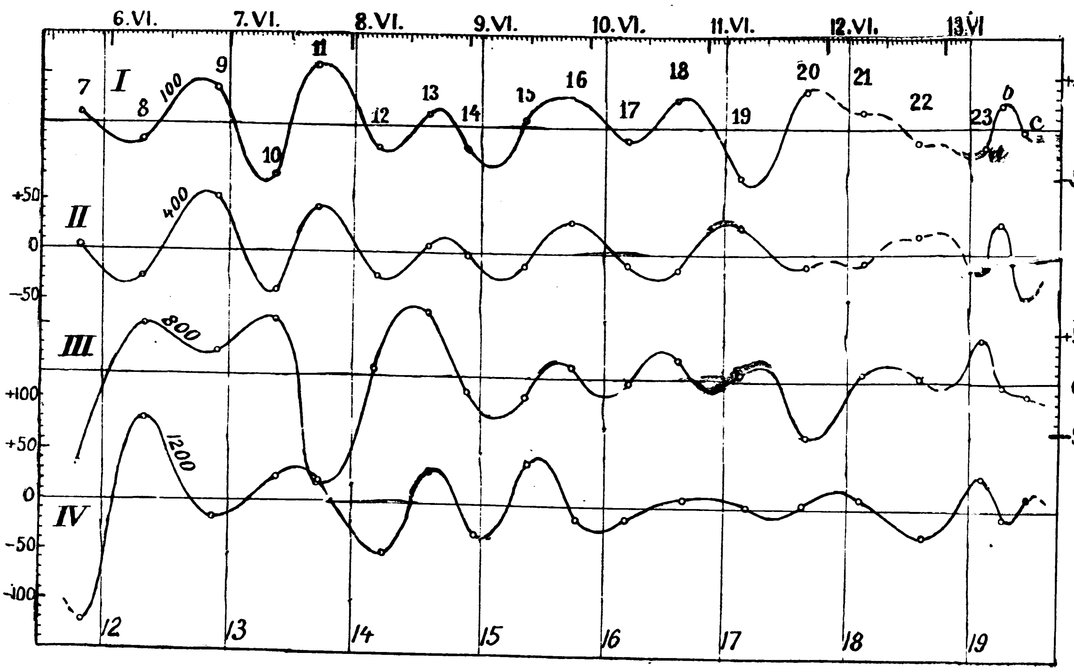

Fig. 9. Variations in Density at 100, 400, 800, and 1200 Meters, at Stats. 7—23. The curves give the differences between the observed densities and the values obtained by consecutive smoothing of three successive values of observations (at successive stations). The vertical scale gives thousandths of σ_t (+ 50 = 0·050 of σ_t). The date in June (VI) is given above along the absoissa where the hours are also marked. The vertical lines indicate the upper passage of the moon. The figures at the foot of these lines give the number of lunar day after new moon.

them with the tides. Where such oscillations occur they may be expected to manifest themselves also in the vertical sections. We have on previous occasions pointed out that the "waves" often observed in the sections, may in many cases have been created by vertical oscillations of the water-strata [Helland-Hansen and Nansen, 1909, pp. 96 f., Nansen 1913, pp. 114 f.].

Let us examine whether the wave-like shape of many of the curves in our sections from 1914 is explicable as a result of such oscillations. For this purpose we have drawn curves illustrating the variations of density at some depths, with the time as argument. We have partly used the observations of density directly, and partly tried to eliminate other variations by taking the differences between the observed values of density and the values found by means of a consecutive smoothing of three successive values of observation. In Figs. 9—11 we have shown some of the curves for these differences. The time of the moon's upper passage is marked by thin vertical lines the figures at the foot of which give the number of lunar day after new moon.

Fig. 9 illustrates the conditions along our two first sections in 1914, between Station 7 and 23 (Sects. VIII & X, Pls. 14 & 17). The curve I demonstrates the variations at *100 meters*. There seems to be here a pronounced period of about 25 hours. In most cases the relative minima of density seem to occur some hours after the upper passage of the moon. *The curve II for 400 meters* exhibits in its first part (to Stat. 17 incl.) variations which are simultaneous with the variations in the first curve, while the variations between Stats. 17 and 22 (incl.) are nearly inverse to those at 100 meters. *Curve III for 800 meters* shows variations which mostly go inversely to those at 100 meters, except in the middle part, between Stations 13 and 17, where the oscillations seem to have been nearly the same at the three different depths. *Curve IV for 1200 meters* shows variations which partly coincide with those at 800 meters, and partly with those at the higher levels, especially at 100 meters.

The curves in Fig. 9 also include the successive observations made at Stat. 23, the values having been reduced by the smoothed values in the same way as the values of the other stations. It may seem strange that the oscillations at 100 and 400 meters at Stat. 23, show a semi-diurnal period, while otherwise all the curves in Fig. 9 show a diurnal period. The curves for 100 and 400 meters in this figure may, however, between Stats. 20 and 23 be drawn in such a way that they display a semi-diurnal period, with minima shortly after the upper and lower passages of the moon, in accordance with the variations found at Stat. 23 (Fig. 6). The conditions may be so interpreted that the semi-diurnal period dominates near the banks, at any rate in some water-layers, while the diurnal period is predominant farther out in the deep ocean. These are conditions which are still very little known, and need more special investigation. We know that the semi-diurnal period is strongly predominant in the tides near the coast, while for instance the heavy pressures of ice in the Polar Sea during the drift of the "Fram" displayed a diurnal period; on the other hand the observations in the pack ice at the coastal bank near Spitzbergen [the cruise of the "Veslemøy", cf. Nansen 1915] prove the existence of a semi-diurnal period in the variations of the packing of the ice, as well as in the currents measured at various depths. Pillsbury's measurements of the Gulf Stream in the Strait of Florida demonstrated a diurnal period. Current measurements at the banks near the west coast of Norway in 1906 showed that the semi-diurnal was far more pronounced than the diurnal period, while measurements farther out, at Storeggen, showed that the diurnal period was more pronounced there than the semi-diurnal [Werenskiold 1916].

Fig. 10 shows the variations at 100, 400, 800, and 1200 meters along our third section in 1914 (Sect. XII) from Lisbon to Madeira (1914 Stats. 27—38). For 400 meters a curve, representing the directly observed densities, is added; it shows practically the same variations as the other curve for the same depth representing the differences between the directly observed values and the smoothed values. The curves II and III, for *400 and 800 meters*, exhibit very nearly identical fluctuations with four marked oscillations. Their period has in our curves an average length of about 25 hours, but is considerably shorter between Stations 27 and 33 than later. This difference in the apparent length of the period might possibly have some connection with the fact that the vessel was moving and the observations were not made in the same locality. There are no perceptible indications of a semi-diurnal period. The minima of density occur perhaps slightly later in relation to the moon's passage than they do in the previous series of observations (Fig. 9). Curve I, for *100 meters*, shows irregular oscillations which differ from those at 400 and 800 meters, but have a noteworthy resemblance to

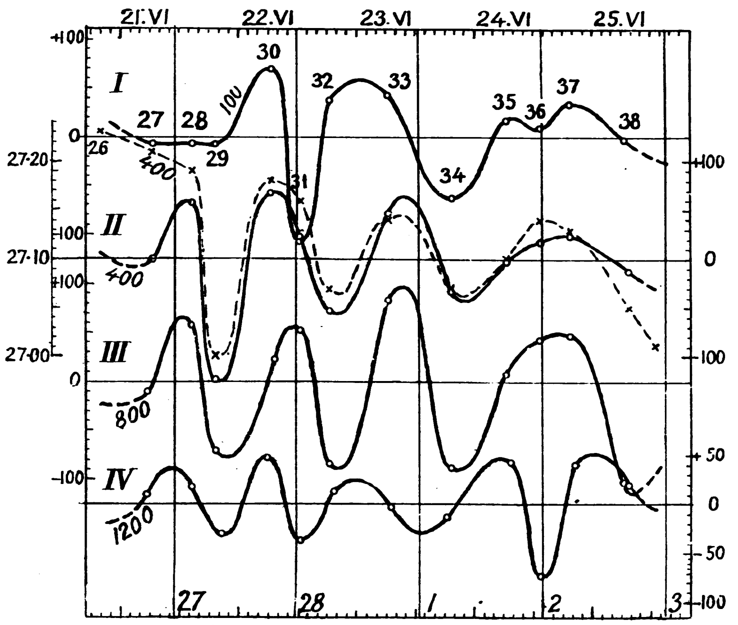

Fig. 10. Variation in Density at 100, 400, 800, and 1 200 Meters, at Stats. 27—38. The broken curve for 400 meters gives the directly observed values of σ_t (scale to the left, 27·00—27·20). The other curves give the differences between the direct values and the smoothed values (100 = 0·100 σ_t).

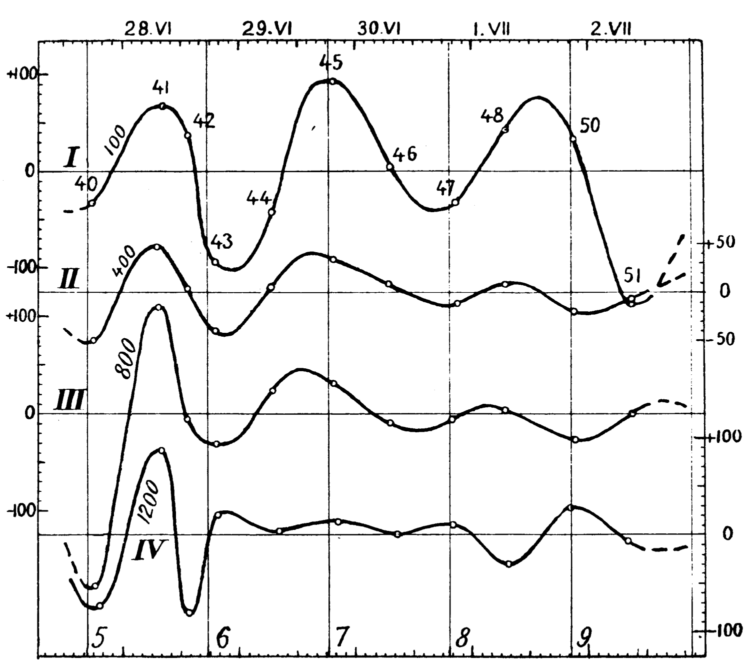

Fig. 11. Variations in Density at 100, 400, 800, and 1 200 Meters, at Stats. 40—51.

the oscillations shown by Curve IV for *1200 metres.* The period of the variations at the latter depth seems to have been about 21 or 22 hours.

Fig. 11 represents the conditions along our fourth section in 1914 (Sect. XI) from Madeira to the Azores. The curves I, II, and III, for *100, 400 and 800 meters,* show fairly regular variations but their periods are on the average considerably longer than in the preceding figures, being about 35—37 hours. It is perhaps worthy of note that the last oscillation shown by the corresponding three curves for 100, 400 and 800 meters in Fig. 10, between Stations 34 and 38, seems to have a similar long period of about 35 hours or more. This is in the region just north of Madeira and near the region of the Stations of Sect. XI (Fig. 11). The curves for 400 and 800 meters show a striking similarity in Fig. 11 as was also the case in Fig. 10. Curve IV for *1 200 meters* shows variations which on the whole are very different from those of the other curves, their mean period being about 21—24 hours, or nearly the same as at 1 200 meters in Fig. 10. The oscillations of the last part of the curve, after Stat. 47, seem to have been exactly inverse to those at 800 and 400 meters. The first oscillation, between Stats. 40 and 42, near Madeira, is very similar in all four curves, and at 800 and 1 200 it is conspicuously greater than the later oscillations at these depths. This may be due to the neighbourhood of the bank.

The stations along the route from the Azores northwards (our fifth section from 1914, Sect. VI) are too far apart to permit of an analysis of the variations in the same way as we have analyzed the other sections.

If we now make a general comparison between our graphic representations of the variations of density along our three sections (Fig. 9—11) and at Stat. 23 (Fig. 6) we find a certain general system in the occurrence and distribution of the oscillations. At Stat. 23 a distinct semi-diurnal period seemed to occur in the variations at the upper levels, 100 and 400 meters, while lower down, at 800, 1200 and 1600 meters, a diurnal period was apparently predominating (pp. 19—20).

The observations at the stations along our sections mentioned show nowhere indications of variations with a semi-diurnal period. As far as our investigations permit of conclusions, variations with a semi-diurnal period seem to be limited to the regions near the continental shelf or great banks. Some of the curves in our sections, *e. g.* curves I, II, and III in Fig. 9, show fairly regular variations with a distinct period of nearly 25 hours. Other curves show different periods, *e. g.* about 21 hours and 36 hours as mentioned above (see especially Fig. 11 and curve IV in Fig. 10); this seems to have been the case especially in the southern part of our area of investigation.

Another feature worthy of note is that the variations have practically the same phase at certain depths — *e. g.* at 100 and 400 meters in Fig. 9, at 400 and 800 meters in Fig. 10, and at 100, 400 and 800 meters in Fig. 11 — while at other depths the phase may be different and to some extent inverse to the former. In all figures the variations indicated by the curves for 1200 meters are more or less different from those at 800 and 400 meters and to some extent inverse to them, but in Figs. 9 and 10 the curves for 1200 meters have a certain resemblance to those for 100 meters. These features seem to indicate that at least the greater part of the variations shown by the curves in our sections are actually periodical oscillations caused by wave-motion of some kind. The undulations of our curves cannot as a rule indicate more or less stationary vortices; for in that case it would not be possible to explain the *regularity* of these undulations which obviously indicate a certain periodicity. This, however, does not prevent that some undulations may represent vortices.

It has already been mentioned that the oscillations described have obviously to a great extent some connection with the tides; but how the tidal wave can produce vertical movements of such dimensions in the different strata of the sea seems to us at present to be inexplicable. We have here a phenomenon of fundamental importance to Oceanography, which has to be made the subject of special methodical investigations.

Owing to the occurrence of such vertical oscillations the individual series of observations will not, as a rule, represent the average conditions at the stations in question, and we cannot, therefore, arrive at definite conclusions, as to these conditions, on the basis of such individual series.

For some of our sections of 1914 (Sects. VIII, X, XII & XI), where the curves exhibit numerous marked "waves", we have drawn special diagrams representing the variations of the smoothed values of the densities. The smoothing, by taking the means of every three values of density observed at three consecutive stations, is of course very imperfect, as the distances between the stations, as well as the time taken in sailing from one station to the next, were very different. The new forms of our sections (Pls. 34 & 35) naturally show much greater regularity in the distribution of density than the sections where the direct observations have been used. The smoothed curves, *e. g.* in Sect. XII D (Pl. 35), certainly exhibit the same main features as the curves in Sect. XII B (Pl. 19) as regards both the horizontal and the vertical distribution of density; but most of the local "waves" have disappeared. The same differences between the smoothed curves and the curves of the directly observed values of density are also conspicuous in the other three sections.

The representation in horizontal charts shows analogous conditions. If the individual series of observations could be considered as representing the average local conditions within a reasonable space of time, and the differences between the densities at the individual stations consequently represent permanent conditions. the sometimes very considerable differences between stations lying close together might be regarded as an evidence of strong horizontal movements, often forming eddies. As, however, a great many of these differences are due to vertical oscillations, the direct observations would have to be reduced, in order to embrace the same phase of oscillations, before a detailed examination of the horizontal movements can be made. As an experiment, and for lack of more representative data, we have confired ourselves to enter into charts the same smoothed σ_t-values as represented in the above mentioned sections, Pls. 34 and 35. Such charts for 400 and 800 meters are reproduced in Pls. 60 and 61. A comparison of these charts and the corresponding charts of the densities casually observed, Pls. 41 and 45, will show the difference between the results obtained from direct observations and those obtained from values which may be expected to be more representative. The charts with smoothed values show the same main features as those with the directly observed values, but many details have disappeared. It is therefore possible that our charts, constructed directly on the basis of the observed values at the different depths, may show many details which do not really exist. Our knowlcdge of the oscillations at different places is, however, still so defective that it is impossible to carry out any reliable reduction of the observed values. For the present, therefore, we shall regard the individual series of observations as representative in the sense mentioned above, and *make use of the curves in our charts to denote the horizontal movements, even if, in our opinion, only the main features are fairly trustworthy, and many of the details may be erroneous.*

V. The Vertical Distribution of Temperature.

In Fig. 12 we have drawn curves to indicate the vertical distribution of temperature at four characteristic stations, representing the two extreme types of this distribution inside our area of investigation.

Our observations, during the three years 1913, 1914, and 1922, were all taken in the summer months, May to July, hence the uppermost water-strata had been considerably heated by the radiation of the sun. Owing to the wave-motion the temperature of the upper ten or twenty meters, or even more, was very uniform and relatively high. From this level down to some 50 meters the temperature sank very rapidly. Below this depth the thermal conditions differed in the different regions of our area.

The curves for Stat. 5 (1913) and Stat. 61 (1914), for example, represent a northern type. The decrease of temperature from about 100 meters down to 400 or 500 meters is extremely slow. This is obviously due to the vertical circulation during the previous winter which may have reached a depth of several hundred meters. From 500 or 600 meters down to 1000 or 1200 meters the temperature again decreases more rapidly. In the deeper layers the temperature approaches uniformity.

The curves for Stat. 29 (1914) and Stat. 14 (1922), for example, represent a southern type. From 50 and 100 meters down to about 600 meters the temperature decreases rapidly, though not so rapidly as nearer the surface. In the region represented by these two stations the vertical circulation during the winter is of but little importance. Below 600 meters the curves are nearly vertical down to about 1200 meters, where they show a small secondary maximum of temperature. This is caused by the admixture of Mediterranean water flowing out through the Straits of Gibraltar. Below 1200 meters the temperature decreases rapidly towards 2000 meters, where it is still slightly warmer than at the northern stations. The broken curves between 600 meters and 2000 meters indicate the probable shape of the curves for the two southern stations if there had been no admixture of Mediterranean water.

In Fig. 13 we have drawn curves demonstrating the vertical distribution of what we have called the "anomaly of salinity" (cf. p. 10) at the above mentioned four stations. In the water-layers near the surface the anomalies are negative owing to the summer-heating. The positive anomalies between 50 and 350 meters at Stat. 29 and Stat. 14 may be due to the fact that this water comes from the regions to the south-west and

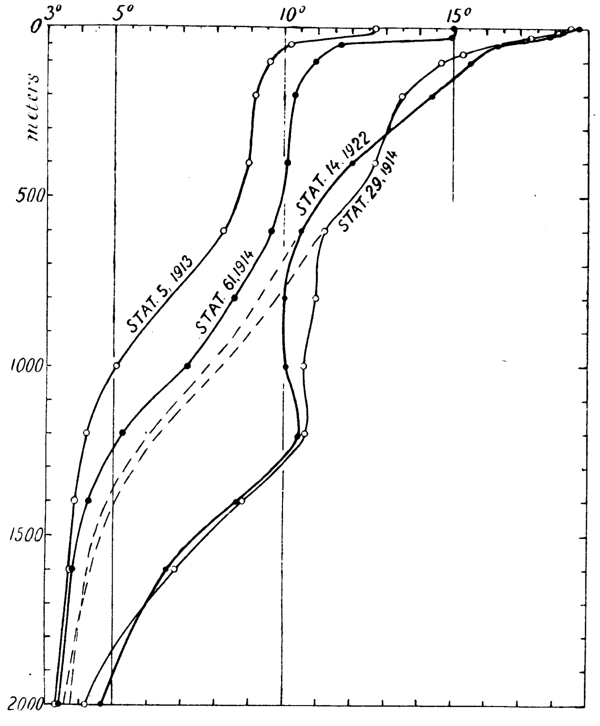

Fig. 12. The Vertical Distribution of Temperature at four different stations.

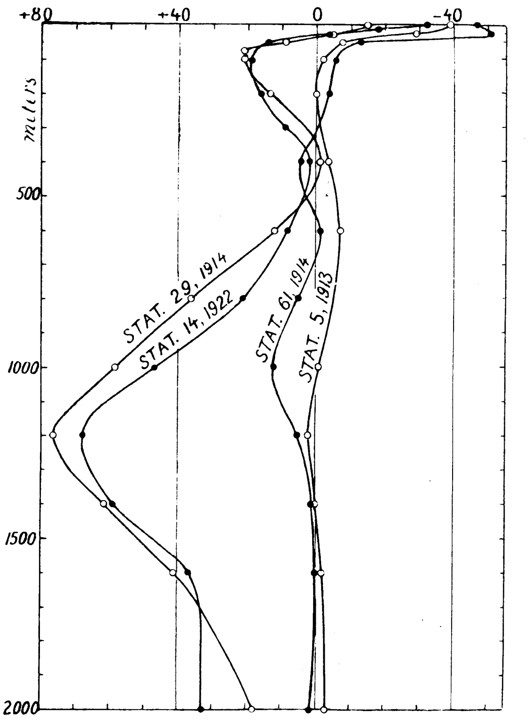

Fig. 13. The Vertical Distribution of Salinity-Anomaly at the same four stations as illustrated in Fig. 12.

west, where there is an active process of evaporation from the surface of the sea. Positive anomalies of this kind do not occur at these depths at the two northern stations. The curves for the two southern stations show a rapid increase of the anomaly from about 500 meters downwards to a maximum at about 1200 meters, which corresponds exactly to the maximum of temperature at the same depth, as shown by the curves for these two stations in Fig. 12. The anomaly-curve (Fig. 13) for Stat. 61 shows a small maximum of anomaly at about 1000 meters which is obviously due to a slight admixture of Mediterranean water, the effect of which may also be traced in the shape of the temperature-curve for the same station.

As will be mentioned later, the temperatures at 2500 meters are very uniform, being slightly above 3° C., except in the Rockall Channel, were they are a little below 3° C. At 3200 meters the temperature sinks to between 2·75° C. and 2·93° C.

VI. Circulation of the North Atlantic Ocean West of Europe.

The Current-Systems.

The physical conditions in the eastern part of the North Atlantic Ocean, west of Europe, are dominated by the great North Atlantic Current, popularly known as "the Gulf Stream". The different kinds of charts for a series of depths show striking similarities. They demonstrate very clearly the manner in which the great North Atlantic Current coming from the west approaches the Atlantic Longitudinal Ridge (north of the Azores), and enters, between 46° and 49° N., the region included in our investigations. Passing across the Longitudinal Ridge the current turns southwards and divides into two branches. One branch turns abruptly northwards towards the Porcupine Bank and the Rockall Channel, where it is again deflected by the Rockall Bank, and its main body passes towards the west and north-west round this bank. A continuation of this current enters the Norwegian Sea.

The fact that the main body of the water-masses carried by the Atlantic Current turns northward after the crossing of the Longitudinal Ridge is in accordance with the theoretical results arrived at by Prof. V. Walfrid Ekman [1923]. He has found that in the Northern Hemisphere a "gradient current" will be deflected towards the left when it moves above a bottom where the depths are increasing while it is deflected towards the right where the depths are decreasing. This holds good even if the depths are very great. The deflection of the main current towards the south-east over the western slope of the Longitudinal Ridge, seems also to agree with this rule.

The southern branch of the North Atlantic Current flows southwards along the eastern slope of the Longitudinal Ridge, and chiefly east of the Azores. Apparently its main direction coincides with that of our sections between the Azores, Madeira and Portugal. It might seem to be a suspicious coincidence that in this region so many curves in the different charts closely follow our route, and that the current chiefly runs along the lines where we made our observations. An examination of the bathymetrical chart, however, will furnish a natural explanation. Our route from Portugal to Madeira passed through a topographically peculiar region, between two series of banks, running near one another, while the sea-bottom along our route between Madeira and the Azores is somewhat higher than in the basins to the north and south. It seems reasonable to assume that the direction of the current is to a great extent determined by the topographic features of the bottom, and it stands to reason that, with perpetual oscillations and turns, it closely follows these elevations and these series of banks.

In a large area to the north of the main Atlantic Current, west of Long. 20° W., no modern observations have been taken except at two stations of the Danish vessel "Margrethe" in 1913, where, however, the observations were limited to the upper 50 or 100 meters. The values of temperature and salinity observed here were remarkably high, and much higher (except the surface-temperature) than the values found at a third station of the "Margrethe" further south near the border of the great Atlantic Current. The observations at those two stations indicate peculiar vortex-movements or other local and possibly casual transport of water from the south, which, however, we have no means of examining, owing to the paucity of observations.

In the comparatively large area between the two above-mentioned branches of the North Atlantic Current and the European Continental Shelf, extending from the south-western corner of Portugal to the Porcupine Bank, the current-curves on the different charts are of less regular shapes and are much more dispersed; it is doubtful how they ought to be drawn in order to be most nearly correct. Observations from other years agree well on the whole with our observations from 1914. The whole body of observations from the different years has been utilized in constructing the charts. Some of these observations show a few fairly distinct, though mostly weak, convection currents, which may have followed different directions in the upper, medium, and lower water-strata, while some show several vortices. These latter are especially noticeable in places where there are observations at many stations close together, as for instance in the Bay of Biscay and further westwards, and north of the eastern part of the Azores. As already stated in Chapter IV our investigations with the "Armauer Hansen" in 1914 along the two sections from the English Channel, first south-westwards and then south-eastwards to Lisbon, show many and great variations, although they were carried out in the course of ten days only. We arrived at the conclusion that these variations were to a great extent due to periodic vertical oscillations. But as mentioned before, we have no trustworthy means of eliminating the effects of these oscillations, and for drawing the curves in our charts we have therefore used the direct observations as if they were representative, showing stationary conditions. One has consequently to be aware that the local eddies may be illusory.

For a rather extensive area east and north-east of the Azores we have found it possible to utilize only a very scanty stock of observations. Consequently the curves of the charts are very unreliable inside this area. It is possible that fuller investigations would have given quite different results, and we should probably have found various vortices there too, coupled with considerable local variations.

In the dynamic chart showing the variations of the anomalies of the thickness (in dynamic millimeters) of the water-layer between the isobaric surfaces of 2000 decibars and of *100 decibars* (Pl. 62), curves are drawn for every 25 dynamic millimeters. These curves, as we have said, indicate the direction of the current at about 100 meters in relation to the direction of the current at about 2000 meters. They represent the stream-lines of the real current at about 100 meters, provided the water-motion at about 2000 meters be considered as negligible, which assumption may, however, be untenable to some extent, as previously mentioned. The relative velocities of the current are inversely proportional to the distance between the curves. By relative velocities we mean in this case the difference between the velocity at the higher level and the velocity at about 2000 meters.

Using the method above mentioned we have drawn similar charts for other levels giving the differences in the anomaly of dynamic depth between the surface of 2000 decibars and the surfaces of: 200, 400, 600, 800, 1000, 1200 and 1400 decibars. As the observations at a great many stations were not extended down to 2000 meters, we have as an experiment also constructed charts of the surface of 400 decibars relatively to the surfaces of 1000 decibars and 1400 decibars, thereby obtaining more stations and additional details. The latter chart is reproduced in Pl. 64. It shows a conspicuous agreement with the other chart for 400 decibars (Pl. 65), the geometric difference being represented by the chart for 1400 decibars (Pl. 70). In some few localities the additional observations mentioned gave more details, but on the whole they made no difference in the shapes of the dynamic isobaths drawn in the charts based upon the surface of 2000 decibars.

The mean difference between the velocities at the two surfaces has been computed at a good many different places. The values obtained at about 100 meters have been used for the construction of the chart Fig. 14, where the arrows are drawn in the direction of the stream-lines, their length indicating approximately the velocity of the current (cf. the scale at the foot of the figure). The Atlantic Current and its two branches mentioned above, appear very distinctly on the chart.

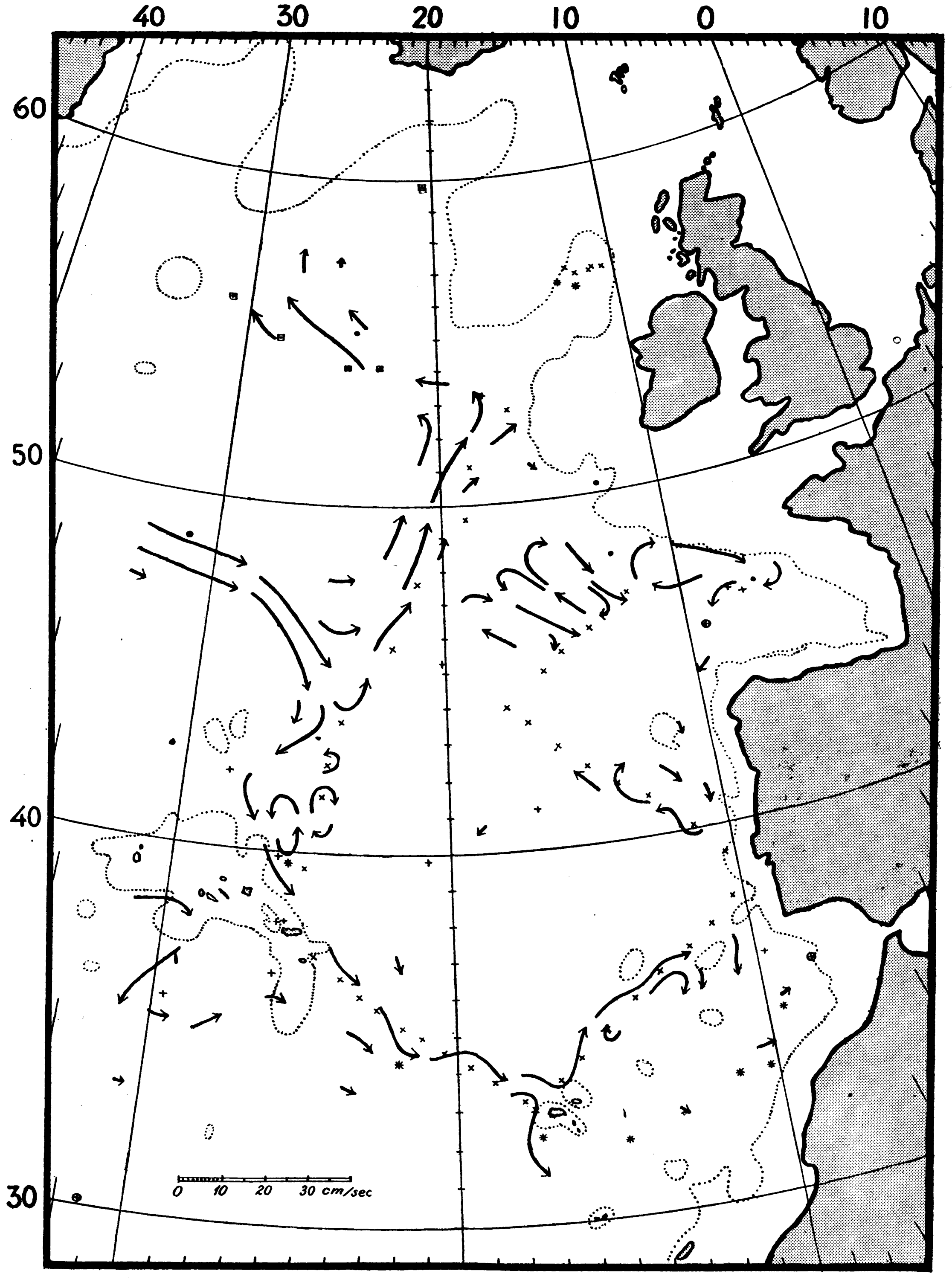

Fig. 14. The Arrows indicate the Directions and Velocities of the Currents at about 100 Meters in relation to 2000 Meters. The dotted Curves are the Isobaths for 2000 Meters.

The charts Pl. 62 and Fig. 14 illustrates the following main features in the area between the Continental Shelf and these two branches of the Atlantic Current: The greater part of the southern branch passes Madeira and follows the series of banks extending from that island towards Portugal, and turns to a great extent southwards when it approaches the south-western corner of this country, but a smaller part of it appears to pass first towards the north and then towards the north-west (the banks obviously preventing it from approaching near to the coast). This branch forms part of a cyclonic movement, with very small velocities, in the southern portion of the area under discussion. In the region north-west of this cyclonic circulation, and north of the Azores, the conditions are very complicated. The observations are too few and too scattered to demonstrate the details; they may, however, indicate that some vortices occur, similar to those we have drawn tentatively on the charts, but of course there is always the possibility that the differences between the stations may be due to vertical oscillations.

North of the cyclonic circulation, just mentioned, there appears to be an anti-cyclonic movement of a very irregular shape. It receives its chief impulse from the northward-flowing branch of the great Atlantic Current to the west. A portion of the water-masses of the latter turns southwards again, south-west of the Porcupine Bank, and forms part of the anti-cyclonic circulation, where the computed values of the "relative velocities" show very considerable variations.

Another anti-cyclone seems to occur near the Continental Shelf off Brittany, with a movement towards the south-east near the banks and in the opposite direction a short distance farther out. The velocities seem to be considerable in some places.

If the dynamic chart for 100 decibars (Pl. 62) be compared with the chart giving the salinities and temperatures at the depth of 100 meters (Pl. 36) it will be found that there is a good general agreement, the main features being the same. Both the isohalines and the isotherms indicate the same division of the great Atlantic Current, coming from the west, into two branches turning northwards and southwards. In the southern part of the area between these branches and the European coast the isohalines and isotherms have shapes corresponding to the cyclonic circulation indicated by the dynamic curves. In the northern part of the above-mentioned area (west and south-west of Ireland) the shapes of the different curves resemble each other. The agreement between the shapes of the curves in the two charts is not so complete in the central region, west of the Bay of Biscay and northern Spain, which fact may probably be due to the mixing of different waters.

Some of the main features of the circulation may also be traced in the chart showing the horizontal distribution of density (σ_t) at 100 meters (Pl. 37). The relative directions of the movements (*i. e.* in relation to the underlying water-layers), which the distribution of density should indicate, are marked by arrow-heads along the isopycnals. If the velocities decrease with increasing depth — as is generally the case in the sea — the higher densities should be found to the left of the direction of the current in the northern hemisphere, and lower ones to the right of it. The relative direction of the currents is indicated in the charts according to this principle. As far as the Atlantic Current and its two branches are concerned, the directions thus indicated in the density chart agree very well with those indicated by the dynamic chart and the chart of temperature and salinity for 100 meters. This proves that the velocities are actually decreasing downwards at about 100 meters in those regions.

If the velocity decreases rapidly downwards there will be a considerable gradient of density in a horizontal direction at right angles to the direction of the current, and the isopycnals will be situated comparatively close together. The chart of density for 100 meters shows that there are many isopycnals close together in the southward-flowing branch of the Atlantic Current. This branch is more conspicuously marked in this chart than in the dynamic chart for the corresponding depth. If the curves are drawn fairly correctly this should indicate that the velocity changes comparatively rapidly downwards at about this depth in the southern branch.

The chart of density shows that south-west of the Porcupine Bank a portion of the current probably turns towards the east and south-east and the isopycnals assume shapes fairly similar to those of the curves on the dynamic chart for the corresponding depth. The isopycnals in the central part of our area, the region north-west and west of Portugal, indicate that the relative current should follow directions which are very nearly opposite to those indicated by the curves on the dynamic chart. The explanation obviously is that, in this region, the velocities of the current flowing north-west and westwards increase downwards with increasing depth. This is also what one might expect, as in this region the prevailing wind is northerly during the time of the year when our observations were made, and the surface-layers of a northward-flowing current would therefore be retarded, or even driven southwards. Hence the velocity of the northward current must increase with increasing depth from the surface down to a certain level where it will attain its maximum. That this is actually the case is also indicated by the dynamic charts. The curves in their central region, west of Portugal and north of 40° N. Lat., show a greater velocity of the north-westward flowing current at the lower levels than at about 100 meters (Pl. 62), and there seems to have been a maximum of velocity at about 800 meters (Pl. 67). The density-charts and the dynamic charts lead consequently to the same conclusions as regards the currents and their variations in vertical direction.

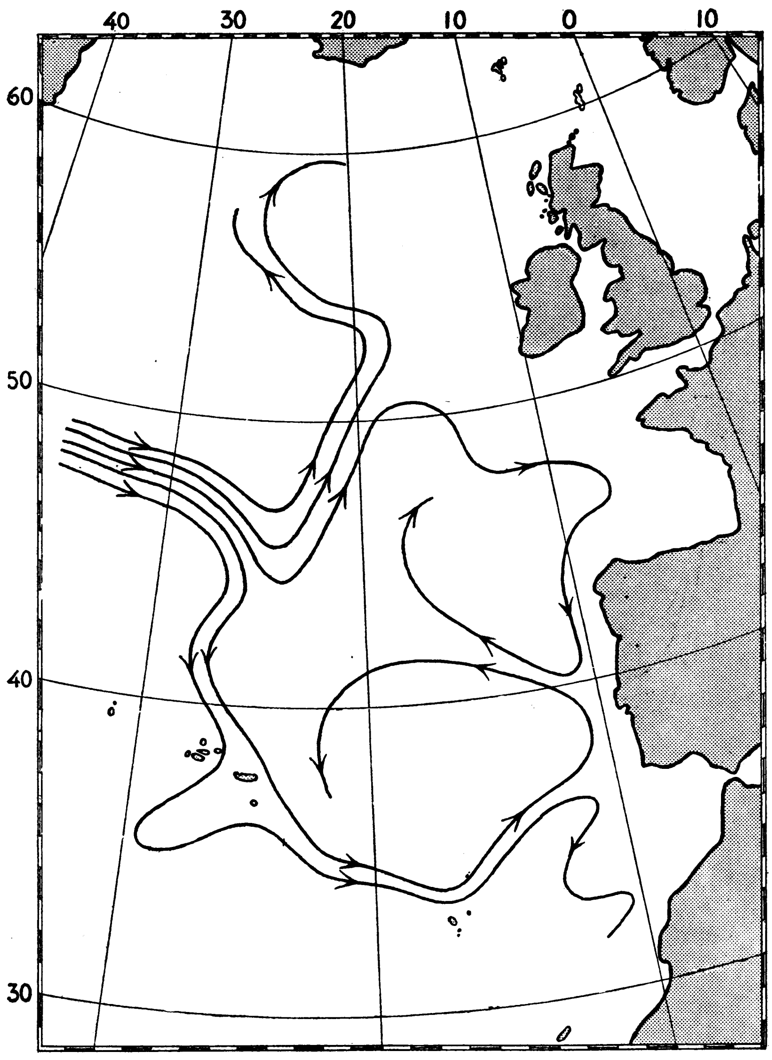

Fig. 15. Skeleton-representation of the General Subsurface Circulation of the Eastern North Atlantic.

The density-charts as well as the dynamic charts for all depths show the same main features: the great Atlantic Current dividing into two branches with two circulation-systems to the east of them, a southern cyclonic and a northern anti-cyclonic system (Fig. 15).

It looks as if the Atlantic Current is severed as it approaches Europe, and that in the divergence thus arising, an enormous double vortex is formed in a manner similar to that which is known to occur in some other regions.

While at the upper levels the northern anti-cyclone receives its chief contribution from the northern branch of the Atlantic Current, this does not appear to be the case at the greater depths, below 600 meters, where the anti-cyclone seems chiefly to be fed by a current coming from the southern part of our area. It even seems probable that this anti-cyclone actively contributes to the northern branch of the Atlantic Current. The water from our southern regions, with traces of Mediterranean water, may thus travel as far north as Rockall, or even further.

It may be worthy of note that, if the vortices indicated in the charts north of the Azores, really exist, they are much more developed in the upper water-layers, especially at 200—600 meters, than in the deeper layers, and at about 1200 meters they practically disappear.

Salinities and Temperatures. The "Mediterranean Water".

Let us now study the distribution of salinity and temperature as represented by our charts. In the southern branch of the Atlantic Current, especially at *100 and 200 meters* (Pls. 36 & 38), there is a considerable increase southwards of salinity and temperature, which is due chiefly to an admixture of salter and warmer water from more southern latitudes, and also, to some extent, to the direct absorption of heat rays. At *400 meters* (Pl. 40) this increase is considerably less, and at *600 meters* still smaller. To the north and east of Madeira there is a slight temperature minimum at the latter depth. Farther towards Portugal a new factor begins to assert itself at 600 meters, namely very salt and relatively warm water coming from the east. This is the first distinct indication of Mediterranean water in this region (Pl. 42).

At 100 meters there is a very extensive area with salinities above 35·60 ‰. It is somewhat smaller at 200 meters, especially in its eastern part. At 400 meters it is reduced to the southern part of the chart, with a very narrow belt creeping along the edge of the shelf into the Bay of Biscay. At 600 meters there is very little left of this water in the south-western part of our area, while, on the other hand, water with salinities above 35·60 ‰ occurs in its eastern part, south and west of Portugal; but this water is distinctly separated from the water of 35·60 ‰ which is found far to the south-west, and is of quite a different origin. This new water of more than 35·60 ‰ extends northwards along the coast of Portugal in a fairly broad belt, and turns into the Bay of Biscay, where it covers a considerable area.

In the chart showing the salinity and temperature at *800 meters* (Pl. 44) the development which began to assert itself at 600 meters south-west of Portugal, has extended over a great area towards the north-west. With very few exceptions, the temperatures are everywhere lower, but the salinities have increased to a large extent. The isohalines for 35·00 ‰ to 35·40 ‰ have approximately the same position at 800 meters as at 600 meters, while the "Mediterranean water", represented by the isohaline for 35·50 ‰, comes near the isohaline for 35·40 ‰ and is followed by the isohalines for 35·60 ‰ and 35·70 ‰. Off the coast of Portugal we now find even considerable quantities of water with a salinity above 36·0 ‰. The development continues downwards. At *1000 meters* (Pl. 46) the temperatures have decreased still more, and the salinities have also decreased in the north-western part of the chart, as well as in the western and south-western parts. In the other portions of our area the salinities show a general increase. At *1200 meters* (Pl. 48) the water with the high salinities (above 35·90 ‰) near the coast of Portugal, has extended still farther than at 1000 meters; water with a higher salinity than that observed at higher levels has appeared; and we have at this depth an absolute maximum of salinity. On the other hand the mixed Mediterranean water with lower salinities, farther out to sea, has almost everywhere a somewhat smaller extension than at 1000 meters. At *1400 meters* (Pl. 50) the isohalines have everywhere moved nearer to the coast. At *2000 meters* the conditions have become fairly uniform as regards the salinity and temperature (Pl. 52), and also the density (Pl. 53). The chart showing the distribution of salinity and temperature indicates, however, that the "Mediterranean water" still asserts itself to some extent in the south-eastern part of our area, and as far north as the Bay of Biscay, and the few isohalines and isotherms which occur in the chart in these tracts have shapes much resembling those of the curves in the chart for 1400 meters. Some extraordinarily high temperatures and salinities shown in the chart for 2000 meters (Pl. 52) have already been mentioned on p. 14.

A striking feature in the charts for 1200 and 1400 meters (Pls. 48 & 50) is the fact that both the isohalines and the isotherms are to a certain extent grouped in two belts.

At 1200 meters this is especially apparent with regard to the isohalines for 35·40 to 35·70 or 35·80 ‰ and the isotherms for 7° and 8° and partly 9°, which form a belt in the direction SW—NE out at sea, and the isohalines for 35·90—36·40 ‰ with the isotherms for 10° and 11°, which form another belt nearer to the coast of Portugal. An indication of a similar grouping of the lines will also be seen on the charts for 1000 and 800 meters. This arrangement, therefore, is found precisely on the charts for the depths where water from the Mediterranean appears, and the belts in question are obviously due to the peculiarities in the distribution of these water-masses.

This condition may be examined more closely by means of the sections showing the vertical distribution of the "Mediterranean water". We shall first study our Section X, Pls. 16—17, illustrating the conditions in the sea NW of Lisbon. In the SE part of the section, near the coast of Portugal, we find a conspicuous 'heart' of "Mediterranean water" with high salinities (observed maximum of salinity 36·36 ‰ at Stat. 23 at 1200 meters; close by, at the "Michael Sars"-station 17 in 1910, a maximum salinity of 36·52 ‰, was found at the same depth). This water has here a relatively great vertical distribution, being more than 1000 meters thick. The corresponding section of densities shows that the isopycnals have such a horizontal course that the components of the current, at right angle to the section, must be very small. The same thick 'heart' of "Mediterranean water" is also seen in Section XVII A, Pl. 27, at the "Dana"-station 1385 off Cape Finisterre, where a maximum-salinity of 36·08 ‰ was observed at 1200 meters (in 1922). This 'heart' obviously extends northwards to the Bay of Biscay as a slow current with decreasing salinities.

As will be seen from these two sections of salinity and temperature, a tongue extends farther seawards from the thick 'heart' just mentioned. The axis of this tongue is situated at 1000—1200 meters, or about the same depth as that at which the centre of the 'heart' is found. As the thickness of the tongue is much less than that of the 'heart' the isotherms and isohalines slope comparatively steeply at the transition from the 'heart' to the tongue. As the salinities and temperatures in the tongue are not so high as in the 'heart', the latter will be limited, at the transition, by some very steep isohalines and isotherms. It is also a striking feature that the tongue stops rather suddenly with a steep slope of some crowded isohalines and isotherms. In horizontal sections, as represented by the charts of different depths, the sloping layers will be cut, and in places where the obliquity is especially prominent the crowded isohalines and isotherms will therefore appear as the two belts mentioned above. The tongue of "Mediterranean water" obviously originates through this water taking part in the southern cyclonic and the northern anti-cyclonic circulation, thereby being spread outwards. This water with high salinities makes itself felt everywhere in much the same way as we might imagine a colouring matter in the sea to do, and the indicator of its presence is the anomaly of salinity (cf. p. 29) represented in our sections (Pls. 29—33) and charts (Pls. 55—59).

Charts of salinity-anomaly have been drawn for 400, 1000, 1200, 1600 and 2000 meters. We have drawn curves for every 10 units of anomaly, the unit corresponding to a departure of 0·01 ‰ from the "normal" salinity at the temperature observed. *E. g.* at our Stat. 20, from 1914, at 1200 meters we found 35·97 ‰ and 9·65° C. According to our curve Fig. 4, the "normal" salinity at this temperature is 35·37 ‰, hence the departure is 60 units.

The chart for *400 meters* (Pl. 55) shows upon the whole very small variations of anomaly indicating that at this depth the relation between temperature and salinity corresponds to the average conditions in the North Atlantic in general. There is a marked tendency towards a negative anomaly in the north-western part of the chart—obviously due to an admixture of arctic water and an excess of precipitation in relation to the evaporation in the northern waters — and towards a positive anomaly in the south-eastern part, obviously due to an excess of evaporation in these southern waters.

It is a striking fact that there are such a remarkably good agreement between the values of anomaly found within the various regions from observations taken by different expeditions in different years. This seems to prove that the annual temperature-variations of water with the same salinity are very small at depths as great as 400 meters. The tongue of water with anomalies above 10 south-west of Portugal, seems to indicate a slight intermixture with deeper lying "Mediterranean water" (see Sects. XIV C and XV C, Pl. 29).

The chart for *1000 meters* (Pl. 56) shows a striking difference from that for 400 meters. In the whole region from the Porcupine Bank, west of Ireland, south to the Canary Islands and west to the Azores the anomalies are remarkably high, showing that the "Mediterranean water" has been spread over this great area from the region near the Straits of Gibraltar where the anomalies have a maximum extending some distance northwards along the coast of Portugal. This chart shows very clearly an arrangement of the curves in belts similar to what was mentioned above (p. 36) with regard to the isohalines and isotherms, The water in the north-western region of the chart has negative anomalies similar to those at 400 meters, and is obviously not influenced by the "Mediterranean water", which, however, may be easily traced by the relatively high anomalies along the Continental Shelf as far north as the Rockall Channel or still further.

The chart for *1200 meters* (Pl. 57) shows the same characteristic features as that for 1000 meters; the anomalies are, however, still greater, obviously because we are here near the level of the maximum-effect of the water from the Mediterranean. In the north-western region there is a slight increase of the anomalies, perhaps indicating that the effect of the "Mediterranean water" has extended further westwards in this area.

The chart for *1600 meters* (Pl. 58) shows a general decrease of the anomalies. There is a striking difference between 1200 and 1600 meters in the horizontal distribution of the anomalies in the region between the Azores and Madeira. In the chart for 1200 meters the anomalies on the north-east side of our route through this region, *i. e.* on the left hand side of the current, were higher than on the other side, while in the chart for 1600 meters the conditions are reversed. The explanation is obviously that owing to the current the water-strata are sloping downwards towards south-west, so that the strata with higher anomalies near the maximum layer of the "Mediterranean water" (*i. e.* near 1200 meters) descend lower on the south-western side of our route.

At *2000 meters* (Pl. 59) there are still distinct traces of an admixture of water from the Mediterranean especially in the southern and eastern regions of the chart, but the conditions have become much more uniform than at the higher levels.

The Water between 2000 and 3200 Meters.

The chart representing the distribution of density at 2000 meters (Pl. 53) shows very small differences, indicating that on the whole there is no appreciable movement at this depth. A tendency towards a slightly higher density may be traced in the south-eastern part of the area; on an average, the differences from the values in other regions amount only to a few units in the second decimal place of σ_t. This higher density is obviously due to a continuous, but slow admixture of "Mediterranean water". The exceptionally high salinities and densities at Stat. "A. H." 27, 1914 (35·34 ‰, 4·51° C, $\sigma_t = 28·03$) and Stat. "A. H." 14, 1922 (35·31 ‰, 4·66° C, $\sigma_t = 27·98$) may easily be explained as "Mediterranean water" sinking along the Continental Slope in this region near the Straits of Gibraltar.

At 2 stations in 1913, and 12 stations in 1914, observations were taken at depths greater than 2000 meters. Either by the direct observations or by relatively trustworthy interpolations we have obtained the values of salinity and temperature at *2500 meters* at these stations, and have thus been able to compute the densities and different dynamic data for this depth. In the chart Pl. 54 we have given the values of temperature, salinity, and σ_t thus found at 2500 meters at our 14 stations and at 3 stations of the "Dana" (1922), one station of the "Margrethe" (1913), and one station of the "Deutschland" (1911). At all stations, except those in the Rockall Channel, the temperatures are between 3·05° C. and 3·36° C. At the three stations in the Rockall Channel the temperatures are slightly below 3° C. The salinities are everywhere between 34·92 ‰ and 34·99 ‰ except at the northernmost station to the north-west of the Rockall Bank, where it is 34·88 ‰. At the latter station the density (σ_t) is 27·78; at the other stations its values lies between 27·81 and 27·92, the maxima, 27·90 and 27·92, occurring in the Rockall Channel.

In the chart Pl. 71 we have given the figures showing the thickness in dynamic meters of the water-stratum between the isobaric surfaces of 2000 and 2500 decibars. This thickness is nearly the same at all 19 stations, being on an average about 481·64 dynamic meters. The figures in the chart give the decimals only (*e. g.* ·6660 means 481·6660 dyn. meters). Curves are drawn in the chart for equal differences between the actual thickness of this layer and the thickness of a corresponding layer with a uniform temperature of 0° C, and a salinity of 35 ‰, in the same manner as we have done in constructing our dynamic charts for other strata.

The observations at these depths now under discussion, are so few that the curves cannot be expected to show any details. The chart demonstrates, however, with absolute certainty that the differences in velocity between the currents at 2000 meters and at 2500 meters are quite insignificant, perhaps with the exception of the region of the main Atlantic Current west of 25° W. Long. The thickness of the layer between the surfaces of 2000 and 2500 decibars has a minimum of 481·596 dyn. meters at the "Margrethe" Station immediately north of the main Atlantic Current, and a maximum of 481·666 dyn. meters at the "Armauer Hansen" Station north-west of the Rockall Bank, the difference between these two extremes being only 7 centimeters. At all the other stations this thickness varies between 481·6235 and 481·6595 dynamic meters; hence the greatest difference in the extensive area of these observations is only 3·6 centimeters. The accelerating force has a maximum value between the "A. H." Stations 49 and 50 (1914) near the Azores, where it gives a mean difference between the velocity-components at the two levels of 5·6 cm. per second in the direction at right angle to the line between the stations. Between most other stations represented in the chart the corresponding difference amounts to only a few millimeters, or even fractional parts of a millimeter.

The results of the above discussion seem to confirm the justification of our assumption that for our computations of the currents at the different levels between 100 and 1400 meters the movement of the water at 2000 meters may practically be neglected. The possibility exists that there may be a uniform current in these deep strata down to 2500 meters or more, which would have to be added to our computed current-velocities for the higher levels. But we do not consider it probable that such a current could in any case have velocities so great that they would affect materially the results of our computations except where the velocities found are very small.

In this connection it may be of interest to examine the vertical variations of velocity as found by dynamic computations. By means of the figures in the last column of Table II we may easily compute the average value of the component of velocity at right angle to the line between any two stations, for various standard isobaric surfaces relatively to the surface of 2000 decibars. On the assumption that the velocity is nil at the latter surface we may find the real value of the said component at other depths. When dividing this value by *sin* α we find the velocity of the current, α being the angle between the dynamic isobaths (the stream lines) and the straight line between the stations. We have done this for different pairs of stations. Fig. 16 illustrates the vertical distribution of variations in velocity

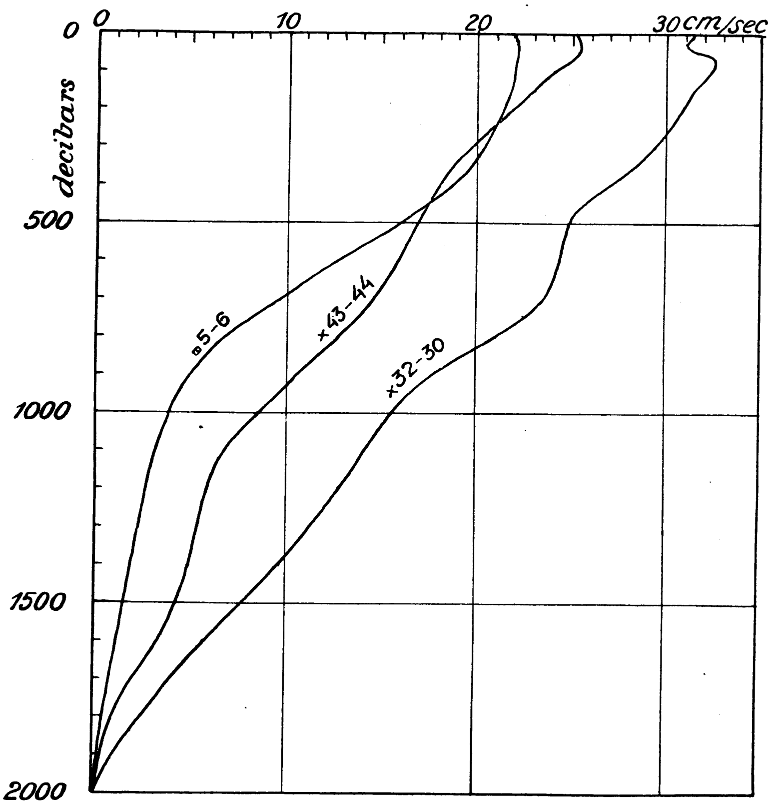

Fig. 16. Curves demonstrating the Vertical Distribution of Velocity down to 2000 Meters between the "Armauer Hansen" Stations 5 and 6, 1913, between 32 and 30, 1914, and between 43 and 44, 1914.

1) between Stats. 5 and 6 from 1913, SW of Rockall Bank $\alpha = 45°$
2) » » 32 » 30 » 1914, SW of Portugal » $= 25°$
3) » » 43 » 44 » » , NW of Madeira » $= 45°$

Within each series (curve) we have used the same value of α for all depths as the deviations from this value are uncertain and at any rate relatively small.

The first curve (Stats. 5—6) is obviously characteristic of the greater part of the Atlantic current in these northern regions. It shows small variations of velocity in the upper 300 meters, and then a rapid decrease to about 1000 meters where the velocity is found to be 4 cm. per second. The velocity decreases very slowly deeper downwards, and especially so from 1800 meters to 2000 meters. At 1800 meters the velocity is only 5 millimeters per second greater than at 2000 meters. The depths mentioned are only approximate, as the numbers refer to isobaric surfaces and not to ordinary depths in meters.

The two other curves in Fig. 16 are of a type somewhat different from that just described. It was mentioned above (pp. 25—27) that the curves of the sections through Stats. 32—30 and 43—44 exhibit great undulations which may be due to vertical oscillations of the water-strata. Especially in the region of Stats. 30—32 these undulations coincide in a striking manner with the diurnal period of the tides (see Fig. 10). As, however, we have not at present sufficient data to eliminate the effect of these possible vertical oscillations, we have had to neglect them in our dynamic computations of the velocities at the various depths. The curves thus found for the two sets of stations in the southern regions exhibit some secondary variations in velocity. If they are not due to vertical oscillations of the strata, they seem to indicate a peculiar stratification of the water and a series of dynamic effects, which may have a connection with the 'belts' of isohalines and isotherms mentioned above (p. 36), giving two discontinuity layers at intermediate depths and not only one as in the northern regions. Apart from these variations the velocity decreases rather evenly from a little below the surface down to relatively great depths. Between the stations 32 and 30 the average velocity was at 100 meters about 32 cm. per second, at 500 m. 25, at 1000 m. 15—16, and at 1500 m. 8 cm. per second. In this case the velocity varied upon the whole almost linearly with the depth. The shape of the curve for Stats. 32—30 seems to show that the decrease of velocity would continue also below 2000 meters, but it is then impossible to decide whether this deep water moves in the same direction as the upper water-layers or in the opposite direction. The third curve, for Stats. 43—44, is of the same type as that for Stats. 32—30, but shows a much slower decrease of velocity below 1800 meters than the latter.

The result of this examination seems to corroborate our assumption that the velocity at about 2000 meters is relatively insignificant, or at any rate very uniform, perhaps with the exception of the regions where the influence from the Mediterranean is most strongly felt.

At the depth of *3200 meters* the following observations were made in 1914:

Stat.	9	2·80° C			
»	49	2·74° »	34·92 ‰	σ_t	= 27·86
»	58	2·89° »	34·94 »	»	= 27·87
»	61	2·93° »	34·91 »	»	= 27·84
»	62	2·77° »	34·98 »	»	= 27·91

At Stat. 6 from 1913 the following observations were made at 3000 meters: 2·83° C, 34·97 ‰, $\sigma_t = 27·90$.

Most of the salinities observed at these great depths are somewhat higher than might be expected as the deep-water of the North Atlantic with temperatures below 3° C generally has salinities about 34·90 ‰. It is a feature which has been pointed out by several authors that in the eastern part of the North-Atlantic the deep-water has a somewhat higher salinity than in the western part. This is obviously due to a slight admixture of "Mediterranean water".

VII. **Current Measurements.**

Observations from Anchored Boat on the Rockall Bank.

During the cruise in 1913 some current measurements were made at Stat. 2 A on the Rockall Bank, where the depth to the bottom was 320 meters (cf. p. 22). The life-boat was tightly anchored for and aft by means of steel wires and heavy grapnels. Two Ekman current-meters were used, one constantly at 2 meters below the surface and the other one at various depths down to 200 meters. The observations commenced at about 8 p.m. (20^h) on July 7th when the sea was smooth, only a light breeze (3—4 meters per second) blowing from WSW. During the following hours the wind increased to a strong breeze and the sea became so rough that the observations had to be given up at about 3 o'clock in the morning.

The observations are demonstrated graphically in Fig. 17 where the time is laid off along the abscissa. The lower series of figures (20—3) gives ordinary hours (Greenwich Mean Time) while the upper series (4—10) gives lunar hours. It may be noted that it was three days after new moon. The velocities observed (in cm.s per second) are given in Fig. 17 *A*, and the true directions (towards which the current flowed) in Fig. 17 *B*; velocities and directions are laid off along the ordinates. Curves are only drawn for the observations made with the same current-meter at 2 meters; the observations at other levels are too few to permit of drawing trustworthy curves.

The curves for 2 meters in Fig. 17 show great variations. The direction of the current has on the whole changed very regularly during the time of observation, the angular variation being 170° in 6 lunar hours (from 4 to 10^h) which is very nearly what we should expect if an ordinary rotatory tidal current was predominating. Apart from the secondary variations, the velocity-curve, Fig. 17 A, also shows the type of such a tidal current, the chief maxima of velocity occurring with an interval of about 6 lunar hours. The fact that the last maximum, from 8 to 10 lunar hours, is much more

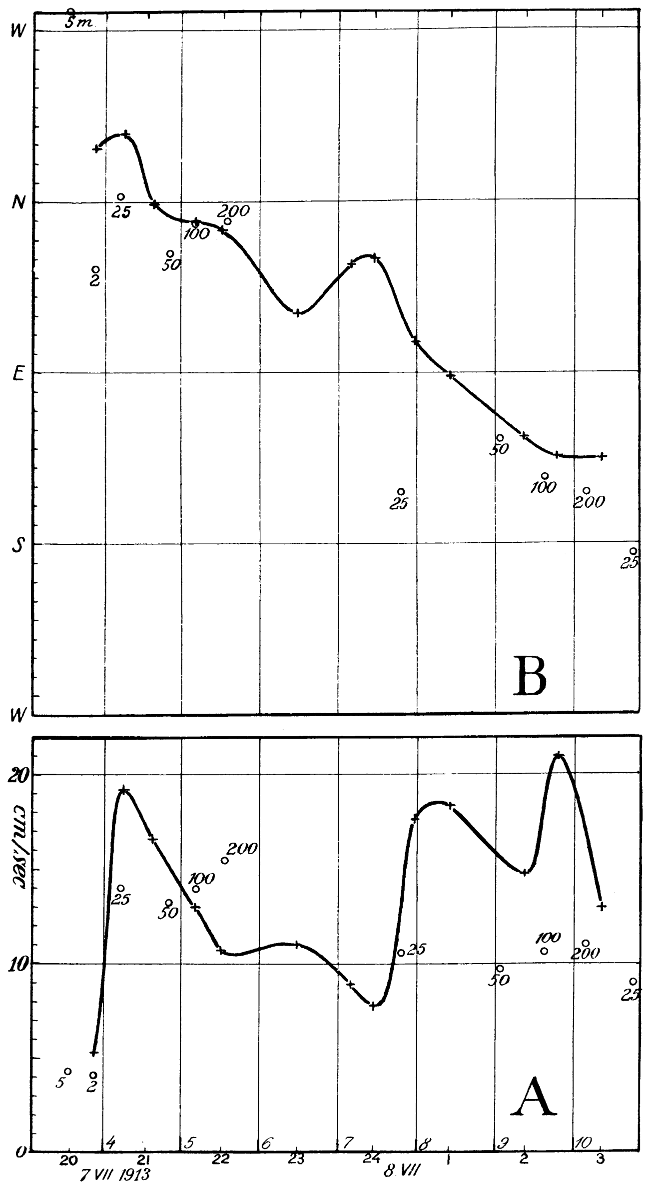

Fig. 17. Current-measurements at Stat. 2, July 7—8th, 1913. *A* gives the velocities in cm. per second (scale to the left) observed at 2, 5, 25, 50, 100 and 200 meters. The time is laid off along the abscissa. The curve indicates the velocities at 2 meters. *B* gives the true direction of the current observed at the different depths. The curve indicates the directions at 2 meters.

developed than the first one, is probably due to the additional effect of the stronger wind during this time. The secondary variations are considerable; they may seem to indicate a certain periodicity, but may also have been caused by casual influences of wind and waves.

By means of the curves in Fig. 17 we have interpolated the values of velocity and direction at 2 meters for every lunar hour from 4 to 10 inclusive. Using the values thus found we have constructed the progressive vector-diagram given in Fig. 18. This shows the general appearance of such a curve for half a semi-diurnal period of a rotatory tidal current. It is an interesting fact, however, that the current rotated *cum sole*. If we assume that the predominating tidal wave in this region proceeds northwards the tidal current might have been expected to rotate *contra solem*, according to the rule generally adopted, as the nearest coast is on the right hand side of the direction of the wave. This rule, however, has no general validity for the open sea where a rotation may be created by the interference of two or more waves with different directions, the direction of rotation in such cases depending on the phase-difference of the waves. We have not sufficient observations for a detailed analysis of these questions.

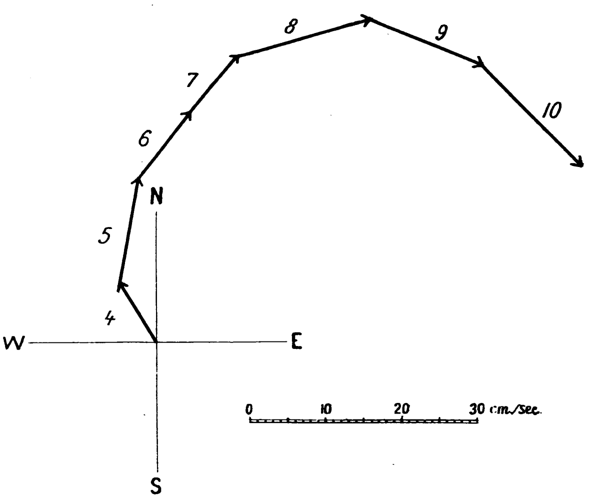

Fig. 18. Progressive Vector-diagram of the Current at 2 Meters, at Stat. 2, 1913, during 6 lunar hours (4—10).

The diagram shows strikingly the difference between the average velocities of the current during the last hours of observation and the average velocities during the first hours. As was mentioned above, this difference is obviously due to the effect of the increasing wind from WSW, creating an increasing movement of the uppermost water-strata towards E and ESE, the deflection caused by the rotation of the Earth being taken into account.

At 25 meters three measurements were made, at 50, 100, and 200 meters only two at each level. The values given by these measurements are plotted out in Fig. 17. At all four levels the direction of the current varies *cum sole* in a similar manner as at 2 meters. The velocities observed at 25 to 200 meters indicate at all levels a decrease from the beginning of the period of observation towards its end. As we have no measurements from the middle of this period we cannot decide whether the decrease has been continuous or whether there has been a minimum in between at the different levels, as might be expected if there has been a marked semi-diurnal period. But at any rate the possible second maximum has not been developed to a similar extent as was the case at 2 meters where we suppose the increased wind to have had an additional effect, which has hardly been of much consequence at 25 meters or deeper during the period of the observations. Neither the simultaneous directions nor the simultaneous velocities seem to have differed much at the various levels between 25 and 200 meters, which indicates that there has been a fairly uniform tidal current at these depths. Our very limited number of observations may indicate some divergence from this uniformity. The current especially at 25 meters, and to a less degree at 50 meters, seems to have been directed to the right of the current at 2 meters, while at 100 and 200 meters it seems to have had a direction more similar to that of the latter. The velocities observed at 25 and 50 meters seem to have been smaller than the probable simultaneous velocities at 2 meters, while the velocities observed at 100 and 200 meters were greater than the latter in the first part of the period of observations and smaller in the last part. Our observations may also indicate that there has been some increase of the velocities from 50 meters downwards to 200 meters.

Observations from Drifting Vessel off the Coast of Portugal.

At Stat. 23 (June 13th, 1914) we made some experiments in measuring the currents from the vessel adrift, as was mentioned above (pp. 17—18). Before the experiments we sounded 2500 meters. We had as many as four Ekman's current meters at work

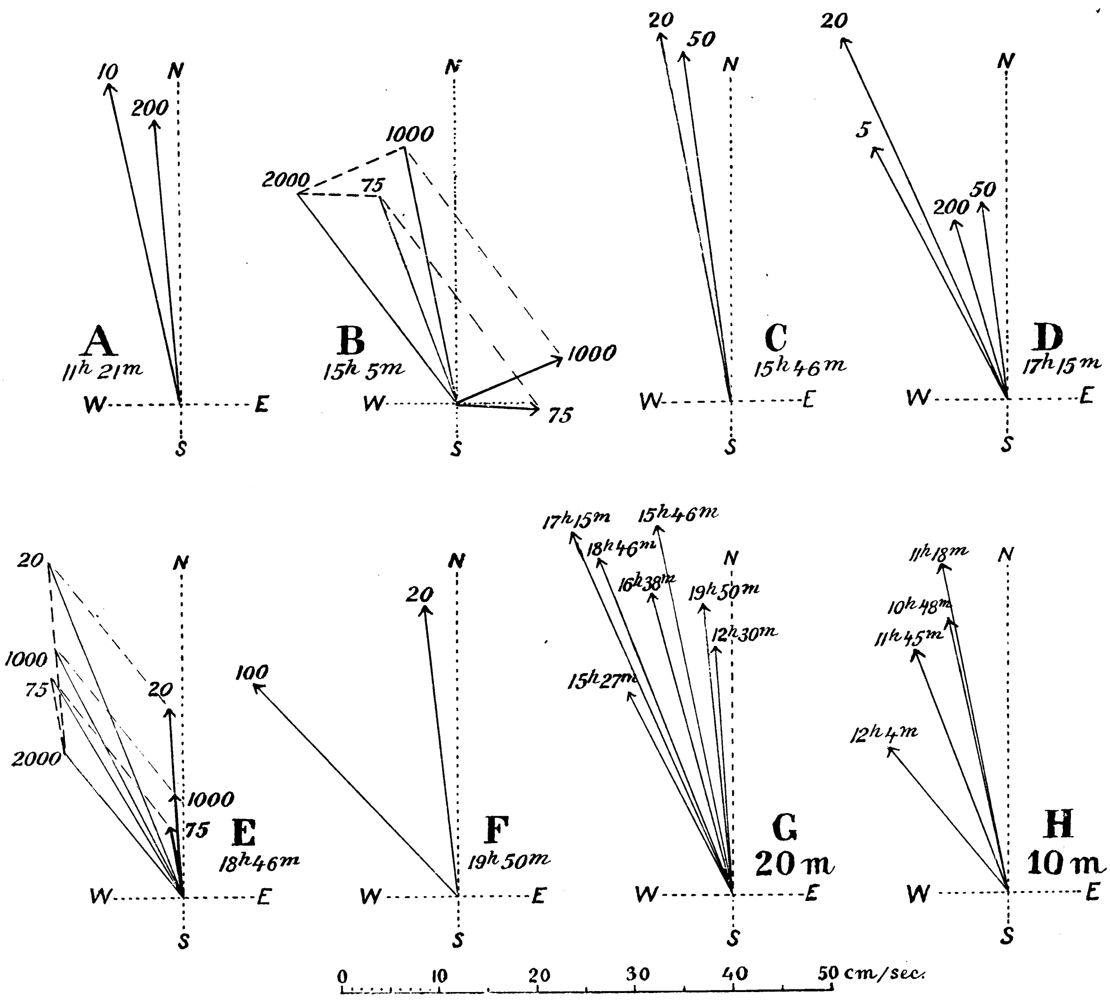

Fig. 19. Current-measurements at Stat. 23, June 13th, 1914.

simultaneously. Observations were made at 5, 10, 20, 50, 75, 100, 200, 1000 and 2000 meters below the surface. It will be seen from Table III, hat the directions observed in all cases were between N and NW (*i. e.* the direction in which the observed motion goes). The velocities varied between 19 and 41 cms. per second. A sometimes fairly fresh wind from the north was blowing, and the vessel drifted southwards.

Two current measurements were made at 2000 meters below the surface. At 15^h 5^m the measurement showed an apparent current of 27 cms. per second towards N 36° W, and at 18^h 46^m 19 cms. per second towards N 38° W. On the assumption that the water at 2000 meters was at rest, these measurements would give the drift of the vessel in the opposite direction, *i. e.* towards about S 37° E. The question then is, whether the motion of the water at 2000 meters may be neglected. At the times of observation the level of 2000 meters was in all probability considerably less than 500 meters distant from the bottom. We have already come to the conclusion that the horizontal movements of the water at 2000 meters must have been quite insignificant (see pp. 38 f.).

No doubt the densities in the layers below 800 meters are higher at Stat. 23 than at the neighbouring Station 22, which might suggest a current with a component towards south-west, but the charts of temperature and salinity (Pl. 52) and of salinity-anomaly (Pl. 59) at 2000 meters indicate a slow movement of water with comparatively high salinities along the banks northwards. It has been pointed out above that the high salinities at these depths are due to an admixture of "Mediterranean water" from above. The comparatively high densities in the deeper layers at Stat. 23 may be explained by a very slow sinking of this heavy "Mediterranean water" down the bottom slope.

If any noteworthy current in a southerly direction occurs at 2000 meters, this means that the drift of the vessel has been still faster than we found by means of the current measurements at 2000 meters, taking the real motion at that depth as equal to zero. If the water moves northwards at 2000 meters it means that the drift of the vessel has been correspondingly less.

In Fig. 19 *A—F* we have illustrated the various cases of simultaneous current measurements, made at $11^h\ 21^m$, $15^h\ 5^m$, etc. In Fig. 19 *G* and Fig. 19 *H* we have joined the different observations at 20 meters and 10 meters, the depths at which most of the observations were made. It shows how strikingly small are the variations of the relative movements measured at these depths, alike in direction and velocity.

Fig. 19 *B* and *E* show the observed values at the times when observations were made at 2000 meters. If the values found at 2000 meters represent the real drift of the vessel, we shall get vectors representing the real movements at the other levels by drawing lines from the head of the arrow for 2000 meters to the heads of the other arrows, as shown by broken lines in Fig. 19 *B* and *E*. In this way we obtain the following values for $15^h\ 5^m$:

At	75	meters	9	cms.	per	second,	direction	N 93° E
»	1000	»	12	»	»	» ,	»	N 67° E

and for $18^h\ 46^m$:

At	20	meters	19	cms.	per	second,	direction	N 4° W
»	75	»	7	»	»	» ,	»	N 10° W
»	1000	»	11	»	»	» ,	»	N 4° W

At 75 meters, as well as at 1000 meters, the current would accordingly have gone eastwards in the first case and northwards in the second. Such a variation in direction might indicate a rotatory tidal current at these levels. The variation in direction is in correspondence with the general rule, assuming that the tidal wave proceeds northwards, as the direction of the tidal current would then alter *contra solem*, the nearest land being on the right hand side. The magnitude of the variation in direction, during the time ($3^h\ 41^m$) that elapsed from the first series of observation to the next, seems also to be very much what we should expect. The observations were made on the fifth day after full moon.

If the above conclusions are correct they imply, however, that the tidal currents of the rotatory type at this place were chiefly limited to the upper water-strata and must have been relatively insignificant at 2000 meters. Our measurements at 20 meters at seven different hours, between $12^h\ 30^m$ and $19^h\ 50^m$ (June 13th, 1914), illustrated in Fig. 19 *G* may indicate that the velocities of the rotatory tidal current have been smaller than the velocity of the permanent current, so that the direction of the resulting movement of the water has not been subject to very considerable variations, *i. e.* the stream-lines may have been of a trochoidal character. Unfortunately our number of simultaneous measurements is not sufficient to enable us to go more into detail. If we had had a continuous series of measurements at 2000 meters, as for instance might have been possible with the repeating current-meter recently constructed by Walfrid Ekman, we would probably have been able to settle the problems discussed above.

It is worthy of note that according to the results of our simultaneous measurements at $18^h\ 46^m$ the velocity northwards would be less at 75 meters than at 20 meters and 1000 meters. The velocities would, in other words, decrease from 20 meters and some way downwards, and then increase again towards greater depths. This corresponds to the vertical distribution of density at Stats. 22 and 23 (Sect. X B, Pl. 17). If the water between these two stations moved on the whole in a northerly direction, as indicated by the current-measurements at Stat. 23, the current would have a component directed north-eastwards at right angle to the section through the stations. If the velocities of this current decreased downwards between 20 and 75 meters, as shown by the measurements, the corresponding water-strata would have higher densities on the left hand side of the current, at Stat. 22, than on its right hand side, at Stat. 23, just as we have found (see Sect. X B, Pl. 17). If at greater depths the velocities increase downwards towards 1000 meters, the densities of the corresponding water-strata should be higher at Stat. 23 than at Stat. 22 as the observations show.

These conditions corroborate the correctness of our supposition that the current at 2000 meters was so insignificant that it may be disregarded for the purpose of our computations of the currents at higher levels.

The direction of the ship's drift, towards S 37° E, may seem surprising, as the direction of the wind was N 5—10° W (*i. e.* towards S 5—10° E). The direction of the ship's drift was thus about 30° to the left of the wind. This may, however, be explained if we note the bearing of the ship, which was N 10—30° E. If the ship had moved freely it would have had a position transversely to the wind, and would have drifted away from it. As the line with the drift anchors was put out on the port bow, the bow was kept against the wind so that the ship took up a position obliquely to the wind. Owing to its action upon the hull the wind forced the ship ahead, that is to say in an easterly direction. This state of things might easily result in a drift in the direction indicated by our measurements.

The general result of all our measurements from Stat. 23 seems to be that the water-masses at depths between 5 meters and 1000 meters mainly moved in a northerly or north-easterly direction, which was modified by rotatory tidal currents.

Literature.

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Explanation of Tables.

Table I

gives the *Surface-Observations.* During the cruises in 1913 and 1914, the hour for taking the surface-observations was fixed according to the ship's time, which seldom differed as much as half an hour from the local mean time. In 1922 all hours were recorded in Greenwich Mean Time (G. M. T.). — The hours are everywhere given from 0 to 24 (from midnight to midnight).

Table II

gives the *vertical series from the stations.* The Table includes direct observations, interpolated values, and the results of dynamic calculations.

1. column, *G. M. T.:* Hours and minutes when the observations were taken, in Greenwich Mean Time. The time recorded at any certain depth is valid also for the subsequent depths until a new time is recorded.
2. column, *a:* The argument, *a*, has a different meaning in different parts of the Table. It gives the depth in meters for the observations recorded in the following five colums (3 to 7, incl.). The argument means dynamic depth (in dynamic meters) for the computed values given in columns 8 and 9; and it means pressure (in decibars) for the data in columns 10 and 11. The brackets with no figure affixed indicate that the values of t, S, and σ_t have been interpolated, and not observed. The figure *1* outside a bracket indicates that the temperature recorded in column 3 has been observed and the salinity (column 4) found by interpolation, while the figure *2* indicates that the salinity has been found by observation and the temperature by interpolation.
3. column, $t^\circ C$: The corrected temperature in centigrade.
4. column, S ‰: The salinity *per mille.*
5. column, σ_t: The usual indication of density, disregarding compression.
6. column, O_2: The amount of oxygen, recorded in cubic centimeters per liter of sea-water.
7. column, p_H: The hydrogen ion concentration, expressed by means of the exponent, *i. e.* the logarithm of the reciprocal value of the concentration itself.
8. column, $\sigma_{t,P}$: The abbreviated statement of density *in situ* at a depth of *a* dynamic meters, including the effect of compression. The values of t, S, and σ_t recorded for *a* meters have been used without reduction as valid also for *a* dyn. meters (and the same holds good of the values given in the following column).
9. column, $10^4 \Delta P$: The pressure reckoned from the sea-surface to the level of *a* dyn. meters, expressed as the difference (in ten-thousandth parts of a decibar) between the pressure which would have been found if the sea-water had everywhere had a temperature of 0° C and a salinity of 35·00 ‰, and the pressure which is really exerted owing to the actual conditions prevailing in the water-layers at the station in question. The pressure exerted by water of 0° C and 35 ‰ from the sea-surface to the standard levels is tabulated below.
10. column, $10^5 \Delta \alpha$: The specific volume (taking into account compression) at the isobaric surface of *a* decibars, expressed in 10^{-5} units as the difference between the actual specific volume *in situ*, and the value which would have been found if the water had had a temperature of 0° C and a salinity of 35·00 ‰. The latter value is tabulated below. The values of t, S, and σ_t recorded for *a* meters have been used without reduction as valid also for the depth where the pressure is *a* decibars.
11. column, $10^4 \Delta D$: The dynamic depth from the sea-surface to the isobaric surface of *a* decibars, expressed as the difference (in ten-thousandth parts of a dynamic meter) between the real dynamic depth in the actual conditions found in the water-layers, and the dynamic depth which would have been found in water of 0° C and 35·00 ‰. The latter value is tabulated below.

Table showing the Values of Pressure (P'), Specific Volume (α') and Dynamic Depth (D') in Water of a Uniform Temperature of 0° C and a Uniform Salinity of 35·00 ‰.

a	a = dynamic meters	a = decibars		a	a = dynamic meters	a = decibars	
	$10^4 P'$	$10^5 \alpha'$	$10^4 D'$		$10^4 P'$	$10^5 \alpha'$	$10^4 D'$
0	0	97 264	0	700	7 208 914	96 951	6 797 489
10	102 815	260	97 262	800	8 240 709	907	7 766 779
25	257 048	253	243 147	900	9 272 989	863	8 735 629
50	514 126	242	486 266	1 000	10 305 749	819	9 704 039
75	771 236	230	729 356	1 200	12 372 719	732	11 639 549
100	1 028 376	219	972 417	1 400	14 441 619	645	13 573 319
150	1 542 749	197	1 458 457	1 600	16 512 429	559	15 505 359
200	2 057 244	174	1 944 384	1 800	18 585 139	473	17 435 679
300	3 086 599	129	2 915 899	2 000	20 659 749	388	19 364 289
400	4 116 444	084	3 886 964	2 500	25 854 524	177	24 178 414
500	5 146 779	040	4 857 584	3 000	31 061 024	95 970	28 982 089
600	6 177 604	96 995	5 827 759	3 500	36 279 149	766	33 775 489

The above values of $10^4 P'$ and $10^4 D'$ are computed by means of Hesselberg and Sverdrup's Tables [1915] in the same manner as the observations from the stations, Table II. They differ slightly from the values tabulated by Bjerknes [1910], the difference being due chiefly to the fact that the numerical integration has not been performed for the same intervals of the argument a. The differences $10^4 \Delta P$ and $10^4 \Delta D$ given in Table II (columns 9 and 11) are, however, on the whole independent of the choice of the basic tables.

Table III

gives the results of the *current-observations* with the Ekman Current-Meter (cf. Chapt. VIII). The following data are recorded in the Table:

The mean hour of the observations (in Greenwich Mean Time). To the hour when the propeller was actually released is added a number of minutes corresponding to half the duration of the registration. At stat. 23, 1914, several current-meters were sometimes worked absolutely simultaneously, the hour when the messengers were let down being regulated according to the time required by a messenger to reach an instrument.

The depth of the observations, in meters.

The instrument used.

The velocity registered, in centimeters per second.

The mean direction (true) of the apparent current.

The distribution of the single shots in the compass-box (the magnetic direction towards which the apparent current moved).

Table I.

Surface-Observations.

Date	Hour Ship's Time	Lat. N	Long. W	t°C	S ‰	Date	Hour Ship's Time	Lat. N	Long. W	t°C	S ‰	Date	Hour Ship's Time	Lat N	Long. W	t°C	S ‰
July	**1913**					*July 1913*						*July 1913*					
3	18			11·0	34·40	11	18			12·7	35·25	19	6			10·9	34·97
	20	58°16′	6° 0′	·0	·66		20	54°38′	19°42′	·7	·25		8	55°19′	29°20′	11·0	·92
	22			·4	·98		22			·6	·28		10			10·5	·92
	24	30	0	·7	35·16		24	40	56	·6	·33		12	28	41	·7	·98
4	2	37	0	·2	34·88	12	2	37	57	·4	·22		14			·9	·52
	4	39	7	·2	·88		4	30	20 0	·5	·16		16	37	30 11	11·0	35·00
	6	38	22	·1	35·24		6			·2	·16		18			10·8	34·87
	8			·7	·25		8	27	18	·4	·22		20	45	34	·7	·82
	10			·5	·18		12	24	38	·4	·19		22			·6	·94
	12	38	7 3	·4	·00		14			·3	·21		24	49	49	·5	·87
	14			·9	·01		16	9	58	·1	·17	20	2			11·0	·80
	16	23	22	·9	·10		20	0	21 10	·1	·18		4	51	54	10·9	·85
	18	15	21	·3	·18		24	1	21	·2	·24		6			·4	·96
	20	11	30	·4	·13	13	2			·2	·24		8	55	31 7	·4	·95
	22			·4	·15		4	3	54	13·0	·35		20	55	7	·1	
	24	5	47	·6	·20		6			12·6	·32		22			·4	·93
5	2			·2	·30		8	5	22 38	·9	·34		24	56 2	30 41	·5	35·02
	4			12·4	·23		10	6	55	·8	·26	21	2	5	31	·0	·03
	6			11·8	34·89		24	6	23 5	·8	·31		4			9·9	34·97
	8	57 33	8 28	12·3	35·16	14	2			·9	·35		6			10.0	·99
	16	31	34	·4	·31		4	5	37	·3	·15		8	5	30	·0	·97
	18			·2	·30		6			·0	·15		10			·0	·97
	20	26	9 7	·1	·35		8	3	24 16	·1	·05		12	9	21	·2	·97
	22			·0	·36		10	2	33	·6	·06		16	19	29 54	·4	35·01
	24	17	49	·0	·32		18	3	48	·4	·13		18			·5	·03
6	2			·2	·37		20	4	25 12	·0	·08		22			·4	34·96
	4	9	10 34	11·6	·35		22			·3	·16		24	48	28 38	·2	35·01
	6			·7	·32		24	6	51	·4	·19	22	6			·2	·02
	8	1	11 18	·9	·34	15	2			·1			8	57 5	27 53	·4	·07
	10			12·1	·37		4	7	26 18	11·4	·06		14	8	46	11·1	·13
	12	56 50	12 16	·1	·40		6			·2	·05		16	12	36	·1	·16
	14			·3	·41		8	7	20	·1			18			10·6	·02
	16			·8	·38		12	7	20	10·9	·19		20	22	8	·7	·07
	18			·2	·32	16	2			·8	·22		22			·4	·02
	20	41	13 30	·3	·37		4			·7	·22		24	31	26 41	·7	·17
	22			11·8	·32		6			·7	·21	23	2			·7	·14
	24			·9	·28		8	5	10	·7	·14		4	41	18	·3	·07
7	2			·8	·33		12	5	8	11·9	·14		6			·5	·07
	4	55	14 47	12·0	·29		14			10·3	·15		8	49	25 53	11·1	·16
8	16	54	15 13	·5	·27		16	8	30	12·1	·13		10	54	42	10·7	·14
	18			11·6	·27		18			10·9	·21		14	58 8	12	·7	
	20	40	37	·7	·27		20	27	36	·9	·22		16	18	24 49	11·0	·11
	24	37	55	·6	·30		22			·9	·25	24	6	59 4	22 56	10·9	·16
9	2			·6	·31		24	37	40	·8	·25		8	8	41	·9	·18
	4	32	16 21	·6	·29	17	4	45	47	·8	·28		16	26	21 12	11·3	·23
	6			·6	·31		6			·9	·29		18	28	20 56	·1	·23
	8	28	37	·7	·31		8	49	57	11·7	·26		24	30	40	·3	
	10			·8	·31		14	49	27 15	12·0	34·96	25	2			·6	·26
	12	24	17 1	·9	·31		16	50	30	11·6	35·00		4			·7	·25
	18	8	22	·8	·31		18			·6	·07		8	42	39	·2	·28
	20	2	26	·7	·33		20	51	28 0	10·9	34·98		16	42	27	·2	·18
	24	55 42	47	·8	·34		24	51	15	11·0			18			10·9	·20
10	2			12·0	·33	18	2			·1	·86		20	44	19 53	·8	·20
	4	27	18 1	·1	·30		4			·1			22			11·2	·21
	6			·2	·37		6	51	15	·0			24	46	22	·1	·20
	8	12	16	·0	·34		16	57	29	·5	·97	26	2			·1	·21
	10			·1	·36		18			·3	·97		4	47	18 53	·2	·24
	12	54 52	38	·1	·34		20	55 5	47	·1	·97		6			·3	·19
	22	44	38	·1	·36		22			·2	35·01		8	50	9	·4	·20
	24	44	39	·2	·37		24	11	29 1	·4	·02		10	51	17 39	·6	·21
11	4	43	41	·0	·23	19	2			10·4	34·96		14	46	1	·8	·24
	16	38	19 24	·6	·28		4	17	16	11·0	·96		18	34	16 28	12·2	·31

Table I. (Continued).

Date	Hour Ship's Time	Lat. N	Long. W	t°C	S ‰
July 1913					
26	20	59°28′	16°13′	12·1	35·26
	22			·1	·27
	24	12	15 34	·1	·24
27	2			·1	·26
	4	58 55	14 53	·2	·26
	6			·2	·26
	8	37	8	·7	·21
	10			·6	·24
	12	20	13 26	·5	·28
	16	14	12 41	13·2	·20
	18			·3	·31
	24	5	11 34	·2	·34
28	2			·3	·29
	4	4	2	·2	·28
	6			·2	
	8			·2	·28
	12	0	0	·2	·27
	18	57 59	10 53	·3	·27
	20	57	37	·4	·35
	22			·3	·32
	24	53	12	·2	·28
29	2			·2	·27
	4	50	9 48	·4	·31
	6			·4	·31
	8	47	28	·5	·31
	10	46	20	·6	·35
	14	44	0	14·0	·20
	20	46	8 27	13·3	34·47
	22	47	25	·3	·34
	24	52	11	·4	·39
30	2	58 3	7 53	·1	·67
	4	13	35	·3	·44
	6	20	31	·1	·69
	8	22	18	·2	·65
	16	21	6 9	·9	·88
June **1914**					
5	2	48°20′	8°56′	13·2	35·58
	4	10	9 15	·8	·59
	6	1	35	·4	·57
	14	47 45	10 13	14·3	·66
	16	39	29	·2	·62
	22	30	56	·2	·63
	24	26	11 6	·2	·64
6	2	23	16	·2	·57
	4	19	29	·2	·57
	8	13	44	·3	·59
	10	5	59	·3	·70
	12	46 58	12 13	·2	·58
	24	50	29	·1	·60
7	2	43	43	·1	·62
	4	37	54	·0	·61
	6	30	13 6	·0	·61
	10	24	19	·4	·67
	20	45 55	14 13	·3	·62
	22	46	30	·1	·59
	24	38	48	·2	·60
8	2	30	15 4	·1	·61
	8	16	31	·0	·61
	10	7	46	·1	
	18	44 49	16 19	·5	·70
	20	41	33	·4	
	22	33	48	·3	·69
9	4	17	17 14	·5	·81
	6	9	28	·5	·77
	8	1	41	·5	·78

Date	Hour Ship's Time	Lat. N	Long. W	t°C	S ‰
June 1914					
9	12	43°56′	17°41′	14·8	35·76
	14	49	30	15·0	
	16	41	13	·0	
	18	32	16 58	·0	·85
	24	15	33	·0	·86
10	2	4	18	·0	
	4	42 53	4	·0	
	10	37	15 40	·3	·85
	12	29	27	·3	·88
	14	20	13	·8	·90
	16	12	0	·3	·83
	20	5	14 48	·0	·86
	22	41 59	36	·0	·71
	24	52	22	·0	
11	4	37	13 53	·5	·94
	13	17	12	·9	·91
	22	40 55	12 32	·9	·91
	24	52	26	·6	·90
12	2	47	19	·6	·68
	4	41	10	·6	·78
	8	35	0	·9	·85
	12	20	11 43	18·3	·99
	14	11	32	16·9	·89
	16	6	24	17·1	·95
	20	39 58	17	16·0	·90
	22	48	5	·2	·71
	24	39	10 55	·3	·71
13	2	30	44	·6	·76
	4	20	32	·5	·66
	24	9	14	·5	·60
14	2	1	9 58	·5	·48
	4	38 54	45	·2	·62
20	24	17	51	17·8	·98
21	4	2	10 13	18·0	·93
	8	37 57	20	·0	·92
	12	39	45	·1	·99
	16	28	11 2	·5	·92
	24	5	39	·8	36·38
22	4	36 52	12 4	·8	35·99
	16	22	13 5	·9	36·26
	20	14	16	·9	·38
	22	6	27	·7	·49
	24	35 57	39	·7	·10
23	4	40	14 3	·8	·30
	13	10	48	19·2	·51
	16	34 58	15 7	·2	·50
	24	33	40	·3	·59
24	4	16	16 2	·3	·59
	16	33 43	39	20·2	·61
	24	26	17 6	·0	·56
25	4	18	23	·1	·62
27	24	26	18 25	·0	·57
28	4	39	45	·0	·56
	10	33 49	19 4	·0	·64
	16	34 4	31	21·1	·58
	20	10	40	20·0	
	24	19	59	·0	·55
29	4	30	20 20	·0	·68
	12	45	45	·2	·48
	24	35 8	21 24	·0	·43
30	4	18	43	·0	·43
	8	22	52	·0	·40
	13	35	22 18	·3	·47

Date	Hour Ship's Time	Lat. N	Long. W	t°C	S ‰
June 1914					
30	16	35°41′	22°32′	20·2	36·48
	24	54	53	·2	·27
July 1914					
1	4	36 1′	23 6′	·1	·20
	8	6	11	·2	·24
	24	41	24 7	·3	·48
2	4	37 0	37	·3	·41
	13	21	25 6	21·2	·49
	16	29	16	·2	
	24	44	35	20·0	
6	16	38 32	40	21·0	
	20	44	39	·0	
	24	39 2	34	22·0	
7	4	24	27	21·2	
	8	33	24	20·3	
	12	58	17	·3	
	16	40 26	9	·1	
	20	49	2	·0	
	24	41 9	24 56	19·4	
8	4	24	51	·0	
	8	31	49	·3	
	20	42 30	38	18·0	
	24	45	33	·0	
9	4	43 4	26	·5	
	8	25	18	·8	
	13	37	13	·8	
	16	55	23 57	·9	
	20	44 21	33	·2	
	24	46	9	·0	
10	4	45 12	22 45	·0	
	8	37	25	17·5	
	20	46 19	21 53	·2	
	24	39	40	·0	
11	4	59	27	·0	
	8	47 21	13	·1	
	13	42	20 57	16·3	
	16	48 1	36	·1	
	20	23	13	·1	
	24	42	19 53	·0	
12	4	49 4	30	15·8	
	8	31	1	·8	
	12	45	18 56	16·1	
	16	50 6	50	15·3	
	20	18	47	·3	
	24	27	45	·1	
13	4	37	42	14·8	
	8	54	37	15·1	
	20	51 42	17 53	13·8	
	24	59	34	·8	
14	4	52 13	17	14·1	
	8	36	16 52	13·2	
	16	53 7	23	·6	
	20	33	1	·6	
15	4	54 27	15 18	·6	
	12	55 23	14 32	·3	
	16	44	15	14·0	
	20	56 3	0	13·3	
16	8	33	12 54	·0	
	12	34	37	·2	
	20	39	11 32	·2	
	24	41	14	·1	
17	8	44	10 24	14·0	
	16	47	9 28	15·0	
	20	49	7	14·8	

Table I. (Continued.)

Time G. M. T.	Lat. N	Long. W	t°C	S 0/00
May 8		**1922**		
h m				
15 35	49° 58′	3° 50′	14·70	35·48
20 15	46	4 1	13·87	·40
21 5	42	5	·25	
22 0	38	9	·02	·42
23 0	35	13	12·36	
24 0	31	18	·12	·40
May 9				
1 0	27	28	11·98	
2 0	23	38	·57	·28
3 0	19	48	·90	
4 0	15	57	12·20	·43
5 0	11	5 6	·20	
6 0	7	15	11·28	·41
7 0	3	25	10·80	
8 0	0	35	11·22	·42
9 0	48 56	39	12·86	
10 0	52	43	·79	·44
11 0	48	48	13·25	
12 0	43	53	·16	·48
13 0	39	58	·98	
15 10	35	6 2	14·44	·44
16 0	33	4	15·96	
17 0	29	8	·54	
18 0	25	12	14·66	·49
19 0	21	17	·44	
20 0	17	21	13·79	·60
21 0	13	26	·42	
22 0	9	30	·61	·53
23 0	5	35	12·92	
24 0	1	39	13·26	·53
May 10				
1 0	47 55	42	12·91	
2 0	51	44	·93	·54
3 0	47	46	13·10	
4 0	43	48	12·75	·49
5 0	39	50	·10	
6 0	34	53	11·85	·53
7 0	29	56	13·39	
8 0	24	59	·08	·54
9 10	21	7 3	·10	
10 10	19	6	·45	·54
11 0	16	9	·68	
13 30	16	9	14·02	·61
14 0	15	9	13·76	
15 0	15	9	·90	
16 0	9	13	14·12	·60
17 0	4	16	·44	
18 0	0	20	·31	·57
19 0	46 56	24	·15	
20 0	53	27	13·85	·56
21 0	49	31	·94	
22 0	45	36	·79	·57
23 0	41	41	·69	
24 0	37	46	·51	·57
May 11				
1 0	33	52	·31	
2 0	29	57	·34	·58
3 0	25	8 2	·60	
4 0	21	7	·67	·57
5 0	17	12	·69	
6 0	13	18	·80	·58
7 0	9	24	·80	
8 15	4	31	·79	·57
9 0	3	32	·60	
10 0	2	33	·77	·57

Time G. M. T.	Lat. N	Long. W	t°C	S 0/00
May 11, 1922				
h m				
11 10	46° 1′	8° 34′	14·17	
12 0	1	35	·29	35·58
13 0	1	35	·29	
14 0	1	35	·19	·60
15 50	0	36	13·96	·63
17 5	0	36	14·07	
18 0	45 56	37	·00	·61
19 0	52	37	13·60	
20 0	49	38	·70	·63
21 0	45	39	·60	
22 10	42	40	·65	·60
23 10	37	40	14·01	
24 0	33	40	·00	·60
May 12				
1 0	29	40	13·92	
2 0	25	40	·89	·58
3 0	21	40	·87	
4 0	17	40	·61	·58
5 0	13	40	·81	
6 0	10	40	·76	·60
7 0	7	41	·76	
8 0	3	42	·70	
9 10	44 58	46	14·10	
10 0	54	50	13·82	
11 0	50	54	·91	
12 0	45	59	·81	·53
13 0	40	9 3	·90	
14 0	35	8	14·30	·58
15 0	33	11	·48	
16 0	31	17	·61	·60
17 0	28	21	·49	
18 0	24	26	·05	·57
19 0	20	32	13·58	
20 0	16	38	·80	·53
21 0	12	44	·60	
22 0	8	51	·56	·57
23 0	3	58	·60	
24 0	43 58	10 5	·48	·59
May 13				
1 0	43 53	12	·73	
2 0	48	20	·61	35·66
3 0	41	20	14·04	
4 0	35	20	13·87	·69
5 0	28	21	·60	
6 0	21	21	·68	·69
7 0	14	22	·55	
8 0	7	22	·72	·65
9 0	42 59	23	·56	
10 0	53	23	·75	·60
11 0	47	24	·42	
12 0	42	24	·85	·66
13 0	35	25	·85	
14 0	29	25	14·35	·54
15 0	23	26	·00	
16 0	15	26	·25	·29
17 0	9	27	·35	
18 0	2	27	·21	·38
19 0	41 55	27	·35	
20 0	48	27	·40	·67
21 0	41	24	·30	
22 0	34	22	·10	
23 0	26	19	13·92	
24 0	18	16	14·20	·19
May 14				
1 0	10	14	·30	

Time G. M. T.	Lat. N	Long. W	t°C	S 0/00
May 14, 1922				
h m				
2 0	41° 2′	10° 12′	14·49	35·40
3 0	40 55	10	·70	
4 0	48	8	·40	36·07
5 0	41	6	·30	
6 0	34	3	·60	35·42
7 0	26	1	·50	
8 0	19	9 59	·60	·31
9 0	12	57	·74	
10 10	5	55	·96	·49
11 0	39 59	53	·87	
12 0	53	52	·86	·45
13 0	48	49	·89	
14 0	42	46	·89	·49
15 0	36	42	15·05	
16 0	30	39	14·46	
17 0	23	38	·67	
18 10	15	37	·84	·45
20 10	12	37	·70	·50
21 0	10	37	·98	
22 0	8	37	·91	·62
23 10	6	36	·90	
24 0	4	36	·68	·69
May 15				
1 0	1	35	·85	
2 0	38 57	35	·61	·55
3 0	52	34	·60	
4 0	48	34	·50	·66
5 0	45	34	13·40	
6 0	41	33	·10	·85
May 20				
12 30	River Tagus		22·10	22·70
13 30	—»—		19·74	26·30
14 00	38 40′	9 19	16·40	
16 15	32	19	·40	35·35
17 00	29	19	·20	
18 0	25	20	15·85	
19 30	20	20	·46	·48
21 20	19	22	·72	
22 0	18	24	·45	·50
23 0	17	26	·48	
24 0	16	28	·48	·55
May 21				
1 0	13	30	·41	
2 0	10	32	·42	·57
3 0	38 10	28	·40	
4 0	11	23	·20	·61
5 0	11	20	·22	
10 0	12	15	16·74	·90
11 0	14	12	·70	
12 0	16	8	·65	·84
13 5	18	5	19·00?	
14 20	20	2	17·02	·78
15 0	18	4	·13	
16 0	14	6	·70	
17 0	16	8	·54	
18 0	12	10	18·20	·80
19 20	9	12	16·92	·73
21 00	10	13	17·12	·59
22 0	6	19	·55	·76
23 0	2	24	16·71	
24 0	37 58	30	·70	·62
May 22				
1 0	55	34	·61	
2 0	53	37	·61	·87
3 0	50	41	·60	

Table I. (Continued.)

Time G. M. T.	Lat. N	Long. W	t°C	S ‰	Time G. M. T.	Lat. N	Long. W	t°C	S ‰	Time G. M. T.	Lat. N	Long. W	t°C	S ‰
May 22, 1922					*May 25, 1922*					*May 29, 1922*				
h m					h m					h m				
4 0	37° 48′	9° 44′	16·45	36·00	1 0	36° 12′	11° 16′	16·61		13 0	33° 42′	7° 35′	20·22	
5 0	48	44	·48		2 0	8	11	·42	36·13	14 0	45	32	·40	35·93
6 15	48	44	·43	35·96	3 0	4	6	17·20		18 0	43	33	19·88	
7 00	47	44	·43		4 0	0	1	·10	·46	19 0	42	34	·72	
8 0	47	45	·48	·98	5 0	35 55	10 55	·20		20 0	42	35	·68	36·01
9 10	47	45	·44		6 0	51	49	·20	·43	21 0	42	36	·38	
12 10	46	45	·55	36·03	7 0	46	43	·25		22 0	42	37	·46	·08
13 10	46	45	·55		8 0	41	38	·28		23 0	42	39	·43	
14 20	46	45	·63	·01	9 0	38	34	·43		24 0	42	40	·56	·06
15 15	45	45	·70	·06	10 10	38	34	·45	·38	*May 30*				
16 00	46	46	·66	·05	11 0	37	30	·30		1 0	42	41	·38	
17 0	43	50	·55		12 0	33	22	·43	·32	2 0	42	43	·21	·10
18 0	40	54	·58	·03	13 0	30	17	·45		3 0	43	45	·30	
19 0	37	59	·78		14 0	28	12	·58	·36	4 0	43	47	·20	·12
20 0	37	59	·90		15 0	24	8	·45		5 0	43	49	·10	
21 0	37	59	17·03		16 0	21	5	·55	·40	6 0	44	51	·04	·17
22 0	36	10 0	·03	·28	17 0	17	2	·49		7 0	44	55	·15	
23 0	36	0	·08		18 0	14	9 59	·52	·37	8 0	45	8 0	·32	·12
24 0	36	1	·08	·30	19 0	13	58	·49	·38	9 0	47	7 57	·58	·07
May 23					20 0	12	57	·48	·38	11 15	49	53	·50	
1 0	36	1	·09		21 0	8	52	·37		12 0	52	49	·34	·21
2 0	35	2	·07	·28	22 0	5	48	·24	·27	13 0	51	53	·28	
3 0	35	2	·03		23 0	3	44	·48		14 0	50	57	·48	·21
4 0	35	3	·00	·30	24 0	1	41	·30	·37	16 20	48	8 5	·55	·21
5 0	34	4	·00		*May 26*					17 0	47	10	·65	
6 0	34	4	·03	·30	1 0	34 58	40	·41		18 0	47	15	·60	·17
7 0	34	5	·10		2 0	56	39	·42	·35	19 15	46	20	·38	
8 0	34	6	·20	·32	3 0	53	37	·55		20 0	46	20	·35	·19
9 10	32	13	·17		4 0	51	36	·60	·37	21 0	45	24	·49	
10 0	30	20	·10	·12	5 0	49	35	·75		22 0	43	29	·28	·25
11 0	28	27	16·83		6 0	47	34	·90	·37	23 0	42	34	·14	
12 0	27	30	17·06	·07	7 0	45	33	18·00		24 0	40	39	·30	·34
13 0	28	30	·00		8 0	43	32	·50	·37	*May 31*				
14 0	30	30	·00	·05	9 0	42	31	·40		1 0	38	34	·45	
15 0	31	31	16·80		10 15	41	30	·89	·44	2 0	37	42	·02	·27
16 0	32	31	·84	·01	11 5	41	29	·68		3 0	36	49	·05	
18 0	33	32	·85	·00	12 0	41	28	·74	·38	4 0	35	57	·10	·27
20 50	34	32	·49	35·99	13 0	40	26	·65		5 0	34	9 4	·29	
22 00	31	36	·42	·95	14 0	39	23	·69	·43	6 0	33	11	·20	·32
23 0	27	40	·51		15 0	38	20	·72		7 0	32	18	·28	
24 0	24	43	·61	·84	16 0	37	17	·65	·44	8 0	30	18	·37	·30
May 24					17 0	37	15	·70		9 0	28	17	·28	
1 0	20	47	·62		18 0	37	15	·59	·38	10 0	26	17	·29	·34
2 0	16	53	·61	·90	19 0	37	15	·56		11 0	24	14	·60	
3 0	13	58	·55		20 0	35	12	·58	·36	12 0	22	12	20·00	·32
4 0	9	11 2	·50		21 0	33	9	·62		13 0	22	12	19·92	
5 0	5	8	·60		22 0	30	5	·58	·39	14 0	22	12	20·00	
6 0	2	14	·48		23 0	27	2	·52		15 0	21	18	·02	
7 0	36 58	19	·60		24 0	24	8 58	·38		16 0	20	24	·01	·30
8 0	53	24	·55		*May 27*					18 0	18	29	·00	·30
9 0	47	30	·79		1 0	21	53	·40		19 0	17	29	19·90	
10 0	41	32	·70	36·07	2 0	18	47	·58	·44	20 0	16	30	·62	·37
11 0	35	32	·35		3 0	15	41	·70		21 0	15	30	·60	
12 0	29	33	17·14	·27	4 0	11	34	·80	·34	22 0	16	28	·60	·34
13 0	30	34	·18		5 0	7	27	·80		23 0	17	26	·42	
14 0	30	35	16·55	·16	6 0	3	20	·90	·32	24 0	18	24	·40	·31
15 0	30	37	·69		7 0	0	14	·95		*June 1*				
16 0	30	38	·30	·12	8 0	33 56	7	·70		1 0	19	21	·41	
17 0	30	40	·68		9 10	52	0	·38		2 0	20	18	·58	·25
18 0	30	41	·25	·11	10 0	49	7 54	19·10	·00	3 0	21	15	·65	
19 15	29	42	·28	·10	11 0	45	48	·09		4 0	22	13	·34	·29
20 0	29	42	·30	·10	12 10	41	41	·13	·00	5 0	23	11	·07	
21 15	28	40	·25		13 00	38	39	·06		6 0	24	9	·04	·28
22 0	24	34	·01	·10	*May 29*					7 0	24	7	18·98	
23 0	20	28	17·01		12 0	38	39	20·08		8 0	24	5	19·22	·26
24 0	16	22	16·65	·32										

Table I. (Continued.)

Time G. M. T.	Lat. N	Long. W	t°C	S ‰
June 1, 1922				
h m				
9 0	33° 24′	9° 2′	19·24	
10 0	22	0	·90	
12 0	21	3	·62	
13 0	21	3	·70	36·26
14 0	21	3	·59	·29
15 0	19	8	20·40	
16 0	17	14	·42	
17 0	15	20	·19	
18 0	14	26	·09	·30
19 0	12	32	19·81	
20 0	10	37	·69	·29
21 0	9	40	·65	
22 0	8	43	·75	·33
23 0	8	45	·52	
24 0	9	48	·81	·40
June 2				
1 0	9	54	·31	
2 0	10	10 0	·49	·44
3 0	11	6	·52	
4 0	11	11	·20	·44
5 0	12	16	·12	
6 0	12	20	·10	·43
7 0	11	20	·13	
8 0	10	21	·15	·42
9 0	8	22	·12	
10 0	6	24	·04	·41
11 0	4	26	·00	
12 0	2	28	·10	·44
13 0	2	29	·04	
14 0	2	30	·03	·44
15 0	2	32	·12	
16 0	1	34	·08	·44
17 0	1	36	·08	
18 0	1	38	·20	
19 0	1	40	18·93	
20 0	2	42	·99	·44
21 0	2	45	·93	
22 0	3	48	·80	·44
23 0	4	51	·75	
24 0	5	54	·42	·46
June 3				
1 0	6	57	·70	
2 0	7	11 1	·62	·48
3 0	8	5	·84	
4 0	9	8	·80	·48
5 0	10	11	·90	
6 0	11	14	·86	·48
7 0	12	17	·88	
8 0	10	19	·91	·50
9 0	8	21	·88	·47
10 0	6	23	·82	·46
11 15	4	25	·85	
12 0	2	27	19·03	·46
13 0	2	30	18·82	
14 0	2	33	·82	·50
15 0	2	36	·92	
16 0	3	40	·88	·50
17 0	4	48	·92	
18 0	5	57	19·00	·48
19 0	7	12 5	18·95	
20 0	8	13	·73	·50
21 0	8	20	·92	
22 0	8	27	·47	·49
23 0	8	33	·36	
24 0	8	39	·29	·48

Time G. M. T.	Lat. N	Long. W	t°C	S ‰
June 4, 1922				
h m				
1 0	33° 8′	12° 45′	18·38	
2 0	8	51	·38	36·45
3 0	8	55	·51	
4 0	8	59	·38	·43
5 0	8	13 4	·49	
6 0	8	9	·50	·48
7 0	8	13	·19	
8 15	8	13	·28	·47
9 0	4	17	·21	
10 0	0	21	·48	·44
11 0	32 56	26	·78	
12 10	51	32	·69	·48
13 0	48	35	·70	
14 0	46	38	·69	·47
15 0	44	42	·81	
16 0	42	46	·88	·53
17 0	39	50	·80	
18 0	36	54	·65	·56
19 0	33	58	·68	
20 0	30	14 2	·68	·57
21 0	27	6	·59	
22 0	24	12	·12	·58
23 0	21	18	·00	
24 0	17	24	·11	·55
June 5				
1 0	13	30	·28	
2 0	9	35	·11	·59
3 0	6	39	·40	
4 0	2	44	·35	·56
5 0	31 59	49	·25	
6 0	56	53	·40	·51
7 0	56	53	·38	
8 0	56	53	·42	
9 0	56	53	·42	·59
10 0	55	55	·48	·53
11 0	55	57	·57	
12 0	54	59	·68	·59
13 0	54	15 0	·69	
14 0	53	3	·83	·54
15 0	52	6	·80	
16 0	52	10	·70	·53
17 0	53	14	19·00	
18 0	54	17	·00	·64
19 0	54	20	·00	
20 5	55	24	18·96	
21 0	55	27	·98	
22 0	54	33	·98	·61
23 0	54	39	·81	
24 0	53	46	·59	·61
June 6				
1 0	56	50	·99	
2 0	59	54	·82	·69
3 0	32 2	58	·82	
4 0	3	16 1	·83	·67
5 0	4	4	·90	
6 0	5	7	·95	·71
7 0	6	12	·71	
8 0	7	17	·76	·60
9 0	9	22	·86	
10 0	12	26	·89	·65
11 5	16	30	·60	
12 0	20	34	19·54	
13 0	24	38	18·85	·53
14 0	28	43	·94	·54

Time G. M. T.	Lat. N	Long. W	t°C	S ‰
June 8, 1922				
h m				
10 0	32° 38′	16° 55′	18·62	
12 0	37	55	19·70	
13 0	36	57	20·39	
14 0	35	59	·01	36·56
15 0	34	17 1	·00	
16 0	33	3	19·60	·56
17 0	33	3	·39	
18 0	33	3	·19	·56
19 0	32	4	18·99	
20 0	31	5	·96	·54
21 0	30	6	·92	
22 0	29	7	19·07	
23 0	28	9	18·95	
24 0	27	11	·60	·60
June 9				
1 0	27	12	·62	
2 0	26	13	·60	·68
3 0	26	14	·51	
4 0	25	16	·50	·69
5 0	25	17	·60	
6 0	24	19	·91	·62
7 0	24	20	19·02	
8 0	23	22	·00	·54
9 0	23	23	·00	
10 0	22	25	·12	
11 0	22	26	·20	
12 0	21	27	·52	
13 0	19	28	·57	
14 0	17	29	·20	
15 10	16	30	·62	
16 0	16	30	·53	
17 0	16	30	·56	
18 5	16	30	·50	·56
19 0	16	31	·46	
20 0	16	32	·50	·64
21 15	16	33	·50	
22 0	15	35	·35	·64
23 0	15	37	·23	
24 0	15	39	·24	·63
June 10				
1 0	15	41	·20	
2 0	14	42	·12	·60
3 0	13	44	·20	
4 0	12	47	·24	·54
5 0	11	50	·20	
6 0	10	53	·30	·58
7 0	12	56	·29	
8 0	14	59	·21	·55
9 0	16	18 3	·35	
10 0	19	7	·40	
11 0	21	12	·52	
12 0	23	17	·89	·64
13 15	27	18	·79	
14 15	31	19	·73	·64
15 0	35	20	·71	
16 0	39	21	·80	·62
17 0	43	22	·75	
18 0	47	23	·64	·63
19 0	48	23	·41	
19 55	48	23	·35	·57
21 0	50	27	·39	
22 0	52	32	·25	·56
23 0	55	37	·29	
24 0	58	43	·18	·53

Table I. (Continued.)

Time G. M. T.	Lat. N	Long. W	t°C	S ‰	Time G. M. T.	Lat. N	Long. W	t°C	S ‰	Time G. M. T.	Lat. N	Long. W	t°C	S ‰
June 11, 1922					*June 13, 1922*					*June 19, 1922*				
h m					h m					h m				
1 0	33° 0′	18° 48′	19·12		15 5	35° 9′	22° 57′	19·45		5 0	38° 34′	25° 59′	18·90	
2 0	1	53	·05	36·52	50	9	57	·43	36·53	6 0	36	59	19·00	
3 0	2	59	·12		17 0	9	57	·39		7 0	38	58	18·98	
4 0	4	19 4	·14	·53	18 15	9	57	·33	·52	9 0	38	58	19·00	
5 0	6	10	·14		19 0	13	23 2	·38		9 50	38	58	18·96	36·09
6 0	7	15	18·85	·47	20 0	17	7	·30		11 0	39	57	·98	
7 0	9	21	·80		21 0	22	13	·37		12 0	42	53	·90	·14
8 5	11	27	·95	·46	22 0	25	18	·38	·57	13 0	46	52	19·15	
9 20	12	32	19·06		23 0	29	24	·28		14 0	51	51	·35	
10 0	12	34	·08	·51	24 0	33	30	·39	·55	15 0	56	50	·20	
11 0	12	36	·12		*June 14*					16 0	39 1	49	·24	·17
12 0	13	37	·19	·48	1 0	38	36	·39		17 0	5	48	·40	
13 10	13	37	·18		2 0	42	41	·40	·42	18 0	9	47	·31	·11
14 0	13	37	·28	·51	3 0	47	47	·45		19 0	13	47	·05	
15 0	14	38	·26		4 0	51	53	·61	·49	20 0	17	47	·11	·08
16 0	14	38	·22	·50	5 0	56	59	·40		21 20	22	47	18·95	
45	14	38	·22	·53	6 0	36 0	24 4	·34	·44	22 5	26	47	·82	·15
18 0	14	39	·25	·53	7 0	5	10	·42		23 0	30	47	·79	
19 0	17	45	·30		8 0	9	16	·42	·44	24 0	34	47	·61	·01
20 0	20	50	·30	·50	9 0	14	22	·46		*June 20*				
21 0	24	55	·53		10 0	18	28	·38	·44	1 0	36	47	·33	
22 0	28	20 1	·12	·51	11 0	22	34	·47		2 0	37	47	·59	35·91
23 0	32	6	·02		12 0	24	37	·20	·21	3 0	37	48	·76	
24 0	35	11	·00	·41	13 0	26	41	·19		4 0	37	49	·80	·95
June 12					14 0	26	41	·13	·21	5 0	37	50	·70	
1 0	38	15	·06		45	26	41	·99	·16	6 0	37	51	·70	·89
2 0	42	19	18·93	·28	16 15	27	47	·16		7 0	37	52	·65	
3 0	46	24	·80		17 0	28	53	·16		8 0	37	52	·65	·92
4 0	50	29	·75	·33	18 0	30	25 0	·01	·19	9 0	37	52	·67	
5 0	54	34	·65		19 0	35	3	·04		10 0	37	52	·58	
6 0	57	38	·74	·37	20 0	41	7	·09	·19	12 0	42	52	·67	·96
7 0	34 0	42	·60		21 0	47	11	18·97		13 0	45	52	·63	
8 0	3	46	·55	·31	22 0	53	15	·71	·21	14 0	48	52	·74	·92
9 0	7	51	·64		23 0	58	17	19·09		15 0	51	53	·80	
10 10	10	56	·86	·34	24 0	37 3	19	·10	·18	16 0	54	53	·63	·91
11 10	13	21 3	·95		*June 15*					17 0	58	53	·65	
12 0	15	9	19·25	·50	1 0	8	21	·35		18 0	40 1	54	·63	·91
13 0	17	15	·19		2 0	11	23	·55	·24	19 0	4	54	·48	
14 0	17	15	·29	·48	3 0	14	24	·55		20 0	8	54	·50	·90
15 0	17	15	·24		4 0	17	25	·45	·22	21 0	12	55	·46	
30	17	15	·21	·47	5 0	20	26	·40		22 0	16	55	·50	·95
16 0	18	17	·26		6 0	23	27	·20	·15	23 0	20	56	·49	
17 0	21	23	18·90		7 0	26	28	·10		24 0	24	56	·44	·95
18 0	25	29	19·21	·44	8 0	28	29	18·95	·20	*June 21*				
19 0	28	35	·20		*June 18*					1 0	28	57	·45	
20 0	30	39	·24	·58	10 0	45	51	·79	·20	2 0	32	57	·42	
21 0	33	45	·00		11 0	46	53	·31		3 0	36	58	·42	
22 0	36	50	18·86	·60	12 0	48	56	·24		4 0	39	59	·23	·99
23 0	39	55	·90		13 0	51	59	·38		5 0	43	26 0	·23	
24 0	42	22 1	·89	·61	14 0	54	26 2	·27	·10	6 0	47	0	·09	·95
June 13					15 0	57	5	·39		7 0	51	1	·21	
1 0	45	7	·81		16 0	38 1	8	·70	·17	8 0	55	1	·29	·94
2 0	48	13	·78	·53	17 0	4	8	·90		10 0	58	2	·40	·96
3 0	51	19	19·10		18 0	7	7	19·03	·16	10 45	58	2	·44	
4 0	54	25	·10	·48	19 0	10	6	·13		12 0	41 2	25 58	·53	·96
5 0	57	31	·10		20 0	12	6	·19	·16	13 0	7	55	·45	
6 0	35 1	38	·11	·50	21 0	15	5	18·94		14 0	12	52	·58	·97
7 0	5	44	·12		22 0	18	5	·89		15 0	14	52	·62	
8 0	8	50	·12	·55	23 0	21	4	·41		16 10	17	52	·45	·97
9 0	8	52	·04		24 0	24	3	·58		17 0	21	52	·47	
10 0	8	54	·09	·53	*June 19*					18 0	23	52	·40	·98
11 0	9	56	·22		1 0	26	2	·92		19 0	26	52	·40	
12 0	9	57	·29	·47	2 0	28	2	·60		20 0	30	52	·38	·93
13 0	9	57	·33		3 0	30	1	·79		21 0	34	51	·39	
14 0	9	57	·40	·49	4 0	32	0	19·03		22 0	38	51	·35	·93

Table I. (Continued.)

Time G. M. T.	Lat. N	Long. W	t°C	S ‰	Time G. M. T.	Lat. N	Long. W	t°C	S ‰	Time G. M. T.	Lat. N	Long. W	t°C	S ‰
June 21, 1922					*June 24, 1922*					*June 27, 1922*				
h m					h m					h m				
23 0	41°42′	25°51′	18·30		13 0	45°16′	23° 6′	17·16		6 0	47°24′	17°19′	15·81	35·69
24 0	46	51	·26	35·92	14 0	16	3	·37		7 0	26	12	·71	
June 22					15 0	17	0	·33		8 0	28	5	16·13	·68
1 0	50	50	·27		16 0	17	22 57	·29	35·79	9 0	29	16 58	·17	
2 0	54	50	·25		17 0	18	53	·25		10 10	30	51	·12	·70
3 0	58	50	·20		18 0	20	49	·06	·77	11 0	31	44	·20	
4 0	42 1	50	·15	·94	19 0	22	45	·00		12 0	32	37	·17	
5 0	4	50	·19		20 0	24	41	16·90	·77	13 0	33	28	·24	
6 0	7	49	·20		21 0	26	36	·89		14 0	35	19	·55	·75
7 0	10	49	·12		22 0	28	31	·76	·77	15 0	37	10	·42	
8 0	13	49	·19		23 0	30	26	·83		16 0	39	1	·45	·71
10 0	13	49	·26		24 0	32	22	·75	·76	17 0	41	15 52	·28	
40	13	49	·28	·95	*June 25*					18 0	43	43	·30	·71
12 0	17	47	·28	·99	1 0	34	17	·78		19 0	44	40	·17	
13 0	21	45	·49		2 0	36	12	·70	·76	20 0	44	40	·12	
14 0	25	43	·50	36·04	3 0	38	7	·66		45	44	40	·20	·66
15 0	30	39	·90		4 0	40	2	·63	·75	21 5	45	38	·13	
16 0	34	35	·80	35·98	5 0	43	21 58	·63		22 0	46	31	·05	·67
17 0	38	32	·70		6 0	47	54	·57	·73	23 0	48	24	·05	
18 0	42	29	·78	36·00	7 0	51	50	·70		24 0	49	17	15·60	·65
19 0	46	26	·69		8 0	54	45	·72		*June 28*				
20 0	50	23	·50	·00	9 0	58	40	·81		1 0	50	10	·77	
21 0	54	19	·23		10 0	46 2	35	·94	·76	2 0	52	2	·97	·61
22 0	58	15	·34	35·97	11 0	6	30	17·03		3 0	53	14 53	·85	
23 0	43 2	11	·09		12 0	8	24	·07	·84	4 0	55	44	·62	·63
24 0	5	7	·08	·92	13 0	10	16	·10		5 0	56	36	·57	
June 23					14 0	12	8	16·58	·68	6 0	58	28	·43	·58
1 0	7	5	17·88		15 0	14	0	·90		7 0	59	19	·57	
2 0	10	2	·89	·92	16 0	16	20 53	·78	·73	8 0	48 1	10	·73	·64
3 0	13	0	·85		17 0	18	46	·65		9 0	2	1	·52	
4 0	16	24 59	·80	·93	18 0	20	39	17·00	·74	10 0	3	13 52	14·65	·56
5 0	19	57	·80		19 0	23	30	16·72		11 0	4	43	·55	
6 0	22	55	·82	·93	20 0	26	21	·68		12 0	6	34	·68	·59
7 0	25	53	·81		21 0	29	12	·65		13 0	7	26	15·04	
8 0	28	50	·84	·93	22 0	31	3	·53	·73	14 0	9	17	·12	·59
9 0	30	47	·79		23 0	33	19 55	·55		15 0	10	9	·04	
10 0	32	45	·80		24 0	35	47	·55	·72	16 0	12	0	·08	·58
11 0	32	45	·87		*June 26*					17 0	13	12 52	·00	
45	33	44	·85	·89	1 0	37	40	·50		18 0	14	43	14·95	·57
13 00	36	41	18·24		2 0	39	34	·40	·72	19 0	16	33	15·04	
14 0	38	39	·60	·95	3 0	42	27	·44		20 0	18	23	·35	·60
15 0	43	35	·69		4 0	45	21	·35	·73	21 0	20	13	14·98	
16 0	49	30	·30	·94	5 0	48	14	·40		22 0	22	3	·96	·66
17 0	54	26	·30		6 0	51	7	·45	·75	23 0	24	11 53	15·08	
18 0	44 0	21	·15	·91	7 0	53	0	·45		24 0	26	43	14·94	·59
19 0	5	17	·04		8 0	56	18 54	·42		*June 29*				
20 0	10	12	17·99	·93	9 0	56	54	·47		1 0	29	33	·95	
21 0	16	7	·79		10 0	56	54	·50		2 0	31	23	·89	·58
22 0	22	2	·72	·95	25	56	54	·50	·72	3 0	34	13	13·89	
23 0	27	23 57	·67		12 0	47 0	45	15·99	·67	4 0	36	3	·82	·55
24 0	32	52	·54	·89	13 0	1	39	·97		5 0	38	10 53	14·00	
June 24					14 0	3	33	16·04	·71	6 0	40	43	·15	·56
1 0	36	48	·40		15 0	5	28	·16		7 0	42	33	·20	
2 0	41	43	·48	·80	16 0	6	23	·19	·67	8 0	43	23	·13	·56
3 0	45	39	·49		17 0	7	19	·31		9 0	43	22	·25	
4 0	50	34	·34	·87	18 0	8	15	·38	·72	30	43	22	·25	·57
5 0	55	29	·34		20 0	9	11	·33		12 0	44	6	·38	·57
6 0	59	25	·16	·72	23 0	10	7	15·97		13 0	46	9 58	·46	
7 0	45 4	20	·18		24 0	12	1	16·28	·71	14 0	48	50	·50	·52
8 0	9	15	·30	·96	*June 27*					15 0	50	41	·50	
9 0	13	11	·37		1 0	14	17 56	·40		16 0	53	32	·38	·45
10 0	15	9	·16		2 0	16	49	·28	·71	17 0	55	23	·36	
11 0	15	9	·12		3 0	18	41	·21		18 0	57	14	·34	·44
12 0	15	9	·13		4 0	20	34	·10	·69	19 0	59	6	·28	
15	15	9	·09	·72	5 0	22	27	15·88		20 0	49 0	8 58	·16	·45
										21 0	1	51	·20	

Table I. (Continued.)

Time G. M. T.	Lat. N	Long. W	t°C	S 0/00	Time G. M. T.	Lat. N	Long. W	t°C	S 0/00	Time G. M. T.	Lat. N	Long. W	t°C	S 0/00
June 29, 1922					*June 29, 1922*					*July 1, 1922*				
h m					h m					h m				
22 0	49° 2′	8° 44′	14·32	35·44	23 0	49° 39′	5° 13′	13·20		24 0	50° 25′	1° 6′	13·98	
23 0	4	36	·23		24 0	41	3	·10	35·34	*July 2*				
24 0	6	28	·15	·48	*July 1*					1 0	27	0 56	·71	
June 30					1 0	43	4 53	12·75		2 0	28	47	·33	
1 0	8	20	·20		2 0	45	43	13·25	·37	3 0	29	38	·32	
2 0	10	12	·35	·51	3 0	47	33	·22		4 0	30	28	·23	35·17
3 0	11	5	·32		4 0	49	23	·15	·40	5 0	32	18	·20	
4 0	12	7 57	·27	·50	5 0	51	13	·28		6 0	34	8	·18	
5 0	13	50	·44		6 0	53	3	·20	·43	7 0	36	7	·11	
6 0	15	43	·58	·44	50	55	3 54	12·88	·42	8 0	38	18	12·99	
7 0	16	36	·58		8 0	56	46	·70	·37	9 0	41	29	13·15	
8 0	17	29	·56	·36	9 0	58	36	·67		10 0	44	36	·06	
9 0	19	21	·54		10 0	50 0	26	·60	·41	11 0	46	43	12·99	
10 0	21	13	·50	·32	11 0	2	16	·64		12 0	48	50	13·08	
11 0	22	5	·42		12 0	4	7	·82	·33	13 0	50	57	·19	
12 0	23	6 57	·12	·27	13 0	5	2 58	·93		14 0	53	1 6	·25	
13 0	25	48	·03		14 0	7	48	·89	·36	15 0	57	14	·35	
14 0	26	39	13·63	·34	15 0	9	38	·81		16 0	51 1	22	·30	
15 0	27	30	·60		16 0	11	28	·90	·41	17 0	6	33	·49	
16 0	28	21	·74	·34	17 0	13	18	·90		18 0	10	43	·61	
17 0	29	12	·50		18 0	15	8	·90	·41	19 0	14	53	·99	
18 0	30	3	·73	·34	19 0	17	1 58	·90		20 0	17	2 00	·98	
19 0	31	5 53	14·10		20 0	19	48	13·04	·42	21 0	19	9	14·08	
20 0	33	43	·11	·44	21 0	21	37	·15		22 0	21	18	·19	
21 0	35	33	·04		22 0	22	27	·20		23 0	23	26	·30	
22 0	37	23	13·52	·34	23 0	23	17	·80		24 0	22	28	·40	

Table II.

Serial Observations at the Stations.

GMT	a	t°C	S 0/00	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta a$	$10^4 \Delta D$
Stat. **1.** 5 VII, **1913.** 57° 32′ N. 8° 30′ W. 156 meters.										
11 00	0	12·10	35·18	26·73	8·39	8·22	26·73	0	133	0
	[10]	11·05	·20	·93			·98	131	112	123
10 25	25	10·32	·24	27·10	6·34	·24	27·22	290	98	280
45	50	9·94	·29	·21	·01	7·95	·45	544	83	508
25	75	·69	·31	·27	5·90	8·13	·62	771	84	716
45	[100][2]	·50	·35	·33	·77	·22	·80	984	78	919
25	125	·07	·34	·39						
45	150	·02	·36	·42	·56		28·13	1376	70	1289
Stat. **2.** 7 VII, **1913.** 56° 58′ N. 14° 59′ W. 370 meters.										
9 50	0	12·10	35·27	26·80	6·39	8·26	26·80	0	126	0
	[10]	·05	·27	·81			·86	133	124	125
25	25	11·72	·28	·88	·30	·24	·99	326	119	307
	50	10·13	·30	27·18	·30	·20	27·42	604	90	568
	[75]	9·60	·30	·27			·63	833	83	785
	100	·11	·30	·35	·03	·20	·82	1043	76	984
	[150]	8·55	·31	·45			28·16	1420	66	1340
	200	·34	·32	·49	5·94	·16	·43	1767	65	1669
	[300][1]	·48	·32	·47	·81	·08	·87	2472	69	2337
	350	·39	·31	·48	·71	·13				
Stat. **2 A.** 7—8 VII, **1913.** Some nautical miles to the NE of the former series. 320 meters.										
18 30	0	10·40	35·29	27·13						
	50	9·58	·29	·27						
18 30	100	8·75	35·28	27·39						
	200	·55	·31	·45						
22 30	0	10·40	35·27	27·11						
	50	9·75	·30	·25						
	100	8·80	·29	·40						
	200	·46	·30	·46						
2 00	0	10·30	35·26	27·15						
	50	9·66	·25	·22						
	100	8·75	·26	·38						
	200	·47	·27	·43						
Stat. **3.** 9 VII, **1913.** 56° 22′ N. 17° 13′ W. 529 meters.										
16 45	0	11·90	35·32	26·86	6·25	8·26	26·86	0	120	0
	[10]	·70	·32	·91			·96	125	114	117
25	25	10·91	·32	27·06	·40	·24	27·18	297	102	279
	50	9·81	·31	·25	·21	·18	·49	543	84	511
	75	·68	·33	·28	·18	·20	·64	763	82	719
15 30	100	·40	·31	·31	·04	·22	·78	976	80	922
	[150]	·00	·31	·38			28·09	1381	73	1302
	200	8·85	·33	·42	·02	·20	·36	1763	71	1663
	300	·89	·30	·39	·03	·18	·79	2543	76	2399
	400	·72	·30	·42		·18	29·29	3350	76	3157
	500	·47	·30	·46	5·77	·13	·80	4145	73	3904

Table II. (Continued.)

Stat. **4 a.** 11 VII, **1913.** 54° 42′ N. 18° 44′ W. <1200 meters.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
10 20	0	12·20	35·31	26·81	6·27	8·26	26·81	0	125	0
10 50	[10]²	·01	·28	·82	·25	·24	·87	132	123	124
	25	11·95	·35	·89	·35	·18	27·01	323	117	304
9 25	50	10·55	·37	27·17	·31	·22	·41	601	91	565
	[75]	·10	·39	·26			·61	834	84	785
	100	9·95	·39	·29	6·14	8·20	·76	1053	82	994
	[150]	·80	·38	·30			28·01	1485	81	1402
9 50	200	·70	·37	·31	6·14	8·22	·25	1918	82	1810
9 00	[300]²	·47	·36	·34	5·99	·20	·74	2780	81	2627
	400	·24	·34	·37	·99	·18	29·23	3640	81	3439
	500	·11	·34	·39	·09	·18	·72	4500	80	4244
7 20	600	8·81	·30	·40	5·77	·18	30·21	5362	81	5051
	700	·28	·28	·47	·09		·74	6204	77	5842
	800	7·54	·26	·56	4·80	·16	31·32	6971	67	6560
	[900]	·60	·27	·57			·79	7701	67	7232
	1000	·76	·30	·57	5·56	8·13	32·25	8446	70	7922
	<1200				·61	·08				

Stat. **5.** 13 VII, **1913.** 54° 06′ N. 23° 00′ W.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
21 10	0	12·70	35·30	26·70	6·24		26·70	0	135	0
	[10]	·65	·32	·73			·77	142	132	134
23 30	[25]²	·25	·34	·82	6·66		·94	347	124	326
	50	10·20	·35	27·13	·02		27·37	638	95	601
	[75]	9·80	·35	·27			·63	874	83	824
23 00	100	·59	·34	·31	5·98		·78	1089	80	1029
	[150]	·32	·33	·34			28·05	1505	77	1422
	200	·16	·32	·36	6·19		·30	1912	77	1808
	[300]	·07	·29	·35	5·97		·75	2742	80	2593
	400	8·96	·26	·35	6·00		29·22	3604	82	3405
	[500]	·70	·22	·36			·71	4569	81	4245
	600	·22	·17	·39	5·80		30·21	5349	81	5040
	[700]	7·45	·09	·45			·74	6189	77	5832
21 35	[800]²	6·45	·03	·54	5·54	8·08	31·32	6959	67	6554
	[900]	5·65	·01	·62			·88	7644	60	7190
	1000	·08	34·99	·68	5·46	8·08	32·42	8256	54	7757
	1200	4·19	·96	·76	·79		33·46	9346	47	8765
	[1400]	3·83	·93	·76			34·42	10370	46	9699
	1600	·71	·90	·76	6·28		35·35	11414	48	10643
	[1800]	·50	·89	·77			36·32	12458	49	11617
	2000	·31	·88	·78	6·56		37·27	13488	49	12601

Stat. **6.** 14 VII, **1913.** 54° 02′ N. 24° 34′ W. 3368 meters.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
13 00	0	12·70	35·02	26·49	6·51	8·16	26·49	0	155	0
	[10]	·50	·03	·53			·58	163	151	153
	25	11·28	·06	·79	6·81	8·16	·91	384	127	362
	50	9·68	·14	27·14	5·84	·13	27·38	678	94	639
	[75]	8·65	·12	·29			·65	910	81	858
	100	·13	·09	·34	6·03	8·05	·81	1118	77	1057
	[150]	7·80	·08	·39			28·10	1514	72	1430
14 05	200	·53	·08	·42	6·05	8·02	·36	1895	71	1789
	300	6·57	34·96	·47	5·85	7·99	·89	2627	68	2480
	400	5·73	·90	·53	6·11	·99	29·43	3314	63	3134
	500	·18	·90	·60	·05	·95	·98	3946	55	3725
	600	·02	·95	·65	5·54	·95	30·51	4528	52	4265
	[700]	4·60	·94	·69			31·03	5070	49	4774
17 00	800	·04	·90	·72	6·39	8·05	·55	5577	46	5251
	[900]	·00	·90	·73			32·02	6074	46	5713
	1000	3·97	·89	·73	6·14	8·02	·49	6584	47	6183
	1200	·54	·89	·78	·29	7·94	33·50	7568	43	7087
	[1400]	·40	·89	·78			34·46	8518	43	7951
	1600	·29	·88	·78	6·51	7·81	35·40	9478	44	8835
	[1800]	·35	·89	·79			36·34	10458	46	9745
16 50	2000	·41	·90	·79	6·37	7·95	37·27	11468	48	10689
	2500	·08	·99	·89	·20	·95	39·70	13843	41	12924
	3000	2·83	·97	·90	·09	8·02	42·03	16043	42	15004
	3368		·98							

Stat. **7 a.** 16 VII, **1913.** 54° 05′ N. 26° 08′ W.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
11 00	0	12·05	35·16	26·72	6·38	8·24	26·72	0	133	0
12 30	10	11·95	·12	·71	·47	·20	·76	142	133	133
	25	·15	·17	·90	·79	·24	27·02	341	116	320
11 55	[50]²	10·02	·17	27·10	·27	·11	·34	625	98	588
	[75]	9·05	·17	·26			·62	866	84	815
	100	8·70	·17	·32	5·96	8·05	·79	1081	79	1020
	[150]	·35	·14	·35			28·06	1491	76	1409
	200	·00	·10	·38	5·96	8·11	·32	1892	75	1788
	300	7·15	·02	·43	6·07	·05	·85	2664	71	2522
10 50	400	6·86	·08	·52	6·83	7·95	29·41	3381	64	3201
	[500]	·15	·04	·58			·95	4043	58	3813
	600	5·48	·00	·64	5·22	7·92	30·50	4645	54	4372
	[700]	4·90	34·99	·70			31·03	5192	49	4886
	800	·48	·98	·74	5·70	7·99	·56	5692	45	5356
	[900]	·15	·95	·75			32·04	6174	44	5803
	1000	3·92	·92	·75	6·01	8·02	·51	6661	45	6250
	1200	·58	·90	·77	·29	·05	33·50	7625	43	7134

Stat. **8.** 17 VII, **1913.** 54° 49′ N. 26° 57′ W.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
12 00	0	11·75	35·25	26·84	6·39	8·26	26·84	0	122	0
13 25	10	·73	·22	·82	·32	·29	·87	130	143	123
	25	·66	·22	·84	·38	·24	·96	326	122	306
	50	9·70	·25	27·22	·18	·18	27·46	603	87	567
	[75]	·45	·25	·26			·62	830	84	781
12 55	100	·31	·26	·29	5·86	8·13	·76	1048	82	989
	[150]	·00	·24	·33			28·04	1473	78	1391
	200	8·59	·21	·37	5·96	8·13	·31	1883	76	1779
	300	7·17	·06	·46	6·29	·08	·88	2645	69	2504
12 00	400	6·50	·08	·57	5·86	·08	29·46	3320	59	3144
12 55	500	5·95	34·99	·57	·26	·08	·94	3955	59	3736
12 00	[600]	·40	·97	·62	·24	·05	30·48	4572	56	4309
	[700]	4·91	·97	·68			31·01	5139	51	4841
	800	·47	·97	·73	5·68	8·11	·55	5654	46	5325
	[900]	·18	·97	·76			32·05	6136	43	5772
	1000	·01	·97	·78	6·10	8·08	·54	6606	42	6202
	1200	3·67	·92	·78		·02	33·50	7546	43	7062

Stat. **9.** 18 VII, **1913.** 54° 51′ N. 28° 15′ W.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
12 05	0	11·43	34·99	26·71	6·54	8·20	26·71	0	134	0
	[10]	·35	35·05	·72			·77	143	133	134
14 50	25	10·76	·10	·92	6·55	8·20	27·03	340	115	319
	50	8·91	·05	27·19	·39	·18	·43	612	89	574
	75	·51	·15	·33	·13	·13	·69	832	77	782
12 05	100	7·83	·06	·37	·05	·11	·84	1032	74	972
	[150]	·32	·03	·41			28·12	1415	70	1332
	200	·01	·02	·45	6·17	8·08	·39	1783	67	1675
	300	6·33	·01	·53	·31	·08	·95	2468	61	2320
14 20	400	5·97	34·99	·57	·39	·08	29·47	3105	59	2925
	500	·69	35·00	·62	·10	·02	·99	3712	54	3493
	600	4·94	34·95	·66	5·47	7·95	30·52	4282	52	4021
	700	·47	·94	·71	·69		31·05	4809	47	4516
13 15	800	·23	·94	·73	·87	7·99	·56	5304	45	4981
	[900]	3·99	·94	·76			32·05	5781	43	5423
	1000	·72	·94	·79	6·22	7·92	·56	6238	40	5840
	1200	·57	·93	·79	·37	·92	33·52	7138	41	6660
	[1400]	·51	·93	·80			34·47	8052	41	7490
	1600	·48	·93	·80	6·53	7·89	35·40	8992	43	8340
	[1800]	·36	·93	·82			36·36	9942	44	9216
	2000	·20	·93	·83	6·41	7·95	37·31	10882	43	10096

Stat. **10.** 20 VII, **1913.** 55° 55′ N. 31° 07′ W.

GMT	a	t° C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
14 00	0	10·50	34·99	26·88	6·65	8·18	26·88	0	118	0
10 35	10	·54	·94	·83	·78	·26	·88	128	122	121
	25	·30	·97	·89	·60	·26	27·00	320	118	301
	50	7·72	35·02	27·35	·62	·16	·59	575	74	540
	[75]	·00	·02	·45			·81	761	66	715
	100	6·64	·01	·50	6·39	8·11	·97	929	62	875
	[150]	·33	·02	·54			28·26	1246	57	1172

Table II. (Continued.)

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
	200	6·18	35·02	27·56	6·43	8·08	28·51	1545	57	1458
9 40	300	5·98	·01	·58		·05	29·00	2145	56	2023
	400	·82	34·98	·58	6·05	·05	·48	2750	58	2593
	500	·15	·94	·63	5·56	7·95	30·01	3340	52	3144
	600	4·84	·93	·66	·65	·95	·52	3900	52	3663
	[700]	·50	·93	·70			31·03	4435	49	4165
	800	·14	·93	·74	5·96	7·99	·56	4935	46	4639
	[900]	3·90	·93	·76			32·05	5410	43	5086
12 27	1000	·79	·92	·77	6·28	7·95	·53	5880	43	5518
	[1200]	·55	·94	·80	5·83	8·02	33·53	6794	40	6352
	[1400]	·48	·95	·82			34·49	7678	40	7154
	1600	·46	·97	·84	6·28	7·99	35·44	8558	40	7950
	[1800]	·15	·98	·87			36·43	9402	38	8730
	2000	2·91	·98	·90	6·30	7·95	37·43	10217	35	9466
Stat. 12. 22 VII, **1913.** 57°08′ N. 27°46′ W.										
16 25	0	11·10	35·13	26·88	6·41	8·26	26·88	0	118	0
15 25	10	10·79	·10	·91	·55	·26	·96	124	114	117
	25	·68	·08	·91	·43	·32	27·03	308	116	289
	50	8·66	·07	27·25	·55	·16	·49	573	84	538
	[75]	·34	·08	·30			·66	791	80	743
	100	·10	·08	·34	6·14	8·08	·81	998	77	944
	[150]	7·66	·08	·40			28·11	1391	71	1315
	200	·31	·08	·45	6·00	8·05	·39	1761	68	1663
	[300]	6·90	·07	·51			·93	2458	64	2325
14 30	400	·62	·07	·55	6·25	8·13	29·44	3120	61	2955
	[500]	·16	·03	·57			·94	3765	59	3557
	600	5·69	34·98	·60	5·54	8·08	30·45	4395	58	4142
	[700]	·10	·96	·65			·98	4990	53	4699
	800	4·47	·92	·69	5·79	8·08	31·51	5540	50	5216
	[900]	·10	·89	·71			32·00	6067	48	5708
	1000	3·91	·88	·72	6·04	8·05	·49	6587	47	6188
	1200	·62	·89	·76	·32	·05	33·48	7591	45	7112
Stat. 13. 23 VII, **1913.** 58°00′ N. 25°32′ W.										
14 50	0	10·60	35·16	26·93	6·51	8·18	26·93	0	114	0
	[10]	·85	·14	·93			·98	121	112	113
	[25]	·50	·13	·98			27·10	297	109	279
	[50]	8·60	·13	27·30			·54	546	79	514
	[75]	·18	·15	·38			·74	747	72	703
13 35	100	7·97	·15	·42	6·16	8·11	·89	934	70	880
	[150]	·51	·13	·46			28·17	1292	66	1218
	200	·24	·10	·48	6·19	8·11	·42	1640	65	1545
	[300]	·14	·10	·50			·92	2327	65	2196
	400	·07	·10	·51	5·80	8·08	29·40	3017	65	2850
	[500]	6·65	·07	·54			·91	3702	62	3490
	600	·13	·02	·57	5·73	8·08	30·42	4367	61	4110
	[700]	5·93	34·99	·57			·88	5029	63	4732
	800	·77	·97	·57	5·57	8·05	31·37	5706	62	5359
	[900]	·00	·94	·65			·92	6343	55	5949
	1000	4·14	·92	·73	6·04	8·02	32·49	6900	47	6464
Stat. 14. 24 VII, **1913.** 59°30′ N. 20°40′ W.										
22 30	0	11·30	35·17	26·87	6·39	8·26	26·87	0	119	0
	[10]	·44	·17	·84			·89	128	121	120
20 40	25	·44	·17	·84	6·50	8·22	·96	322	122	302
	50	10·19	·23	27·12	·22		27·36	612	96	576
	[75]	9·40	·25	·23			·59	854	87	805
	100	·11	·25	·31	6·08		·78	1074	80	1013
	[150]	8·82	·25	·36			28·07	1483	75	1401
	200	·72	·26	·39	5·98		·33	1879	74	1775
	[300]	·65	·26	·40			·80	2671	75	2522
	400	·58	·25	·41	6·11		29·28	3478	76	3279
	[500]	·00	·20	·45			·80	4275	72	4024
	600	7·31	·14	·51	5·91		30·33	5035	70	4736

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
Stat. 14 a. 25 VII, **1913.** 59°42′ N. 20°39′ W. 2735 meters.										
14 30	0	11·72	35·21	26·82	6·44	8·13	26·82	0	124	0
	[10]	·70	·21	·83			·88	131	122	123
	[25]	·50	·21	·86			·98	324	120	305
	[50]	10·30	·20	27·07			27·31	618	101	581
	[75]	9·35	·20	·24			·59	865	86	815
	[100]	8·80	·20	·33			·80	1082	78	1021
	[150]	·43	·20	·38			28·09	1482	73	1400
	[200]	·30	·20	·40			·34	1870	73	1765
16 15	300	·21	·19	·41	6·16	8·05	·82	2645	73	2495
	[400]	·10	·18	·42			29·30	3430	74	3231
	500	7·94	·18	·44	6·25	8·02	·79	4220	73	3969
	600	·75	·17	·46	·32	·02	30·28	5010	75	4709
	[700]	·60	·17	·48			·77	5795	74	5451
	[800]2	·35	·17	·52	6·06	8·02	31·28	6565	71	6175
	[900]	6·90	·11	·54			·77	7322	69	6877
	1000	·29	·05	·57	5·13	7·95	32·29	8057	66	7557
14 40	1200	5·28	34·97	·64		·95	33·33	9417	60	8821
	[1400]	4·50	·93	·69			34·33	10667	55	9973
	1600	3·89	·88	·72	6·19	7·92	35·31	11841	52	11051
	[1800]	·70	·88	·74			36·28	12965	52	12101
	2000	·44	·88	·77	6·43	7·92	37·25	14045	49	13121
	2500	·30	·88	·78	·48	·92	39·58	16755	52	15656
Stat. 15. 26 VII, **1913.** 59°40′ N. 16°43′ W.										
17 35	0	12·05	35·18	26·74	6·54	8·22	26·74	0	132	0
	[10]	·00	·18	·75			·80	139	130	131
	[25]	11·22	·19	·90			27·02	336	116	315
	[50]	9·45	·24	27·25			·49	601	83	565
	[75]	8·94	·26	·35			·71	812	75	764
17 45	100	·65	·26	·39	6·15	8·05	·86	1006	72	948
	[150]	·25	·23	·43			28·14	1378	68	1299
	200	·06	·21	·45	6·15	8·02	·39	1742	69	1642
	[300]	·01	·20	·45			·86	2474	69	2384
	400	·01	·20	·45	6·04	8·02	29·33	3224	71	3039
	[500]	7·75	·19	·48			·83	3979	70	3745
	600	·34	·17	·52	5·92	8·02	30·35	4716	68	4436
	[700]	6·93	·12	·54			·84	5433	67	5113
	800	·51	·08	·57	5·24	7·95	31·35	6135	64	5770
	[900]	5·95	·04	·61			·86	6812	61	6398
	1000	·20	·00	·67	5·45	7·92	32·41	7439	55	6979
Stat. 16. 27 VII, **1913.** 58°20′ N· 13°26 W. 275 meters.										
18 10	0	13·15	35·26	56·58	6·44	8·20	26·58	0	147	0
16 00	10	12·87	·28	·65	·33	·16	·70	152	149	148
	25	·09	·27	·80	·11	·13	·92	364	126	355
	50	10·19	·26	27·14	·40	·11	27·38	656	103	642
	[75]	9·50	·30	·27			·62	891	84	876
	100	·20	·34	·37	6·01	8·05	·84	1098	74	1073
	[150]	8·82	·30	·40			28·11	1483	71	1436
	200	·63	·28	·42	5·99	8·02	·36	1861	72	1793
	250	·58	·31	·45	6·05					
Stat. 17. 29 VII, **1913.** 58°00′ N. 11°00′ W. 1860 meters.										
18 15	0	13·30	35·30	26·58	6·05	8·22	26·58	0	147	0
17 40	10	·19	·28	·59	·11	·16	·64	155	145	146
	25	11·41	·29	·94	·36	·18	27·06	360	113	340
	50	10·10	·29	27·18	·24	·16	·42	630	90	593
	75	·28	·35	·19	·35	·13	·55	869	90	818
	100	9·60	·36	·32	5·89	·11	·79	1093	79	1031
	[150]	·30	·36	·37			28·08	1498	74	1415
16 55	200	·19	·36	·39	6·01	8·08	·33	1892	74	1786
	[300]	·10	·33	·38			·78	2694	77	2543
	400	·02	·31	·38	5·98	8·08	29·24	3529	80	3328
	[500]	8·81	·31	·41			·74	4374	78	4118
	600	·60	·29	·43	6·10	8·08	30·24	5209	78	4900
	[700]	·58	·28	·43			·70	6051	81	5695
	800	·56	·27	·42	6·07	8·05	31·16	6918	82	6507
	[900]	·23	·26	·46			·67	7783	80	7313

Table II (Continued.)

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
18 45	1000	7·73	35·26	27·54	5·00	7·99	32·22	8600	73	8078
	1200	6·21	·17	·68	·22	·99	33·33	10024	60	9410
	1400	5·03	·06	·73	·73		34·35	11244	53	10538
	[1600][1]	4·24	·01	·78	6·00	8·02	35·35	12354	48	11552
	1800	3·56	34·97	·83	·13	·02	36·37	13348	44	12474

Stat. **18.** 29 VII, **1913.** 57°45′ N. 9°16′ W. 587 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
12 45	[0][1]	13·80	35·35	26·52	6·21	8·29	26·52	0	153	0
	[10]	·70	·34	·53			·58	161	151	152
12 20	25	12·98	·34	·68	6·33	8·32	·80	391	137	368
	50	10·79	·37	27·12	5·93	·13	27·36	700	96	659
	[75]	·20	·37	·23			·58	943	87	888
	100	9·90	·37	·28	5·79	8·08	·75	1167	83	1101
	[150]	·55	·38	·34			28·05	1591	77	1502
	200	·40	·39	·38	5·98	8·05	·31	1997	75	1883
	[300]	·25	·38	·39			·79	2802	76	2643
	400	·20	·38	·40	5·98	8·05	29·27	3619	77	3413
	500	·14	·38	·41	·99	·05	·75	4449	78	4188

Stat. **19.** 29 VII, **1913.** 57°42′ N. 8°35′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
18 25	0	13·45	34·61	26·02	6·12	8·26	26·02	0	200	0
18 15	10	·17	·73	·17	·30	·32	·21	205	186	193
	25	11·20	35·06	·80	·39	·26	·92	452	126	427
	50	9·96	·18	27·12	5·42	·22	27·36	747	96	706
	75	·80	·35	·28	·88	·16	·63	984	83	930
	100	·47	·34	·33	·74	·13	·80	1196	78	1132
	125		·27		·75					

Stat. **1.** 3 VI, **1914.** 50°01′ N. 4°34′ W. 72 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
10 50	0·5	14·76	35·13	26·14						
11 30	9·5	12·70	·13	·57						
25	20	·55	·10	·57						
20	30	11·10	·08	·84						
05	51	·04	·06	·83						
15	69	·04	·06	·83						

Stat. **2.** 3 VI, **1914.** 49°47′ N, 5°10′ W. 87 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
18 37	0	14·10	35·18	26·33	6·43	8·22	26·33	0	171	0
	10	12·75	·17	·59	·49	·22	·64	168	145	158
	25	10·95	·17	·94	·18	·20	27·05	374	113	352
	50	·90	·17	·94	·35	·16	·18	674	112	633
	75	·92	·18	·95	·45	·16	·30	973	113	915

Stat. **3.** 4 VI, **1914.** 49°09′ N. 6°42′ W. 123 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
9 09	0	13·40	35·24	26·51	6·13	8·22	26·51	0	153	0
	10	·46	·24	·50	·11	·22	·55	163	154	153
	25	12·73	·24	·65	·28	·22	·77	397	140	374
	50	11·98	·25	·85	·12	·13	27·09	744	121	700
	75	10·61	·25	27·06	5·94	·13	·42	1041	103	980
	100	·20	·24	·12	·97	·13	·59	1305	98	1232

Stat. **4.** 4 VI, **1914.** 48°43′ N. 7°35′ W. 150 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
17 48	0	13·50	35·44	26·65	6·10	8·22	26·65	0	140	0
	10	·68	·40	·58	5·96	·22	·63	152	146	143
	25	·38	·40	·64	6·09	·20	·76	381	141	359
	50	12·79	·40	·76	·28	·16	27·00	741	130	698
	75	10·73	·40	27·15	5·98	·16	·51	1038	94	979
	100	·61	·40	·17	6·00	·13	·64	1285	93	1213
	140	·48	·43	·22	5·90	·13				
	[150]	·47	·43	·22			·93	1766	88	1666

Stat. **5.** 5 VI, **1914.** 48°28′ N. 8°39′ W. 173 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
0 13	0	13·30	35·52	26·75	6·08		26·75	0	130	0
	10	·46	·51	·71	·09		·76	141	133	132
	25	·15	·51	·78	·29		·89	349	129	328
	50	11·46	·50	27·10	5·97		27·34	649	98	611
	[75][2]	10·90	·49	·19	6·33		·55	899	90	847
	100	·78	·48	·21	5·98		·68	1135	89	1072
	150	·80	·47	·20	·82		·90	1612	91	1522

Stat. **6.** 5 VI, **1914.** 47°57′ N. 9°42′ W. 2620 meters.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
	0	13·70	35·61	26·74	6·19	8·22	26·74	0	131	0
11 00	10	·73	·58	·71	·22	·24	·76	141	134	133
	25	·07	·54	·81	·28	·22	·92	348	126	327
	50	11·69	·53	27·08	·03	·22	27·32	647	100	610
10 30	75	·11	·53	·19	5·93	·22	·55	899	95	854
	100	·06	·53	·20	·83	·13	·67	1138	90	1087
	150	10·95	·53	·22	·90	·18	·92	1613	89	1536
	200	·92	·52	·21	·89	·13	28·14	2093	92	1988
	300	11·02	·52	·20	·82	·08	·60	3080	95	2923
10 00	400	10·74	·47	·21	6·23	·05	29·07	4095	97	3888
	500	·50	·48	·26	5·16	7·95	·58	5107	94	4843
	600	·22	·52	·34	4·73	·95	30·14	6074	88	5753
	[700]	·08	·52	·36			·62	7006	88	6638
	800	9·94	·53	·39	5·75	8·13	31·11	7941	86	7513
	900	·76	·71	·56	4·63	7·99	·74	8798	72	8308
8 40	1000	·10	·70	·67	5·03	·95	32·32	9530	63	8986
	1200	8·51	·52	·62	·87	8·13	33·21	10974	70	10320
	[1400]	6·80	·32	·72			34·28	12388	60	11626
	1600	5·10	·17	·82		7·89	35·36	13562	48	12712
	[1800]	4·44	·08	·82			36·32	14596	48	13678
	2000	·07	·03	·82	5·60	7·89	37·27	15624	69	14650
	2500	3·30	34·96	·85	·45	·81	39·64	18149	46	17025

Stat. **7.** 5 VI, **1914.** 47°36′ N. 10°38′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
19 00	0	13·60	35·56	26·72	6·30	8·24	26·72	0	133	0
19 30	10	·81	·57	·68	·36	·29	·73	144	136	135
	25	·65	·57	·72	·09	·24	·83	359	134	338
	50	11·90	·56	27·06	5·91	·20	27·30	672	102	632
19 03	75	·32	·54	·15	·79	·13	·51	931	94	877
	100	·15	·53	·18		·13	·65	1178	92	1116
	[150]	·00	·53	·21			·91	1660	90	1566
	200	10·93	·53	·22		·11	28·15	2140	91	2018
	[300]	·80	·50	·22			·62	3112	94	2940
	400	·69	·47	·22	5·22	·20	29·08	4111	96	3891
	[500]	·45	·46	·25			·57	5122	94	4846
17 55	600	·23	·46	·29	4·95	7·99	30·08	6122	93	5787
	[700]	·21	·46	·29			·55	7119	95	6731
	[800][2]	·19	·46	·30	5·64	7·86	31·02	8130	95	7685
	[900]	·17	·48	·32			·49	9159	96	8642
	1000	·15	·52	·35	5·36	7·89	·98	10244	94	9594
	1200	9·84	·63	·49	4·29	·89	33·04	12134	86	11398
	[1400][2]	7·90	·38	·61	5·01	·81	34·14	13858	74	12992
	[1600][1]	5·97	* ·19	·73		·86	35·24	15298	59	14322

Stat. **8.** 6 VI, **1914.** 47°18′ N. 11°53′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
6 30	0	14·00	35·61	26·67	6·15	8·18	26·67	0	138	0
	[10]	·10	·62	·66			·71	147	138	138
	25	·00	·61	·68	6·13	·20	·79	367	138	345
5 45	50	12·38	·57	·98	·04	·16	27·22	695	109	654
	75	11·49	·55	27·13	5·96	·13	·48	968	97	911
	100	·31	·55	·16	·81	·11	·63	1217	93	1148
	[150]	·18	·55	·19			·90	1705	91	1609
	200	·10	·55	·20	5·92	8·02	28·13	2193	92	2069
	[300]	10·89	·51	·21			·61	3180	95	3004
	400	·61	·46	·22	5·31	7·95	29·08	4185	96	3958
	[500]	·32	·43	·25			·57	5197	94	4911
6 30	600	·01	·43	·31	4·90	7·92	30·10	6187	92	5843
	[700]	9·78	·48	·38			·64	7129	86	6735
	800	·58	·56	·48	4·33	7·89	31·20	8005	78	7557
	[900]	·33	·60	·55			·74	8813	73	8312
	1000	8·95	·60	·62	4·45	7·86	32·27	9570	69	9022
	1200	7·81	·52	·73	·68	·81	33·34	10940	58	10298
	1400	5·94	·25	·78	5·23	·81	34·37	12140	51	11398
	1600	4·46	·01	·77	·48	·81	35·34	13250	50	12412

* Stat. 7, 1600 meters observed S = 35·75 ‰.

Table II. (Continued.)

Stat. **9.** 6 VI, **1914.** 46° 54′ N. 12° 21′ W. 4781 meters.

GMT	a	$t°$ C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
19 00	0	13·90	35·52	26·63	6·29	8·18	26·63	0	142	0
22 23	[10][2]	·81	·53	·65	·14		·70	150	139	141
22 23	25	·42	·56	·76	·26		·88	364	130	343
	50	11·50	·49	27·08	5·58		27·32	668	100	630
	75	10·90	·46	·17	·78		·52	923	93	870
17 10	100	11·02	·51	·19	·99	8·11	·66	1165	91	1100
22 23	150	10·65	·47	·22	·81		·93	1641	88	1549
17 10	200	·55	·46	·23	·77	8·13	28·16	2114	90	1995
	300	·14	·43	·28	·80	·08	·68	3049	88	2883
	400	9·96	·42	·30	·62	·11	29·17	3970	88	3763
21 40	500	·90	·41	·31	·41		·64	4903	88	4646
	600	·67	·41	·35	·02		30·15	5838	87	5526
	700	·42	·44	·41	4·69		·67	6739	83	6377
	800	·11	·50	·51	·44		31·25	7575	74	7163
	900	·22	·64	·60	·30		·80	8338	67	7869
	1000	8·97	·66	·66	·43		32·31	9034	64	8523
20 23	1100	·12	·57	·72	·56					
	1200	7·93	·55	·73	·63		33·33	10364	59	9753
	[1400][1]	5·58	·13	·73			34·34	11598	54	10887
	1600	·91	·18	·73	5·45	7·99	35·24	12832	59	12021
18 50	1700	4·06	34·99	·79	·93					
	[1800]	3·90	·98	·80			36·33	13976	47	13085
20 23	2000	·53	·95	·81	6·22		37·28	14980	47	14025
18 50	2200	·41	·95	·83	·08	7·99				
	[2500]	3·27	·94	·83			39·63	17490	48	16477
	2700	·02	·94	·86	5·70	7·89				
	3200	2·80								

Stat. **10.** 7 VI, **1914.** 46° 25′ N. 13° 14′ W.

GMT	a	$t°$ C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
8 20	0	14·15	35·67	26·69	6·08	8·22	26·69	0	136	0
	[10]	·20	·66	·67			·72	146	137	137
	25	·20	·65	·66	6·31	8·24	·78	366	139	344
	50	12·66	·61	·95	·23	·20	27·19	701	112	658
	75	11·86	·62	27·12	·40	·16	·47	980	98	921
	100	·64	·57	·12	5·79	·16	·58	1239	99	1168
	[150]	·38	·56	·14			·84	1756	97	1658
	200	·30	·54	·16	5·72	8·16	28·09	2269	96	2142
	[300]	·05	·53	·20			·60	3281	95	3102
	400	10·82	·52	·23	5·44	8·13	29·09	4286	95	4056
	[500]	·61	·49	·24			·56	5298	95	5009
	600	·36	·45	·26	6·01	8·08	30·05	6320	97	5971
	[700]	·41	·57	·34			·59	7312	91	6911
9 09	800	·44	·73	·48	4·07	8·13	31·19	8216	79	7759
	[900]	9·85	·72	·56			·74	9030	72	8515
	1000	·25	·68	·63	4·38	8·08	32·27	9785	67	9214
	1200	8·49	·72	·78	·51	7·95	33·37	11117	55	10434
	1400	7·63	·55	·78	·81	8·08	34·31	12339	57	11550
	1600	5·74	·24	·79	5·46	7·95	35·31	13533	52	12644
	[1800]	4·42	·06	·81			36·28	14657	51	13680
	2000	3·85	·01	·83	6·05	7·89	37·29	15701	47	14658

Stat. **11.** 7 VI, **1914.** 46° 00′ N. 14° 03′ W.

GMT	a	$t°$ C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
ca. 17 30	0	14·00	35·59	26·66	6·17	8·22	26·66	0	139	0
	[10]	·10	·58	·63			·68	149	141	140
16 48	25	·03	·58	·64	6·06	8·22	·76	374	141	352
	50	12·59	·57	·93	·04	·22	27·17	713	114	671
	75	11·27	·54	27·17	5·98	·18	·52	987	93	929
	100	10·96	·51	·20	·85	·18	·67	1228	90	1158
	[150]	·78	·50	·23			·93	1700	88	1603
	200	·67	·49	·24	5·66	8·18	28·17	2170	89	2046
	[300]	·39	·47	·27			·67	3105	89	2934
	400	·25	·45	·28	5·45	8·18	29·14	4045	90	3829
	[500]	·24	·42	·26			·58	5020	93	4748
	600	·24	·38	·22	4·83	8·16	30·02	6047	100	5714
	[700]	·24	·39	·23			·49	7107	101	6716
	800	·17	·43	·28	5·48	8·13	31·00	8162	97	7706
	[900]	9·20	·48	·48			·67	9109	79	8589
ca. 17 50	1000	7·95	·50	·69	4·55	8·02	32·36	9854	59	9282
ca. 17 50	1200	6·27	35·28	27·76	5·08	8·02	33·41	11058	52	10396
	1400	4·81	·07	·77	·37	·02	34·40	12158	48	11400
	1600	·21	34·98	·77	·89	7·95	35·35	13228	48	12370
	[1800]	3·82	·96	·79			36·32	14278	48	13334
	2000	·55	·95	·81	6·12	7·89	37·28	15292	47	14284

Stat. **12.** 8 VI, **1914.** 45° 21′ N. 15° 22′ W.

GMT	a	$t°$ C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
5 45	0	13·55	35·67	26·81	6·07	8·22	26·81	0	125	0
7 40	10	·94	·58	·66	·56	·22	·71	140	138	132
	25	·90	·58	·67	·20	·24	·79	360	138	339
	50	12·31	·57	·99	·03	·18	27·23	687	108	647
	75	11·60	·58	27·13	5·81	·18	·48	959	97	903
	100	·53	·59	·15	·95	·18	·62	1212	95	1144
	[150]	·48	·58	·15			·86	1715	95	1620
5 45	200	·42	·57	·16	5·96	8·18	28·09	2222	106	2099
	[300]	·13	·53	·18			·58	3244	97	3069
	400	10·90	·50	·20	5·73	8·16	29·06	4274	98	4046
	[500]	·63	·46	·22			·54	5311	97	5022
	600	·34	·43	·24	5·38	8·13	30·03	6351	98	6000
	[700]	·10	·46	·31			·57	7363	53	6959
	800	9·83	·51	·40	4·54	8·11	31·12	8318	85	7854
	[900]	·83	·63	·50			·68	9203	78	8674
	1000	·83	·75	·58	4·23	8·08	32·20	10025	73	9431
6 40	1200	7·34	·37	·68	·83	·08	33·29	11505	62	10783
	1400	5·72	·19	·76	5·23	·05	34·36	12759	58	11985
	1600	4·42	·03	·78	·97	·05	35·35	13869	48	13049
	[1800]	3·87	34·95	·78			36·30	14933	50	14033
	2000	·63	·93	·78		8·08	37·25	15997	50	15033

Stat. **13.** 8 VI, **1914.** 44° 57′ N. 16° 05′ W.

GMT	a	$t°$ C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
16 50	0	14·40	35·71	26·67	6·00	8·22	26·67	0	138	0
	[10]	·15	·71	·72			·77	144	133	135
	[25][2]	13·74	·70	·80	6·20	8·24	·91	350	127	330
	50	·13	·71	·94	5·91	·20	27·17	669	113	630
	75	12·59	·72	27·05	·63	·18	·40	959	104	902
	100	·23	·65	·07	·55	·16	·53	1232	104	1163
	[150]	11·85	·60	·10			·80	1771	100	1672
14 57	200	·67	·60	·14	5·73	8·11	28·06	2301	99	2173
	[300]	·28	·55	·17			·57	3343	98	3163
	400	10·93	·50	·20	5·31	8·11	29·05	4380	98	4148
	[500]	·55	·47	·24			·56	5410	95	5117
	600	·17	·46	·30	5·02	8·08	30·10	6407	92	6056
	[700]	9·79	·50	·40			·65	7342	84	6941
	800	·50	·57	·50	4·36	8·05	31·22	8197	76	7743
	[900]	·45	·60	·53			·70	9014	75	8500
	1000	·45	·59	·53	4·23	7·99	32·17	9839	77	9265
15 55	1200	8·56	·69	·75	·38	·95	33·34	11299	58	10619
	1400	6·60	·39	·80	5·10	·92	34·36	12599	52	11719
	1600	4·87	·13	·82	·46	·86	35·37	13574	47	12715
	[1800]	·23	·05	·82			36·33	14684	47	13659
	[2000][1]	3·72	34·98*	·82	4·93	7·99	37·28	15584	47	14597

Stat. **14.** 9 VI, **1914.** 44° 28′ N. 16° 56′ W.

GMT	a	$t°$ C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
2 00	0	13·90	35·71	26·78	5·98		26·78	0	128	0
	[10]	14·15	·72	·73			·78	138	132	130
2 07	25	·46	·70	·65	6·13		·76	355	142	333
	50	13·12	·70	·93			27·17	693	114	652
	75	12·50	·69	27·05	5·67		·40	983	105	925
	100	·50	·68	·04	·65		·51	1261	103	1189
	[150]	·12	·63	·08			·78	1811	103	1710
	200	11·81	·57	·09	5·41		28·01	2359	104	2227
	[300]	·25	·49	·13			·52	3449	104	3268
	400	10·80	·44	·17	5·49		29·03	4520	101	4291
	[500]	·40	·41	·22			·54	5571	97	5280
1 06	600	·05	·39	·27	5·21		30·07	6593	95	6242
	[700]	9·60	·38	·34			·60	7573	90	7171
	800	·10	·38	·42	4·48		31·15	8495	84	8044

* Stat. 13, 2000 meters observed S = 35·30 ‰.

Table II. (Continued.)

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
1 06	[900]	8·55	35·44	27·53			31·73	9337	74	8837
	1000	·37	·52	·65	4·36		32·31	10079	64	9529
	1200	6·72	·32	·73	·37		33·36	11381	57	10657
	[1400]	5·15	·09	·75			34·36	12569	46	11755
	1600	4·08	34·97	·78			35·36	13669	48	12765

Stat. **15.** 9 VI, **1914.** 43° 58′ N. 17° 46′ W.

11 10	0	14·40	35·72	26·68	5·98	8·22	26·68	0	137	0
	[10]	·48	·71	·65			·70	147	139	138
10 23	25	·59	·70	·62	6·06	8·20	·73	373	144	351
	50	13·20	·70	·91	5·98	·20	27·15	718	115	675
	75	12·62	·69	27·02	6·00	·16	·37	1013	107	954
	100	·37	·69	·07	5·62	·16	·53	1290	104	1217
	[150]	·19	·67	·09			·79	1832	101	1730
	200	11·90	·63	·11	5·69	8·13	28·04	2370	102	2238
	[300]	·49	·56	·14			·54	3438	101	3254
	400	·04	·49	·17	5·77	8·13	29·03	4503	101	4266
	[500]	10·69	·46	·21			·53	5560	99	5264
	600	·29	·43	·26	5·20	8·08	30·05	6595	97	6242
	[700]	9·61	·36	·32			·58	7592	92	7189
	800	8·96	·31	·39	4·52	8·02	31·12	8539	86	8081
	[900]	·90	·46	·51			·71	9406	76	8893
11 16	1000	·87	·64	·66	4·33	8·05	32·32	10171	64	9593
	1200	7·22	·50	·80	·80	·02	33·42	11411	50	10733
	1400	5·24	·11	·75	5·47	7·95	34·37	12531	51	11753
	1600	4·58	·07	·80		·89	35·37	13611	47	12743
	[1800]	·12	·00	·79			36·31	14651	49	13713
	2000	3·60	34·92	·78	6·21	7·89	37·25	15711	50	14707

Stat. **16.** 9 VI, **1914.** 43° 29′ N. 16° 51′ W.

20 05	0	14·60	35·80	26·70	5·84	8·20	26·70	0	135	0
	[10]	·70	·78	·66			·71	146	138	137
21 20	25	·86	·76	·61	5·86		·72	371	145	349
	50	13·74	·74	·83	·80		27·07	727	123	685
20 28	75	12·87	·76	27·08	·67	8·18	·38	1032	107	972
	100	·40	·65	·04	·70	·18	·50	1312	106	1239
	[150]	11·98	·60	·08			·78	1864	102	1760
	200	·58	·57	·14	5·53	8·10	28·06	2399	99	2265
	[300]	·10	·52	·18			·58	3436	97	3250
	400	10·76	·48	·21	5·60	8·13	29·07	4461	97	4223
	[500]	·40	·46	·26			·58	5473	94	5176
	600	·06	·46	·32	4·76	8·05	30·12	6450	90	6096
	[700]	9·88	·48	·37			·63	7390	87	6986
	800	·70	·51	·42	4·31	8·02	31·15	8297	83	7840
	[900]	·05	·47	·50			·70	9154	77	8643
	[1000]	8·38	·43	·57			32·23	9951	71	9388
21 20	1200	6·85	·37	·75	4·95		33·38	11311	54	10642
	[1400][1]	·21	·29	·77			34·35	12485	53	11716
	1600	5·34	·17	·79			35·32	13629	51	12766
	[1800]	4·60	·07	·80			36·29	14729	50	13786
	[2000][1]	3·79	34·98*	·81			37·27	15779	48	14772

Stat. **17.** 10 VI, **1914.** 42° 45′ N. 15° 53′ W.

8 10	0	15·00	35·81	26·62	6·10	8·26	26·62	0	143	0
	[10]	·04	·81	·61			·66	152	143	144
8 18	25	·08	·81	·60	6·10	8·29	·71	382	146	360
	50	13·86	·80	·85	5·80	·24	27·09	737	121	694
	75	·20	·79	·98	·73	·22	·33	1045	111	985
	100	12·82	·73	27·01	·54	·20	·48	1334	109	1259
	[150]	·50	·70	·05			·75	1899	105	1794
	200	·24	·67	·08		8·18	28·01	2455	105	2320
	[300]	11·68	·58	·12			·51	3552	104	3364
	400	·15	·51	·16	5·87	8·11	29·02	4633	102	4392
	[500]	10·80	·48	·20			·52	5701	107	5438
	600	·45	·48	·27	5·47	8·11	30·06	6741	96	6456
	[700]	·05	·49	·34			·60	7726	90	7389
	800	9·59	·49	·42	4·52	8·05	31·15	8649	83	8255

* Stat. 16, 2000 meters observed S = 35·28 ‰.

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
8 18	[900]	9·00	35·50	27·53			31·72	9495	75	9043
7 18	1000	8·33	·50	·64	4·63	8·02	32·30	10245	65	9742
	1200	7·60	·53	·77	5·49	·02	33·38	11535	54	10930
	1400	5·39	·18	·79	·39	·02	34·40	12659	48	11954
	1600	4·42	·05	·80		·02	35·37	13709	46	12904
	[1800]	·05	·01	·81			36·33	14723	47	13840
	2000	3·67	34·97	·82	6·32	8·02	37·29	15717	47	14780

Stat. **18.** 10 VI, **1914.** 42° 09′ N. 14° 56′ W.

17 45	0	15·10	35·82	26·60	6·68	8·32	26·60	0	145	0
	[10]	·11	·80	·59			·63	154	146	145
18 00	25	·13	·79	·57	6·22	8·26	·68	388	149	366
	50	13·22	·78	·97	·15	·26	27·21	731	110	689
	75	12·99	·76	27·00	5·62	·22	·35	1023	109	963
	100	·92	·76	·02	·67	·20	·48	1308	108	1234
	[150]	·40	·68	·05			·75	1873	105	1767
	200	11·88	·58	·08	5·94	8·18	28·01	2429	105	2292
	[300]	·40	·51	·12			·52	3524	103	3383
	400	·03	·47	·16	5·78	8·18	29·01	4606	102	4363
	[500]	10·65	·44	·20			·52	5676	99	5370
	600	·39	·43	·24	5·52	8·13	30·03	6726	98	6357
	[700]	·17	·49	·32			·58	7733	92	7311
	800	9·98	·59	·44	4·29	8·08	31·15	8665	82	8185
	[900]	·85	·72	·56			·74	9500	72	8960
18 47	1000	·84	·86	·67	4·39	8·08	32·30	10240	65	9645
	1200	·06	·82	·77	·65	·02	33·35	11564	57	10867
	1400	6·59	·39	·80		7·95	34·36	12758	52	11981
	1600	5·29	·21	·83	6·83?	·99	35·37	13842	48	12959
	[1800]	4·55	·10	·83			36·32	14866	48	13919
	2000	3·75	34·98	·82	5·99	7·99	37·28	15880	47	14873

Stat. **19.** 11 VI, **1914.** 41° 34′ N. 13° 47′ W.

7 00	0	15·10	35·82	26·60	6·22	8·29	26·60	0	145	0
	[10]	·11	·82	·60			·64	154	145	145
8 00	25	·14	·82	·59		8·22	·70	385	147	364
6 15	50	13·36	·77	·94	5·78	·22	27·17	731	113	689
8 00	[75][1]	·06	·76	·99			·34	1027	110	968
6 15	100	12·95	·76	27·01	5·73	8·18	·47	1315	108	1241
	[150]	·96	·76	·01			·71	1891	109	1786
8 00	200	·96	·76	·01	{(6·85) 6·17	8·13	·94	2475	111	2337
	[300]	·18	·66	·09			28·48	3625	107	3429
6 15	400	10·97	·51	·20	5·13	8·13	29·05	4707	98	4458
	[500]	·53	·49	·26			·58	5727	94	5418
	600	·48	·54	·31	4·73	8·08	30·10	6712	92	6346
	[700]	·52	·60	·35			·60	7672	90	7256
	800	·60	·68	·40	4·26	8·08	31·11	8614	86	8138
	[900]	·58	·82	·51			·67	9506	79	8965
7 10	1000	·48	36·00	·67	4·21	8·02	32·28	10293	66	9688
	1200	9·82	35·99	·78	·93	·02	33·32	11663	59	10934
	1400	8·15	·71	·83	5·10	·02	34·34	12899	58	12063
	[1600][1]	5·46	·22	·82		7·95	35·35	14019	51	13093
	[1800]	4·65	·11	·82			36·31	15079	50	14069
	2000	3·92	·00	·82		7·95	37·27	16119	49	15039

Stat. **20.** 11 VI, **1914.** 41° 03′ N. 12° 44′ W.

18 05	0	15·50	35·91	26·58	5·83	8·24	26·58	0	147	0
	[10]	·53	·91	·57			·62	156	147	147
18 40	25	·58	·90	·56	6·04	8·32	·67	392	150	370
	50	14·21	·79	·77	·13	·26	27·01	762	129	718
19 45	75	12·97	·78	27·02	·15	·22	·37	1075	107	1014
	100	·65	·71	·03	5·58	·18	·50	1357	107	1282
	[150]	·31	·66	·06			·76	1915	104	1759
	200	·07	·64	·09	5·68	8·16	28·02	2466	104	2279
	[300]	11·43	·54	·14			·54	3546	101	3301
	[400][1]	10·95	·46	·16	5·09	8·08	29·01	4618	102	4316
	[500]	·80	·45	·18			·50	5700	101	5336
	600	·98	·50	·19	4·79	8·08	·97	6792	104	6363
	[700]	11·17	·59	·22			30·47	7884	102	7395

Table II. (Continued.)

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
19 45	800	10·97	35·70	27·35	4·23	8·05	31·05	8921	92	8367
	[900]	·65	·80	·48			·64	9856	82	9236
	1000	·21	·89	·63	4·13	8·05	32·25	10673	69	9989
18 40	1200	9·65	·97	·79	·50	·08	33·34	12057	57	11251
	1400	8·49	·70	·77	·95	·08	34·28	13341	60	12431
	[1600][1]	6·37	·35*	·80		·13	35·29	14585	53	13571
	[1800]	5·19	·17	·81			36·27	15739	52	14627
	[2000][1]	4·02	·02*	·82		8·08	37·27	16813	48	15629

Stat. **21.** 12 VI, **1914.** 40° 36′ N. 12° 02′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
6 30	0	15·60	35·86	26·82	5·85	8·26	26·52	0	152	0
	[10]	·65	·86	·50			·55	163	153	153
6 35	25	·75	·86	·48	5·55	8·29	·59	410	157	385
	50	14·42	·83	·76	·99	·26	·99	790	130	744
7 42	75	12·69	·66	·99	·79	·18	27·34	1109	110	1045
	100	·77	·71	27·01	·69	·18	·47	1398	109	1319
	[150]	·32	·65	·05			·75	1964	105	1853
	200	11·88	·60	·10	5·58	·18	28·02	2517	103	2375
	[300]	·45	·54	·13			·53	3599	102	3404
	400	·13	·50	·16	5·13	8·13	29·02	4674	102	4426
	[500]	10·98	·53	·21			·53	5739	99	5429
	[600]	·83	·59	·28			30·07	6769	95	6398
	[700]	·72	·69	·38			·63	7731	87	7309
	800	·59	·77	·47	4·31	8·08	31·17	8623	80	8145
	[900]	·35	·86	·58			·75	9443	71	8903
	1000	·12	·94	·68	4·19	8·05	32·30	10179	64	9578
6 35	1200	9·62	·96	·79	·45	·08	33·34	11511	57	10788
	1400	7·29	·58	·85	·93	·05	34·39	12681	49	11852
	1600	5·92	·33	·85		·05	35·35	13745	48	12826
	[1800]	4·94	·17	·84			36·31	14789	49	13794
	2000	3·93	·02	·82	6·04	8·02	37·27	15813	48	14760

Stat. **22.** 12 VI, **1914.** 40° 03′ N. 11° 22′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
18 58	0	16·40	35·93	26·39	6·02	8·32	26·39	0	165	0
	[10]	·20	·93	·43			·48	173	160	163
18 17	25	15·95	·92	·48	6·13	8·32	·59	425	157	400
	50	14·15	·90	·87	5·80	·24	27·10	792	120	746
	75	13·21	·81	27·00	·71	·22	·35	1095	109	1032
	100	12·99	·79	·03	·59	·22	·49	1381	107	1303
	[150]	·76	·75	·04			·74	1945	106	1837
	200	·50	·70	·06	5·47	8·20	·98	2510	107	2371
	[300]	11·80	·61	·12			28·51	3620	104	3426
	400	10·99	·51	·19	4·88	8·16	29·05	4686	99	4439
	[500]	·78	·56	·27			·59	5704	93	5398
	600	11·15	·77	·37	4·33	8·13	30·15	6664	87	6301
	[700]	·54	36·00	·47			·70	7551	80	7139
	800	·60	·15	·58	4·31	8·13	31·26	8366	71	7897
	[900]	·50	·18	·62			·76	9136	70	8605
19 10	1000	·33	·20	·67	4·21	8·08	32·27	9884	68	9296
	1200	·32	·31	·76	·35	·08	33·27	11323	65	10626
	1400	10·38	·17	·82	·71	·02	34·27	12697	61	11866
	[1600][1]	7·54	35·58+	·82		·02	35·27	13971	56	13030
	[1800][1]	5·45	·22+	·82		·02	36·27	15145	52	14108
	2000	4·28	·06	·82	5·77	7·95	37·26	16235	49	15122

Stat. **23.** 13 VI, **1914.** 39° 17′ N. 10° 28′ W. 2500 meters.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
8 15	0	16·40	35·63	26·16	5·65	8·24	26·16	0	187	0
	[10]	·47	·61	·12			·17	200	190	188
	25	·55	·59	·09	5·68	·22	·20	504	194	476
	50	14·72	·93	·77		·20	27·00	933	130	879
	75	13·37	·74	·91	5·43	·18	·26	1260	117	1188
	100	·15	·80	27·00	·60	·20	·47	1560	109	1471
	[150]	12·91	·79	·04			·74	2130	106	2011
	200	·72	·78	·07	5·58	8·18	28·00	2691	106	2541
8 15	[300]	12·00	35·66	27·12			28·51	3793	104	3589
	400	11·41	·59	·18	4·71	8·13	29·03	4868	100	4611
	[500]	·42	·69	·26			·57	5903	94	5586
7 12	600	·43	·83	·36	4·32	8·11	30·14	6875	88	6498
	[700]	·51	36·04	·51			·74	7750	77	7323
	800	·60	·22	·63	4·46	8·11	31·32	8520	66	8039
	[900]	·51	·25	·68			·82	9232	65	8694
	1000	·43	·27	·71	4·34	8·08	32·30	9932	64	9338
	1200	·25	·36	·81	·17	·11	33·32	11284	59	10570
	1400	9·31	·00	·87	·35	·11	34·35	12514	53	11692
	1600	6·87	35·53	·88		·08	35·35	13624	48	12706
	[1800]	5·50	·31	·89			36·33	14654	46	13652
	2000	4·60	·18	·89	5·25	8·05	37·31	15628	45	14564
11 42	50	14·15	35·94	26·90	5·28					
	100	13·51	·93	27·03	·70					
	400	11·25	·58	·20	·00					
	800	·53	36·11	·55	4·20					
	1200	·34	·33	·77	·34					
	1600	7·70	35·70	·88	·59					
16 21	50		35·96		5·83					
	100	13·83	·98	26·99	·19					
	400	11·69	·59	27·13	4·67					
	800	·27	·95	·48	·13					
	1200	·04	36·26	·76	·28					
	1600	9·15								
20 25	50	15·05	35·90	26·67	6·23					
	100	13·86	·94	·96	5·39					
	400	11·47	·61	27·18	4·73					
	800	·58	·99	·45	·06					
	1200	·34	36·26	·71	·09					
	1600	9·57	·05	·86	·14					

Stat. **24.** 14 VI, **1914.** 38° 50′ N. 9° 37′ W. 83 meters.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
7 00	0	15·00	35·68	26·52	6·12	8·26	26·52	0	153	0
	10	·05	·68	·51	·43	·29	·55	162	153	153
	25	·08	·68	·50	·11	·32	·61	407	155	384
	50	13·77	·71	·80	·14	·18	27·04	781	126	736
	75	·26	·79	·97	5·43	7·95	·32	1097	112	1034

Stat. **25.** 20 VI, **1914.** 38° 33′ N. 9° 29 W. 136 meters.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
	0	16·40	35·68	26·20	6·66	8·22	26·20	0	183	0
18 13	[10][2]	·14	·63	·22	·34	·22	·27	193	180	182
17 52	25	15·16	·70	·50	·16	·22	·61	460	155	434
	50	14·11	·75	·76	5·63	·26	27·00	839	130	790
18 13	75	13·04	·77	27·00	·11	·13	·35	1156	109	1089
	100	12·58	·71	·05	4·78	·13	·51	1440	105	1357
	120	·50	·71	·06	·82					
	[150]	·40	·70	·07			27·77	1992	103	1878

Stat. **26.** 20 VI, **1914.** 38° 28′ N. 9° 36′ W. 1195 meters.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
19 50	0	17·20	35·77	26·08	5·76	8·26	26·08	0	194	0
	[10]	·10	·97	·25			·30	197	177	186
20 40	[25][2]	16·60	36·04	·43	5·43		·54	467	160	439
	50	15·57	·04	·67	6·70		·90	866	139	812
	75	14·22	·02	·95	5·38		27·30	1201	114	1127
	100	13·93	·04	27·03	·31		·49	1494	108	1406
	[150]	·55	35·96	·04			·74	2061	106	1941
19 59	200	·13	·86	·05	5·11	8·16	·98	2628	107	2476
	[300]	12·18	·70	·12			28·51	3743	104	3536
	400	11·32	·63	·23	5·23		29·08	4795	96	4537
	[500]	·15	·75	·35			·66	5760	85	5443
	600	·40	·91	·43	4·57		30·20	6654	82	6279
	[700]	·52	36·02	·49			·72	7503	78	7080
	[800][1]	·63	·12	·55	4·18		31·24	8318	74	7842
	[900]	·55	·17	·60			·74	9108	72	8572
	1000	·47	·22	·66	4·53		32·26	9870	68	9274

* Stat. 20, 1600 meters observed S = 35·55 ‰, 2000 meters 35·52 ‰.
+ Stat. 22, 1600 meters observed S = 35·90 ‰, 1800 meters 36·34 ‰.

Table II. (Continued.)

GMT	a	$t° C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
16 59	1150	11·33	36·32	27·76	4·19					
	[1200]	·26	·35	·80			33·31	11274	60	10558
Stat. 27. 21 VI, **1914.** 37° 58′ N. 10° 18′ W.										
6 34	0	17·90	35·97	26·06	5·52	8·24	26·06	0	196	0
	[10]	·72	·97	·10			·15	206	191	194
	25	·30	·97	·20	5·73	8·24	·31	504	184	475
	50	14·45	·88	·57	·91	·24	·80	944	149	890
	75	15·61	36·09	·91	·51	·22	27·26	1296	117	1223
	100	·30	·08	·98	·33	·20	·44	1602	112	1510
	[150]	13·90	35·99	·99			·69	2194	111	2067
	200	·65	·95	27·01	5·45	8·16	·93	2785	112	2624
	[300]	12·72	·80	·09			28·47	3940	107	3718
	400	11·55	·66	·21	5·13	8·11	29·06	5022	98	4744
	[500]	·20	·70	·30			·62	6022	90	5686
	[600][1]	·20	·81	·39			30·17	6954	85	6563
	[700]	·38	·96	·47			·71	7826	80	7389
5 32	800	·41	36·08	·56	4·64	8·18	31·25	8642	73	8152
	[900]	·25	·13	·63			·78	9408	69	8860
	1000	10·95	·18	·72	4·19	8·13	32·33	10118	62	9514
	1200	·55	·24	·84	·18	·11	33·37	11398	55	10682
	1400	9·15	·02	·91	·50	·08	34·40	12538	49	11726
	1600	6·90	35·57	·90	·92	·05	35·37	13582	46	12686
	1800	5·42	·32	·90	5·63	·02	36·35	14576	45	13606
	2000	4·51	·34	28·03	·12	7·99	37·44	15400	32	14378
Stat. 28. 21 VI, **1914.** 37° 33′ N. 10° 54′ W.										
14 30	0	18·00	35·99	26·05	5·44	8·22	26·05	0	197	0
	[10]	17·31	36·05	·26			·31	198	176	187
	[25]	16·50	·14	·52			·63	460	153	434
	50	15·60	·20	·78	5·66	8·24	27·02	834	128	785
	[75]	14·90	·15	·90			·25	1161	118	1095
	100	·44	·09	·95	5·35	8·18	·41	1469	114	1386
	[150]	13·68	35·92	·98			·68	2070	112	1952
	200	·05	·81	27·03	4·82	8·13	·96	2657	109	2505
	[300]	12·16	·68	·10			28·49	3789	106	3581
	400	11·48	·62	·19	4·64	8·08	29·05	4866	99	4606
	[500]	·35	·72	·29			·61	5876	91	5558
	[600]	·33	·86	·40			30·18	6811	84	6435
	[700]	·31	·98	·50			·74	7666	77	7242
	800	·30	36·11	·60	4·18	8·05	31·30	8446	69	7972
	[900]	·20	·19	·68			·83	9166	64	8636
	[1000]	·18	·26	·74			32·34	9846	60	9260
	1200	10·96	·35	·85	4·30	8·05	33·37	11116	55	10412
	[1400]	9·48	·09	·91			34·39	12266	50	11462
	1600	7·65	35·77	·95	4·72	8·02	35·39	13306	44	12406
Stat. 29. 21 VI, **1914.** 37° 15′ N. 11° 19′ W.										
19 17	0	18·50	36·40	26·23	5·74	8·22	26·23	0	180	0
	[10]	·20	·35	·27			·32	189	175	178
	25	17·50	·31	·42	5·87	8·24	·53	457	163	431
	50	16·45	·27	·64	·89	·22	·87	861	142	812
	75	15·30	·22	·86	·53	·22	27·21	1212	122	1143
	100	14·66	·14	·94	·32	·22	·40	1526	115	1440
	[150]	13·90	·00	27·00			·70	2124	110	2004
	200	·49	35·91	·02		8·18	·94	2702	111	2556
	[300]	·08	·78	·00			28·38	3909	115	3684
	400	12·70	·68	·00	5·08	8·08	·84	5144	118	4851
	[500]	11·96	·64	·11			29·42	6349	109	5988
	600	·22	·64	·25	4·20	8·05	30·03	7446	98	7023
	[700]	·04	·74	·36			·60	8438	89	7960
	800	10·95	·86	·47	4·44	8·02	31·17	9348	81	8811
	[900]	·75	·95	·58			·74	10173	72	9574
20 15	1000	·58	36·04	·68	4·17		32·29	10918	65	10258
	1200	·62	·22	·81	·32		33·34	12262	48	11482
	1400	8·80	35·90	·88	·80		34·37	13456	52	12574
	1600	6·91	·54	·88	·99		35·34	14556	49	13576
	[1800][1]	5·14	·26	·88			36·33	15596	36	14526
	2000	4·19	·12	·88	5·53		37·32	16560	44	15432
Stat. 30. 22 VI, **1914.** 36° 48′ N. 12° 12′ W.										
7 19	0	18·40	36·31	26·19	5·26	8·22	26·19	0	184	0
	[10]	·18	·29	·23			·28	193	179	182
	[25][2]	17·80	·26	·29	6·61	8·26	·40	473	174	447
	50	·05	·15	·40	5·70	·24	·64	921	164	869
6 50	75	14·64	·02	·85	·83	·22	27·20	1303	123	1229
	100	·07	35·98	·95	·91	·18	·41	1618	115	1528
	[150]	13·55	·89	·99			·68	2218	111	2093
	200	·14	·81	27·01	5·60	8·13	·94	2809	111	2649
	[300]	12·14	·67	·10			28·49	3951	106	3734
	400	11·41	·59	·18	5·06	8·05	29·03	5036	100	4766
	[500]	·15	·61	·24			·56	6078	96	5748
7 19	600	·01	·67	·32	4·32	8·05	30·10	7075	92	6687
	[700]	·06	·83	·43			·67	8000	83	7543
	800	·14	36·00	·55	4·07	8·02	31·25	8837	74	8347
	[900]	·05	·10	·64			·80	9597	67	9047
5 50	1000	10·90	·17	·72	4·31	8·02	32·33	10297	62	9691
	1200	·56	·26	·86	·24	·02	·38	11561	53	10845
	1400	8·84	35·95	·91	·56	·05	34·40	12681	49	11869
	1600	6·53	·53	·92	5·01	·02	35·40	13691	43	12793
	1800	5·11	·23	·87	·27	7·99	36·33	14671	47	13699
	2000	4·28	·12	·88	·44	·95	37·31	15645	45	14617
Stat. 31. 22 VI, **1914.** 36° 35′ N. 12° 46′ W.										
12 25	0	18·60	36·30	26·13	5·41	8·22	26·13	0	189	0
	[10]	·69	·31	·12			·17	201	190	190
	[25]	·80	·32	·10			·21	505	193	476
	[50]	16·34	·11	·54			·78	961	151	906
	[75]	15·45	·01	·67			27·01	1348	141	1270
	[100][2]	14·85	35·95	·75	5·47	8·32	·21	1710	133	1614
	[150]	13·95	·91	·92			·62	2376	117	2240
	200	·29	·89	27·04	5·36	8·16	·97	2976	108	2805
	[300]	12·28	·72	·11			28·50	4098	105	3872
	400	11·46	·58	·16	4·63	8·05	29·02	5185	102	4907
	[500]	·25	·66	·27			·58	6222	94	5885
	600	·17	·81	·39		8·02	30·17	7171	85	6778
	[700]	·15	·94	·50			·74	8029	77	7590
	800	·14	36·02	·56	4·29	8·02	31·26	8826	72	8337
	[900]	·16	·01	·55			·71	9622	75	9074
	1000	·19	35·99	·53	4·13	8·02	32·13	10464	80	9851
	1200	10·71	36·19	·77	·60	·02	33·29	12014	62	11270
	[1400][1]	9·05	35·92 *	·85		·05	34·34	13284	54	12435
Stat. 32. 22 VI, **1914.** 36° 17′ N. 13° 12′ W.										
18 27	0	18·70	36·33	26·13	5·51	8·24	26·14	0	188	0
	[10]	·65	·34	·15			·22	198	185	187
19 14	25	·52	·35	·20	5·72	8·29	·31	491	184	464
18 27	50	15·56	·12	·73	6·61	·22	·96	912	133	862
	75	14·82	·04	·83	5·36	·20	27·18	1259	125	1186
	100	·56	·02	·87	5·72	·20	·33	1585	122	1496
	[150]	13·93	35·92	·93			·63	2218	116	2092
	200	·31	·81	·98	5·03	8·18	·90	2833	114	2668
	[300]	12·59	·68	27·02			28·41	4035	113	3805
	400	·01	·59	·07	6·02	8·08	·92	5220	112	4929
	[500]	11·59	·65	·19			29·50	6347	101	5992
	600	·20	·73	·33	4·45	8·02	30·11	7369	91	6952
	[700]	·34	·81	·36			·60	8326	90	7859
	800	·51	·90	·40	4·30	8·02	31·09	9278	88	8751
	[900]	·34	36·02	·52			·67	10178	79	9586
19 14	1000	·05	·13	·67	4·53	8·02	32·27	10968	67	10316
	1200	10·31	·12	·79	·22	·02	33·33	12344	58	11572
	[1400][2]	9·20	35·92	·83	·46	·02	34·31	13608	57	12717
	1600	7·58	·64	·86	·71	·02	35·31	14802	52	13792
	[1800][1]	5·80	·32 +	·85		·05	36·29	15926	51	14828
	2000	4·84	·15	·84	5·40	7·95	37·24	17010	50	15842

* Stat. 31, 1400 meters observed S = 36·21 ‰.
\+ Stat. 32, 1800 meters observed S = 35·75 ‰.

Table II. (Continued.)

Stat. **33.** 23 VI, **1914.** 35°35′ N. 14°10′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
6 45	0	18·50	36·27	26·14	5·38	8·26	26·14	0	189	0
	[10]	·25	·27	·20			·25	197	182	186
6 14	25	17·91	·27	·28	5·85	8·32	·39	481	176	454
	50	15·37	·13	·78	6·02	·32	27·02	885	128	834
	75	14·99	·12	·86	5·33	·24	·20	1218	123	1148
	100	·55	·03	·88	·30	·24	·34	1540	121	1453
	[150]	·06	35·93	·91			·61	2176	118	2051
	200	13·62	·85	·94	5·51	8·22	·86	2804	118	2641
	[300]	12·50	·70	27·05			28·44	4011	110	3783
	400	11·53	·57	·14	4·79	8·08	·99	5143	104	4858
	[500]	·25	·52	·15			29·47	6250	104	5903
	600	·16	·50	·16	5·05	8·05	·94	7372	107	6950
	[700]	10·71	·57	·29			30·54	8442	96	7974
	800	·09	·68	·49	3·97	8·05	31·20	9367	78	8838
	[900]	9·95	·77	·58			·75	10172	71	9582
7 05	1000	·87	·85	·66	4·13	8·02	32·29	10914	66	10267
	1200	·43	·90	·77	·36	·02	33·33	12274	59	11517
	1400	·03	·90	·84	·26	7·95	34·33	13524	56	12665
	1600	6·87	·49	·85	5·04	·95	35·32	14694	51	13737
	[1800][1]	·86	·51*	·87			36·26	15824	54	14783
	2000	4·52	·16	·88	5·41	7·95	37·30	16874	45	15773

Stat. **34.** 23 VI, **1914.** 34°54′ N. 15°13′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
18 20	0	18·90	36·50	26·21	5·44	8·29	26·21	0	182	0
	[10]	·85	·48	·21			·26	193	181	182
19 43	25	·72	·44	·21	5·80	8·24	·32	481	183	455
	[50][1]	16·50	·24	·60	·44		·84	916	145	865
19 20	75	·25	·31	·71	·73	8·22	27·06	1303	136	1218
	100	·49	·44	·76	·36	·20	·22	1659	132	1553
	[150]	15·90	·33	·81			·50	2351	128	2204
	200	·08	·14	·85	4·95	8·05	·77	3028	127	2843
	[300]	13·50	35·90	27·00			28·38	4310	115	4055
	400	12·33	·68	·07	4·72	8·05	·92	5515	111	5190
	[500]	11·90	·57	·07			29·38	6702	113	6311
	600	·71	·53	·07	4·73	8·05	·85	7907	116	7453
	[700]	·00	·45	·16			30·41	9090	108	8524
	[800][1]	10·01	·46	·33	4·21	7·99	31·05	10159	92	9529
	[900]	9·70	·58	·47			·65	11091	81	10395
18 20	1000	·60	·71	·59	4·13	7·99	32·23	11913	71	11153
	1200	·62	·92	·76	·24	·99	33·31	13353	59	12457
	1400	8·14	·74	·85	·50	·95	34·36	14587	52	13577
	1600	6·68	·49	·87	5·00	·95	35·35	15691	47	14569
	1800	7·08	·52	·85	·10	·95	36·23	16825	56	15599
	[2000][1]	4·86	·20†	·87			37·27	17935	48	16635

Stat. **35.** 24 VI, **1914.** 34°13′ N. 16° 7′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
6 29	0	19·30	36·56	26·16	5·35	8·29	26·16	0	187	0
	[10]	·40	·55	·13			·18	199	189	188
7 30	25	·55	·54	·08	5·61	8·26	·19	504	195	476
6 29	50	17·07	·36	·56	6·18	·26	·80	961	149	906
	75	16·34	·28	·67	5·70	·20	27·02	1345	140	1268
	100	15·61	·27	·83	·30	·20	·29	1696	126	1602
	[150]	14·82	·13	·90			·60	2347	119	2215
	200	·14	·01	·96	5·13	8·13	·88	2974	116	2806
	[300]	13·05	35·80	27·03			28·41	4189	113	3952
	400	11·99	·63	·10	4·74	8·02	·95	5356	108	5058
	[500]	·25	·56	·18			29·50	6468	101	6108
	600	10·68	·53	·26	4·32	7·99	30·05	7520	97	7098
	[700]	·43	·57	·34			·59	8510	91	8036
	800	·22	·64	·43	4·36	7·99	31·14	9440	83	8907
	[900]	9·83	·69	·54			·72	10290	74	9695
7 29	1000	·44	·75	·65	4·15	7·95	32·29	11047	66	10397
	1200	·81	36·01	·79	·63	·95	33·34	12397	57	11631
	1400	8·13	35·70	·83	·88	·95	34·34	13627	55	12753
7 29	1600	6·62	35·46	27·85	5·16	7·99	35·33	14777	50	13805
	1800	5·57	·32	·88	·30	·92	36·32	15847	47	14783
	2000	4·75	·16	·85	·41	·92	37·26	16887	49	15745

Stat. **36.** 24 VI, **1914.** 33°55′ N. 16°29′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
13 26	0	19·80	36·63	26·08	5·64	8·26	26·08	0	194	0
	[10]	·85	·62	·06			·10	207	196	195
	[25]	·80	·60	·05			·16	520	198	491
	[50]	17·16	·34	·52			·76	984	153	929
	[75]	15·85	·25	·76			27·11	1361	132	1285
	[100]	·39	·23	·85			·31	1699	124	1606
	[150]	14·70	·11	·91			·61	2342	119	2212
	200	13·90	35·95	·96	4·92	8·13	·88	2966	116	2799
	[300]	12·70	·76	27·06			28·45	4158	110	3927
	400	11·73	·62	·14	4·86	8·02	·99	5285	104	4997
	[500]	·15	·56	·20			29·52	6367	99	6017
	600	10·65	·54	·28	4·40	7·99	30·07	7402	95	6990
	[700]	·26	·60	·39			·64	8359	86	7896
	800	9·96	·68	·51	4·55	7·95	31·22	9221	75	8703
	[900]	·74	·66	·53			·71	10033	75	9455
	1000	·60	·64	·54	4·52	8·05	32·18	10850	76	10210
	1200	·50	·81	·69	·14	7·95	33·25	12400	67	11638
	1400	7·86	·61	·79	·15	·99	34·32	13740	56	12870

Stat. **37.** 24 VI, **1914.** 33°38′ N. 16°43′ W. 3908 meters.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
19 15	0	19·80	36·63	26·08	6·14	8·29	26·08	0	195	0
	[10]	·78	·61	·07			·11	207	195	195
	25	·74	·58	·06	5·69	8·32	·17	518	197	489
19 40	50	17·13	·35	·54	6·08	·20	·77	980	151	925
19 15	75	16·03	·33	·78	5·68	·18	27·13	1353	130	1277
	100	15·71	·31	·84	·90	·20	·30	1690	125	1597
	[150]	·25	·17	·84			·53	2356	126	2225
19 40	200	14·74	·02	·83	5·48	8·11	·75	3031	129	2863
	[300]	13·20	35·80	·99			28·37	4326	116	4087
	400	11·85	·63	27·13	4·76	8·02	·98	5496	105	5194
	[500]	·14	·53	·18			29·50	6593	101	6229
	600	10·70	·50	·24	4·29	7·95	30·03	7658	99	7230
	[700]	·40	·55	·33			·58	8665	92	8184
	800	·09	·64	·46	4·05	7·95	31·17	9585	80	9046
	[900]	9·75	·73	·58			·76	10400	70	9801
20 23	1000	·28	·77	·70	4·29		32·34	11112	62	10463
	1200	8·49	·75	·81	·55		33·39	12356	53	11611
	1400	7·22	·61	·89	5·53		34·43	13436	46	12599
	1600	6·42	·52	·93	·09		35·41	14406	42	13481
	1800	5·66	·37	·91	·49		36·35	15360	45	14355
	2000	4·74	·25	·93	·95		37·33	16294	42	15229

Stat. **38.** 25 VI, **1914.** 33°15′ N. 17°28′ W.

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
6 35	[0][2]	19·60	36·68	26·16	5·42	8·26	26·16	0	187	0
	[10]	·65	·68	·15			·20	198	187	187
8 00	[25][2]	·65	·67	·15	5·48	8·29	·26	498	188	470
6 35	50	17·45	·53	·60	6·45	·29	·83	945	146	891
	[75][2]	·18	·54	·67	5·46	·26	27·02	1324	140	1249
	100	16·95	·54	·73	·25	·24	·18	1689	137	1596
	[150]	·38	·50	·83			·52	2386	122	2254
	200	15·86	·42	·89	5·17	8·18	·80	3051	123	2875
	[300]	14·26	·06	·97			28·35	4333	118	4084
7 27	400	12·88	35·77	27·03	4·78	8·08	·87	5573	116	5257
	[500]	11·82	·63	·13			29·44	6756	107	6374
6 35	600	·03	·55	·22	4·94	8·05	30·00	7861	101	7414
	[700]	10·79	·53	·24			·49	8928	101	8424
	800	·61	·52	·27	4·18	8·02	·98	9890	99	9422
	[900]	9·75	·56	·45			31·63	10965	83	10330
7 27	1000	8·78	·61	·65	4·35	7·99	32·31	11757	64	11067
	1200	·33	·72	·81	·84	·95	33·40	13021	52	12233
	1400	7·24	·53	·82	·81	·95	34·37	14155	51	13271
	2000	4·48								

* Stat. 33, 1800 meters observed S = 35·61 ‰.
† Stat. 34, 2000 meters observed S = 36·03 ‰.

Table II. (Continued.)

Stat. **39.** 27 VI, **1914.** 32°55′ N. 17°36′ W.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
12 53	[0][1]	20·20	36·66	25·99	5·25	8·24	25·99	0	203	0
	[10]	·20	·64	·98			26·03	215	203	203
	[25]	·22	·61	·95			·06	541	207	511
	[50]	18·05	·49	26·42			·65	1031	162	973
	[75]	17·41	·45	·54			·89	1449	153	1367
	[100]	·09	·46	·63			27·09	1843	145	1740
	[150]	16·45	·39	·73			·42	2588	136	2442
	200	15·86	·30	·80	4·97	8·18	·71	3302	133	3114
	[300]	14·45	·04	·91			28·29	4662	124	4396
	400	13·10	35·80	27·01	4·99	8·05	·85	5942	118	5604
	[500]	12·10	·66	·10			29·41	7152	110	6776
	600	11·21	·56	·19	4·91	7·99	·97	8289	104	7848
	[700]	10·47	·50	·28			30·53	9349	97	8852
	800	9·86	·50	·39	4·91	7·95	31·11	10326	87	9771
	[900]	·56	·58	·50			·69	11211	78	10596
	1000	·35	·67	·60	4·90	7·95	32·26	11998	70	11336
	[1200]	8·41	·67	·75			33·34	13372	58	12620
	1400	7·08	·52	·84	4·63	7·92	34·39	14551	50	13704
	[1600]	6·20	·40	·87			35·36	15616	48	14680
	[1800]	5·31	·28	·88			36·33	16636	46	15618
	2000	4·37	·16	·90	5·42	7·95	37·32	17596	43	16514

Stat. **40.** 27 VI, **1914.** 33°9′ N. 17°59′ W.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
18 19	0	19·90	36·63	26·05	5·25	8·22	26·05	0	197	0
	[10]	·91	·61	·03			·08	210	198	198
19 05	25	·93	·58	·00	5·47	8·29	·11	528	203	499
18 19	50	17·75	·40	·42	·82	·26	·65	1012	162	956
	75	16·86	·35	·60	·55	·22	·95	1422	147	1343
	100	·85	·42	·66	·65	·22	27·11	1805	142	1705
	[150]	·31	·35	·73			·42	2545	136	2402
	200	15·59	·22	·80	5·20	8·18	·72	3256	132	3072
	[300]	14·20	35·94	·89			28·27	4621	125	4460
	400	12·90	·70	·97	4·76	8·13	·81	5928	121	5692
	[500]	11·84	·57	27·08			29·39	7163	112	6857
	600	10·99	·47	·16	4·82	8·02	·95	8320	106	7948
	[700]	11·04	·48	·16			30·41	9455	108	9023
	800	·18	·50	·15	4·49	8·05	·85	10622	111	10120
	[900]	10·60	·48	·24			31·41	11774	104	11194
19 05	1000	9·98	·47	·34	4·29	7·95	·95	12859	95	12191
	1200	8·95	·64	·65	·36	·95	33·22	14663	71	13859
	1400	7·22	·52	·82	·75	·92	34·37	15977	52	15089
	[1600][1]	5·95	·47*	·95			35·45	16977	39	15995
	1800	4·96	·38	28·00	4·91	7·95	36·46	17781	34	16725
	2000	·38	·23	27·95	5·33	·92	37·38	18555	38	17445

Stat. **41.** 28 VI, **1914.** 33°45′ N. 18°54′ W.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
7 13	0	19·50	36·54	26·09		8·22	26·09	0	193	0
	[10]	·65	·53	·04			·09	207	197	196
8 13	25	·82	·52	25·99		8·22	·10	526	204	497
7 13	50	17·51	·36	26·45		·24	·68	1008	159	952
	75	16·60	·36	·67		·20	27·02	1406	140	1327
8 46	100	·06	·35	·79		·20	·25	1763	130	1665
	[150]	15·50	·22	·82			·51	2445	127	2309
7 13	200	14·88	·08	·85		8·16	·77	3120	127	2945
	[300]	13·58	35·87	·97			28·33	4422	118	4171
	400	12·36	·68	27·07	4·62	8·08	·91	5644	112	5322
	[500]	11·45	·58	·16			29·48	6786	103	6399
	600	10·70	·51	·25	4·45	8·02	30·04	7856	98	7406
	[700]	·25	·54	·35			·60	8851	90	8345
	800	9·90	·59	·45	4·26	7·99	31·17	9766	81	9200
	[900]	·70	·64	·52			·70	10613	76	9985
8 13	[1000][1]	·48	·70	·61	4·27	7·95	32·24	11403	69	10712
	1200	8·56	·72	·77	·37	·95	33·35	12777	56	11972
	1400	7·40	·57	·83	·82	·95	34·37	13951	51	13050
	1600	6·39	·50	·92	·62	·95	35·40	14991	43	13998
8 13	1800	5·18	35·27	27·89		7·95	36·34	15961	45	14882
	2000	4·63	·17	·87		·95	37·29	16845	47	15798

Stat. **42.** 28 VI, **1914.** 33°54′ N. 19°15′ W.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
13 40	0	19·60	36·64	26·14		8·22	26·14	0	189	0
	[10]	·65	·62	·11			·16	201	191	190
	[25]	·70	·56	·05			·16	510	198	481
	[50]	17·65	·43	·47			·70	981	157	925
	[75]	16·83	·38	·63			·98	1382	144	1302
	100	·34	·35	·72		8·18	27·18	1752	136	1653
	[150]	15·90	·31	·79			·48	2459	130	2320
	200	·51	·26	·85		8·16	·76	3145	128	2966
	[300]	14·14	·01	·95			28·33	4460	120	4206
	400	12·78	35·77	27·05		8·08	·89	5700	114	5378
	[500]	11·78	·62	·13			29·44	6872	107	6485
	600	10·97	·54	·22		8·02	30·01	7974	101	7523
	[700]	·35	·53	·32			·57	8996	93	8491
	800	9·93	·54	·40		8·05	31·12	9948	85	9393
	[900]	·83	·59	·46			·64	10850	82	10221
	1000	·64	·63	·52		7·99	32·15	11717	78	11021
	[1200]	·00	·63	·63			33·22	13327	70	12499
	1400	7·92	·55	·74		7·95	34·26	14757	62	13811

Stat. **43.** 28 VI, **1914.** 34°09′ N. 19°39′ W.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
19 08	0	20·00	36·56	25·97	5·62	8·26	25·97	0	205	0
	[10]	19·96	·56	·98			26·03	216	203	204
20 36	25	·90	·56	26·00	5·59	8·26	·11	538	203	509
19 08	50	18·81	·46	·20	·89	·32	·43	1050	183	992
	75	17·40	·26	·40	6·31	·24	·75	1513	168	1432
	100	16·91	·29	·54	5·86	·18	27·00	1936	153	1834
	[150]	·20	·21	·65			·34	2724	143	2576
	200	15·50	·12	·74	4·99	8·16	·66	3470	137	3279
	[300]	14·15	35·92	·88			28·26	4870	126	4598
19 53	400	12·79	·73	27·01	4·80	8·08	·86	6157	117	5814
	[500]	11·90	·64	·12			29·43	7347	108	6937
19 08	600	·11	·57	·22	4·59	7·99	30·00	8457	101	7982
	[700]	10·54	·56	·31			·56	9487	94	8957
	800	9·97	·55	·41	4·29	7·95	31·12	10442	85	9852
	[900]	·50	·57	·50			·69	11319	78	10667
19 53	1000	·08	·60	·59	4·39	7·95	32·24	12116	70	11409
	1200	7·97	·55	·73	·53	·95	33·33	13516	59	12703
	1400	6·75	·43	·81	·94	·95	34·37	14710	51	13799
	1600	5·81	·25	·80	5·34	·92	35·31	15840	52	14831
	1800	4·71	·10	·81	·33	·92	36·29	16954	51	15861
	2000	4·09	·07	·86	·86	·89	37·30	17974	45	16821

Stat. **44.** 29 VI, **1914.** 34°33′ N. 20°27′ W.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4\Delta P$	$10^5\Delta\alpha$	$10^4\Delta D$
7 47	0	19·90	36·51	25·96	5·32	8·32	25·96	0	206	0
	[10]	·92	·50	·94			·99	219	207	206
	25	·98	·49	·92	5·39	8·32	26·03	549	210	519
9 20	50	17·94	·28	26·29	·96	·26	·52	1060	175	1000
	75	16·61	·20	·54	·29	·24	·89	1495	153	1410
7 00	100	15·77	·08	·65	·25	·20	27·11	1886	143	1780
	[150]	14·90	35·99	·77			·47	2614	132	2468
	200	·22	·90	·86	4·89	8·18	·78	3299	126	3114
	[300]	13·10	·76	·98			28·36	4586	117	4328
	400	12·08	·63	27·09	5·15	8·13	·94	5783	110	5461
	[500]	11·15	·52	·17			·49	6908	102	6522
7 00	600	10·35	·46	·27	4·56	8·08	30·06	7963	96	7515
	[700]	9·75	·48	·39			·64	8925	86	8425
	[800][1]	·40	·56	·51	4·59	8·08	31·24	9782	75	9230
	[900]	·20	·65	·61			·80	10544	67	9938
	1000	8·95	·70	·69	4·50	8·02	32·33	11236	61	10578
	[1200]	7·85	·58	·77			33·38	12476	54	11736
9 20	1400	6·44	·37	·81	5·04	7·92	34·38	13626	51	12790
	1600	4·75	·16	·85	·55	·95	35·41	14656	44	13740
	1800	·35	·07	·83	·70	·95	36·33	15636	47	14652
	2000	3·91	·06	·87	·73	·92	37·32	16600	44	15560

* Stat. 40, 1600 meters observed S = 35·70 ‰.

Table II. (Continued.)

Stat. **45.** 29 VI, **1914.** 34° 59′ N. 21° 7′ W.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
21 07	0	19·90	36·41	25·88	5·60	8·24	25·88	0	213	0
	[10]	·85	·38	·88			·93	226	212	213
	25	·67	·32	·88	6·15		·99	564	214	533
19 40	50	15·89	·07	26·61	·26	8·26	26·85	1040	144	981
21 07	75	14·84	·08	·86	5·63		27·20	1394	120	1312
19 40	100	·43	·01	·89	·55	8·18	·35	1715	120	1612
	[150]	·01	35·98	·96			·66	2335	114	2196
	[200][1]	13·62	·96*	27·03		8·22	·95	2929	110	2755
	[300]	12·50	·76	·10			28·49	4066	106	3834
	400	11·39	·55	·16	4·76	8·08	29·02	5161	102	4874
	[500]	·14	·53	·18			·50	6241	101	5891
	600	10·86	·53	·23	4·95	8·08	30·02	7311	100	6897
	[700]	·20	·56	·37			·63	8301	87	7833
	800	9·44	·61	·54	4·27	7·95	31·27	9151	72	8630
	[900]	·20	·70	·65			·84	9878	63	9305
20 23	987	·06	·77	·73		8·02				
	[1000]	·00	·77	·74			32·39	10525	57	9905
	1200	7·85	·62	·80			33·41	11705	51	10989
	1400	6·22	·35	·82			34·40	12789	48	11985
	1600	5·00	·17	·83			35·38	13823	47	12935
	1800	4·42	·16	·89			36·39	14773	42	13821
	2000	3·99	·08	·87			37·32	15677	44	14677

Stat. **46.** 30 VI, **1914.** 35° 20′ N. 21° 48′ W.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
7 06	0	19·80	36·41	25·91		8·24	25·91	0	210	0
	[10]	·83	·40	·89			·94	224	211	211
8 47	25	·87	·40	·88	5·74	8·32	·99	561	214	530
7 06	50	17·60	·34	26·41	6·09	·32	26·64	1062	163	1001
	75	15·73	·18	·74	5·44	·18	27·08	1452	134	1373
	100	14·70	·03	·85	6·21	·18	·31	1793	124	1697
	[150]	13·85	35·90	·93			·63	2432	116	2299
	200	·21	·82	27·00	5·17	8·13	·92	3041	112	2871
	[300]	12·33	·67	·06			28·45	4213	110	3981
	400	11·61	·57	·13	4·92	8·11	·98	5348	106	5059
	[500]	·18	·54	·18			29·50	6448	101	6096
	600	10·75	·53	·25	5·94	8·05	30·04	7508	98	7093
	[700]	·12	·53	·36			·62	8493	88	8025
	800	9·47	·54	·48	4·25	8·02	31·21	9378	78	8856
	[900]	·29	·60	·56			·75	10180	71	9602
8 47	1000	·19	·68	·64	4·32	7·95	32·28	10927	66	10291
	1200	8·19	·67	·79	·76	·95	33·38	12241	54	11493
	1400	6·64	·48	·87	5·15	·95	34·42	13345	46	12492
	1600	5·83	·37	·89	·79	8·02	35·40	14345	44	13393
	1800	4·58	·17	·88	·59	7·95	36·36	15299	44	14273
	2000	·03	·03	·83	6·16	·95	37·28	16269	47	15187

Stat. **47.** 30 VI, **1914.** 35° 43′ N. 22° 35′ W.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
19 07	0	20·10	36·48	25·88	5·86	8·24	25·88	0	213	0
	[10]	·02	·45	·88			·93	226	212	213
20 06	25	19·86	·39	·88	5·59	8·26	·99	564	214	532
20 56	50	17·65	·22	26·31	7·62		26·54	1077	172	1015
20 06	75	15·24	·06	·75	5·65	8·22	27·10	1482	133	1402
20 56	100	14·96	·04	·80	·96		·26	1828	129	1729
	[150]	·66	·02	·85			·55	2499	124	2363
	200	·37	·00	·90	5·23		·82	3152	121	2978
	[300]	13·25	35·81	·99			28·37	4414	116	4167
	400	12·10	·63	27·08	5·24		·93	5614	111	5302
	[500]	11·30	·54	·16			29·48	6749	103	6373
	600	10·72	·51	·24	5·10		30·03	7821	98	7382
	[700]	·50	·59	·34			·59	8821	91	8329
20 06	800	·24	·67	·45	4·54	8·02	31·17	9738	81	9189
	[900]	9·90	·72	·55			·73	10573	73	9961
19 07	1000	·47	·76	·66	4·28	7·95	32·29	11325	65	10656
20 06	1200	·11	·84	·78	·33	·99	33·35	12655	56	11876
	1400	7·09	·54	·86	5·49	·95	34·40	13805	48	12927
	1600	5·05	·16	·82	·45	·95	35·36	14855	48	13892

* Stat. 45, 200 meters observed S = 36·04 ‰.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
20 06	1800	4·36	35·06	27·82	5·84		36·32	15905	48	14854
19 07	2000	3·98	·05	·85	·80	7·95	37·30	16899	45	15790

Stat. **48.** 1 VII, **1914.** 36° 3′ N. 23° 9′ W.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
	0	20·00	36·26	25·74	5·45	8·22	25·74	0	226	0
	[10]	19·36	·26	·90			·95	232	210	218
6 56	25	18·32	·25	26·17	5·62	8·22	26·28	547	187	516
7 55	50	15·57	35·99	·63	6·02	·18	·86	1013	143	929
6 56	75	14·98	36·00	·76	5·70	·18	27·11	1351	132	1272
	100	·53	35·98	·85	·46	·13	·31	1686	124	1593
	[150]	·15	·93	·89			·59	2336	120	2204
7 55	200	13·78	·88	·93	5·40	8·13	·85	2971	119	2802
	[300]	·00	·76	27·00			28·38	4211	115	3971
6 56	400	12·10	·62	·07	5·22	8·08	·92	5406	111	5102
	[500]	11·40	·55	·15			29·47	6548	104	6180
	600	10·78	·52	·23	5·04	8·08	30·02	7633	100	7201
	[700]	·34	·54	·33			·58	8645	92	8160
	800	9·96	·59	·44	4·14	8·05	31·16	9572	82	9029
	[900]	·75	·67	·54			·72	10414	74	9821
	1000	·59	·75	·63	4·17	8·02	32·26	11184	68	10522
7 55	1200	7·59	·48	·74	·90	7·89	33·35	12544	57	11770
	1400	6·35	·40	·84	5·01	·89	34·41	13684	47	12814
	1600	5·35	·23	·84	·25	·89	35·36	14724	47	13760
	1800	4·49	·14	·87	·67	·81	36·35	15718	45	14678
	2000	3·94	·06	·86	·85	·81	37·31	16668	45	15570

Stat. **49.** 1 VII, **1914.** 36° 16′ N. 23° 21′ W.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
13 10	1000	8·87	35·60	27·63						
	2400	3·29	34·97	·86						
	2800	2·87	·93	·86						
	3200	·74	·92	·86						

Stat. **50.** 1 VII, **1914.** 36° 30′ N. 23° 45′ W.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
20 06	0	20·20	36·19	25·64	5·36	8·26	25·64	0	236	0
	[10]	·16	·22	·67			·72	248	232	235
	25	·07	·25	·72	5·35	8·26	·83	615	229	580
21 15	50	17·09	·19	26·43	·96		26·66	1132	162	1069
20 06	75	15·99	·11	·62	·58	8·24	·97	1539	145	1453
21 15	100	14·88	35·98	·77	·48		27·23	1905	132	1800
	[150]	·60	·98	·83			·53	2588	126	2446
	200	·34	·97	·88	5·85		·80	3251	123	3071
	[300]	13·40	·82	·96			28·34	4536	119	4281
	400	12·32	·64	27·04	5·05		·89	5768	114	5446
	[500]	11·46	·54	·13			29·45	6938	106	6550
	600	10·75	·49	·22	5·98		30·01	8038	101	7586
	[700]	·18	·49	·32			·58	9058	92	8552
	800	9·60	·49	·42	4·45		31·15	9993	83	9430
	[900]	·10	·52	·53			·73	10838	56	10128
	1000	8·77	·58	·63	5·65		32·29	11593	66	10741
20 06	1200	·35	·70	·79	4·64	7·95	33·38	12897	54	11944
	1400	6·56	·46	·86	·93	·89	34·43	13991	46	12944
	1600	5·22	·22	·85	5·76		35·38	14995	46	13864
	[1800]	4·49	·13	·86			36·35	15975	45	14774
	2000	3·82	·06	·88	5·98		37·33	16905	42	15646
	2400	·23	34·98	·87	6·56					
	[2500]	·12	·97	·87			39·68	19155	43	17771

Stat. **51.** 2 VII, **1914.** 37° 5′ N. 24° 45′ W. 2089 meters.

GMT	a	$t°C$	$S‰$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
7 58	0	20·40	36·40	25·75	6·06	8·26	25·75	0	226	0
	[10]	·18	·42	·79			·84	237	221	224
	25	19·44	·46	26·04	5·47	8·26	26·15	570	198	538
9 17	50	17·57	·27	·37	·66	·26	·60	1057	167	995
7 58	75	16·61	·22	·56	6·12	·20	·91	1478	151	1393
9 17	100	·30	·16	·59	5·39	·18	27·05	1875	149	1769
	[150]	15·50	·09	·72			·41	2633	137	2489
	200	14·79	·02	·82	5·33	8·13	·74	3341	130	3151
	[300]	13·69	35·88	·95			28·33	4663	120	4401
	400	12·60	·75	27·07	5·03	8·08	·91	5890	112	5562
	[500]	11·51	·61	·17			29·48	7030	103	6638

Table II. (Continued.)

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
9 17	600	10·54	35·50	27·27	5·69	7·99	30·06	8087	96	7633
	[700]	·40	·60	·47			·62	9059	88	8553
	800	·21	·70	·48	4·55	7·95	31·20	9945	68	9334
	[900]	9·45	·64	·56			·75	10755	72	10035
	1000	8·43	·52	·64	4·54	7·95	32·29	11495	65	10721
7 58	1200	6·30	·27	·74	5·15	·95	33·39	12785	54	11913
	1400	5·57	·20	·79	·20	·95	34·39	13915	49	12947
	1600	4·55	·05	·79	·77	·99	35·35	14989	48	13927
	1800	3·94	34·98	·80	6·04	·95	36·32	16034	48	14897
	2000	·50	·95	·82	·36	·92	37·29	17544	46	15843
Stat. 52. 2 VII, **1914.** 37° 32′ N. 25° 21′ W. 1916 meters.										
	0	19·90	36·15	25·69	5·64	8·29	25·69	0	231	0
	[10]	·71	·09	·69			·74	245	230	231
20 35	25	·41	·03	·70	5·74	8·32	·81	611	231	577
19 47	50	15·60	35·95	26·59	·86	·22	26·82	1111	147	1049
20 35	75	14·71	·92	·76	·50	·18	27·11	1481	132	1398
19 47	100	·35	·89	·82	·34	·16	·28	1822	127	1822
	[150]	13·75	·82	·89			·59	2478	130	2339
20 55	200	·24	·76	·95	5·66		·88	3108	116	2931
	[300]	12·35	·65	27·04			28·43	4313	111	4070
	400	11·50	·55	·13	5·70		·98	5455	105	5154
	[500]	10·70	·45	·20			29·52	6540	99	6176
	600	·02	·37	·26	4·79		30·05	7580	96	7153
	[700]	9·50	·43	·39			·65	8540	85	8060
	800	8·98	·51	·54	4·74		31·28	9372	71	8843
	[900]	·25	·47	·62			·83	10099	64	9520
19 42	1000	7·43	·40	·69	5·10	7·92	32·37	10759	58	10133
	1200	6·25	·24	·73	·12	·89	33·38	11984	55	11266
	1400	5·50	·16	·76	·93	·89	34·36	13149	52	12336
	1600	4·89	·13	·81	·72	·86	35·36	14239	48	13336
	1800	·05	·00	·80	6·01	·86	36·32	15269	48	14296
Stat. 53. 6 VII, **1914.** 38° 43′ N. 25° 39′ W.										
20 11	[0][1]	20·70	36·20	25·52	5·31	8·22	25·52	0	252	0
	[10]	·02	·09	·63			·68	256	236	245
21 14	25	19·01	·02	·82	5·76	8·26	·93	618	220	587
20 26	[50][1]	15·35	35·92	26·62	6·19	·22	26·86	1100	143	1042
21 14	75	14·11	·86	·85	5·48		27·20	1453	123	1376
20 76	100	13·83	·86	·91	·48	8·13	·37	1773	118	1678
	[150]	·30	·80	·97			·67	2386	112	2256
21 14	200	12·79	·73	27·02	5·21		·95	2977	110	2814
	[300]	·10	·66	·10			28·45	4114	106	3895
	400	11·51	·61	·17	5·18		29·02	5204	101	4932
	[500]	10·95	·54	·22			·53	6261	98	5928
	600	·39	·50	·29	5·79		30·08	7278	94	6886
	[700]	9·98	·52	·38			·64	8230	86	7788
	800	·54	·54	·47	4·27		31·20	9110	79	8614
	[900]	·10	·58	·57			·77	9910	70	9360
20 26	1000	8·62	·61	·68	4·43	7·89	32·34	10620	62	10021
	1200	6·91	·44	·80	·87	·89	33·42	11834	50	11143
	1400	5·17	·17	·81	5·45	·89	34·42	12894	46	12109
	1600	4·17	·00	·79	·91	·86	35·37	13918	46	13035
Stat. 54. 7 VI, **1914.** 39° 31′ N. 25° 25′ W.										
8 14	0	20·20	36·13	25·59		8·22	25·59	0	241	0
	[10]	19·50	·11	·74			·79	247	226	234
	25	18·79	·08	·92		8·32	26·03	593	210	560
	50	15·31	·00	26·69		·20	·93	1053	136	993
	[75][1]	14·22	35·97	·90		·13	27·25	1391	118	1311
	100	13·84	·94	·97			·43	1696	114	1600
	[150]	·29	·83	27·00			·70	2288	110	2158
	200	12·83	·74	·02		8·08	·95	2873	110	2740
	[300]	·11	·64	·08			28·47	4020	107	3830
	400	11·45	·57	·16	5·17	8·08	29·01	5125	102	4781
	[500]	10·96	·54	·22			·54	6187	98	5781
	600	·50	·53	·29	4·84	8·02	30·08	7204	94	6740
	[700]	·10	·54	·37			·63	8161	87	7647
	800	9·74	·55	·44	4·24	7·95	31·17	9061	81	8497

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
8 14	[900]	9·47	35·55	27·49			31·68	9921	79	9292
	1000	·17	·54	·53	4·51	7·89	32·20	10746	76	10069
7 16	1200	7·44	·52	·79		·81	33·40	12126	52	11359
	1400	5·22	·17	·81		·81	34·42	13216	46	12349
	1600	4·37	·08	·83		·81	35·40	14216	44	13255
	1800	3·79	·00	·83		·81	36·36	15170	44	14139
	2000	·54	34·97	·83		·81	37·30	16124	47	15053
Stat. 55. 8 VII, **1914.** 41° 31′ N. 24° 49′ W.										
	[0][1]	19·30	35·85	25·63	5·93	8·18	25·63	0	237	0
	[10]	·18	·84	·65			·70	250	234	236
8 38	25	18·97	·82	·67	5·78	8·26	·78	621	234	587
7 32	50	13·61	·78	26·89	6·30	·18	27·13	1087	117	1026
8 38	75	·44	·79	·93	5·32	·13	·28	1396	115	1317
7 32	100	·00	·74	·99	·70	·13	·45	1695	111	1597
	[150]	12·51	·70	27·05			·75	2267	105	2139
8 38	200	·17	·67	·10	6·30	8·08	28·02	2819	103	2661
	[300]	11·74	·61	·13			·52	3904	103	3693
	400	·32	·55	·16	5·54	8·02	29·02	4981	102	4718
	[500]	·00	·51	·19			·51	6056	100	5730
	600	10·67	·49	·24	5·60	8·08	30·03	7116	99	6726
	[700]	·25	·44	·27			·53	8151	98	7708
	800	9·77	·39	·31	6·21	8·02	31·03	9168	94	8669
	[900]	·10	·31	·36			·56	10155	90	9594
	1000	8·37	·24	·43	4·73	7·92	32·10	11090	84	10467
7 32	1200	6·92	·25	·65	·87	·89	33·27	12694	64	11953
	1400	5·81	·21	·77	5·28	·89	34·36	13968	52	13121
	1600	4·50	·07	·81	·85	·89	35·38	15048	46	14107
	1800	3·89	34·99	·81	6·02	·92	36·34	16048	47	15033
	2000	·61	·97	·82	·20	·92	37·29	17038	32	15823
Stat. 56. 8 VII, **1914.** 42° 28′ N. 24° 39′ W.										
19 10	0	18·60	35·87	25·80	5·45	8·22	25·80	0	221	0
	[10]	·50	·87	·83			·88	232	217	219
20 32	25	·31	·86	·88	5·79	8·26	·99	575	214	543
19 23	50	13·57	·71	26·84	6·82	·18	27·08	1021	122	964
20 32	75	12·88	·71	·98	5·86	·16	·33	1330	110	1255
19 23	100	·65	·69	27·02	6·11	·11	·48	1619	108	1529
	[150]	·36	·64	·03			·73	2189	107	2066
20 32	200	·09	·58	·04	6·20	8·08	·97	2760	108	2605
	[300]	11·65	·55	·10			28·49	3887	105	3677
	400	·10	·53	·19	6·77	8·02	29·04	4967	99	4704
	[500]	10·50	·47	·25			·57	5997	94	5674
	600	9·82	·40	·32	5·28	8·02	30·11	6982	91	6601
	[700]	8·96	·33	·40			·67	7904	83	7473
	800	·22	·28	·48	4·65	7·89	31·23	8754	76	8269
	[900]	7·93	·33	·56			·78	9534	69	8998
	[1000][2]	·71	·39	·64	4·84	7·89	32·32	10249	63	9659
19 23	1200	6·56	·35	·78		·89	33·42	11489	51	10803
	1400	4·63	·08	·80	5·65	·89	34·48	12549	46	11773
	1600	3·96	·00	·81	6·08	·92	35·39	13539	44	12669
	[1800]	·76	34·98	·82			36·35	14509	45	13557
	[2000][1]	·63	·98*	·83			37·29	15479	45	14462
	2400	·25								
	[2500]	·05	·94	·85			39·66	17879	44	16707
Stat. 57. 9 VII, **1914.** 43° 36′ N. 24° 14′ W.										
12 18	0	18·60	35·81	25·76	5·81	8·29	25·76	0	225	0
	[10]	·46	·81	·80			·85	236	220	223
13 29	25	·21	·80	·85	6·07	8·32	·96	582	217	550
12 38	50	13·83	·80	26·86	5·59	·22	27·10	1029	120	972
13 29	75	·06	·73	·97	·55	·13	·32	1338	112	1263
12 38	100	12·97	·73	·98	·63	·13	·45	1633	111	1542
	[150]	·66	·69	27·01			·71	2216	109	2093
13 29	200	·40	·65	·04	5·58	8·13	·96	2793	109	2638
	[300]	11·92	·62	·10			28·49	3923	105	3712
	400	·53	·59	·16	5·29	8·07	29·01	5020	103	4757

* Stat. 56, 2000 meters observed S = 35·10 ‰.

Table II. (Continued.)

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
13 29	[500]	11·02	35·53	27·20			29·51	6095	99	5769
	600	10·47	·45	·24	5·46	8·05	30·03	7147	98	6758
	[700]	9·30	·32	·33			·59	8147	91	7705
	800	8·11	·21	·44	5·03	8·02	31·19	9052	78	8552
	[900]	7·60	·25	·55			·77	9852	69	9291
	1000	·17	·31	·66	4·65	7·99	32·35	10554	61	9943
12 38	1200	5·93	·20	·74	5·04	·95	33·40	11784	53	11087
	1400	4·72	·13	·83		·89	34·46	12834	43	12049
	1600	3·94	·00	·81	6·15	·89	35·39	13798	44	12917
	[1800]	·65	34·98	·83			36·36	14758	44	13799
	2000	·45	·97	·84	6·30	7·81	37·31	15698	44	14679
	2400	·25	·97	·86	·55	·81				
	[2500]	·20	·97	·87			39·67	18033	44	16879

Stat. **58.** 10 VII, **1914.** 45° 45′ N. 22° 15′ W.

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
	0	17·60	35·77	25·98	5·75	8·13	25·98	0	204	0
	[10]	·50	·76	26·00			26·05	215	201	203
13 56	25	·28	·75	·04	5·51	8·26	·15	532	199	503
	50	15·63	·78	·45	·69	·16	·68	1008	160	951
	[75]	13·82	·75	·82			27·17	1386	126	1309
	100	12·98	·70	·96	6·07	8·13	·42	1703	113	1608
	[150]	·64	·67	27·00			·70	2295	110	2167
	200	·32	·63	·03	5·95	8·11	·96	2872	108	2712
	[300]	11·60	·55	·11			28·50	3992	105	3777
	400	10·98	·48	·17	5·95	8·08	29·03	5074	101	4807
	[500]	·55	·43	·21			·53	6131	98	5802
	600	·08	·38	·25	5·34	8·05	30·05	7168	97	6777
	[700]	9·13	·26	·32			·58	8165	92	7722
	800	8·07	·15	·40	4·54	7·95	31·15	9095	82	8592
	[900]	7·46	·18	·51			·73	9942	72	9364
12 32	1000	6·92	·23	·63		7·92	32·32	10674	63	10040
	1200	5·98	·23	·76	5·26	·89	33·42	11908	51	11182
	[1400]	4·90	·09	·78			34·40	12992	48	12176
	1600	3·93	34·97	·79	6·22	7·81	35·37	14032	45	13116
	[1800]	·65	·97	·82			36·35	15022	45	14026
	2000	·50	·97	·84	6·27	7·86	37·31	15976	44	14920
	2400	·28	·96	·85	·24	·81				
	[2500]	·25	·96	·85			39·65	18376	46	17175
	2800	·10	·96	·86		7·86				
	[3000]	·00	·95	·87			41·99	20801	45	19455
	3200	2·89	·94	·87	5·77	7·81				
	[3500]	·75	·94	·88			44·30	23226	48	21590

Stat. **59.** 11 VII, **1914.** 47° 35′ N. 21° 4′ W.

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
12 25	0	16·40	35·44	26·01	5·91	8·24	26·01	0	201	0
	[10]	·38	·46	·03			·08	212	198	200
	[25]	·35	·49	·06			·17	525	197	496
	50	12·17	·52	·98	6·15	8·18	27·22	930	109	878
	[75]	11·50	·48	27·07			·42	1212	104	1144
	100	·13	·43	·10	5·97	8·08	·57	1477	100	1398
	[150]	10·85	·40	·13			·84	2000	97	1892
	[200]	·70	·39	·15			28·08	2517	98	2381
	[300]	·49	·38	·18			·58	3544	97	3356
	400	·18	·38	·24	5·87	8·05	29·10	4549	94	4312
	[500]	9·48	·31	·30			·63	5519	89	5228
	[600]	8·62	·21	·36			30·18	6441	84	6095
	[700]	7·65	·10	·42			·71	7308	79	6913
	800	6·73	·01	·49	5·09	7·95	31·26	8118	73	7673
	[900]	·15	·00	·55			.80	8870	67	8372
	[1000]	5·70	·00	·61			32·34	9565	62	9015
	1200	4·67	·00	·74	5·74	7·89	33·43	10769	50	10131
	[1400]	·15	34·96	·76			34·40	11839	48	11111
	1600	3·79	·93	·78	6·15	7·81	35·37	12883	49	12085
	[1800]	·56	·92	·79			36·33	13903	47	13049
	2000	·41	·91	·80	6·33	7·81	37·28	14913	48	14003

Stat. **60.** 12 VII, **1914.** 49° 33′ N. 18° 59′ W.

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
10 30	0	16·00	35·51	26·16	6·11	8·22	26·16	0	187	0
	[10]	15·88	·54	·21			·26	195	181	184
	[25]	·10	·56	·40			·51	470	165	444
	50	12·38	·58	·99	6·07	8·11	27·23	832	108	785
	[75]	11·86	·55	27·06			·41	1112	104	1050
	100	·50	·51	·10	6·12	8·02	·57	1380	100	1305
	[150]	·25	·49	·13			·84	1901	97	1800
	[200]	·05	·47	·15			28·08	2417	97	2288
	[300]	10·65	·43	·19			·59	3439	96	3258
	400	·32	·40	·23	5·74	7·99	29·09	4446	95	4216
	[500]	9·80	·35	·28			·61	5433	91	5148
	[600]	·30	·30	·32			30·12	6395	90	6054
	[700]	8·65	·24	·38			·66	7317	84	6926
	800	·06	·19	·43	4·74	7·89	31·18	8194	79	7742
	[900]	7·50	·17	·50			·73	9021	74	8506
	[1000]	6·94	·16	·57			32·27	9786	68	9216
	1200	5·76	·14	·72	5·17	7·92	33·38	11116	55	10450
	[1400]	4·85	·04	·75			34·37	12270	51	11514
	1600	·07	34·95	·76	6·01	7·89	35·34	13370	49	12514
	[1800]	3·79	·94	·78			36·31	14430	49	13494
	2000	·48	·92	·80	6·37	7·89	37·27	15464	48	14464

Stat. **61.** 13 VII, **1914.** 51° 6′ N. 18° 34′ W.

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
14 30	0	15·00	35·50	26·38	5·89	8·26	26·38	0	166	0
	[10]	·00	·48	·36			·41	177	167	167
	25	14·97	·46	·35	5·39	8·26	·46	444	169	419
	50	11·69	·44	27·01	6·05	·16	27·25	809	106	763
	[75]	·25	·44	·09			·45	1082	100	1023
	100	10·95	·44	·15		8·08	·62	1340	95	1268
	[150]	·60	·42	·19			·90	1837	91	1734
	200	·32	·39	·22	5·75	8·13	28·15	2320	90	2189
	[300]	·20	·43	·27			·67	3265	89	3084
	400	·10	·45	·30	5·94	8·08	29·17	4192	88	3970
	[500]	9·88	·40	·31			·63	5129	89	4857
	600	·62	·35	·31	5·73	8·08	30·11	6084	91	5757
	[700]	·15	·33	·37			·64	7021	86	6644
	800	8·52	·31	·46	4·64	8·05	31·20	7901	79	7473
	[900]	7·88	·29	·54			·76	8706	71	8227
13 30	1000	·14	·27	·63	4·73	8·02	32·32	9428	63	8901
	1200	5·23	·05	·71	5·38	·02	33·40	10682	53	10069
	[1400]	4·27	34·95	·74			34·39	11802	50	11103
	1600	3·80	·92	·77	6·67	7·99	35·36	12872	48	12084
	[1800]	·62	·92	·78			36·32	13912	48	13047
	2000	·44	·92	·80	6·42	7·95	37·27	14936	47	14001
	2400	·28	·92	·82	·44	·95				
	[2500]	·21	·92	·82			39·62	17486	48	16366
	2800	·16	·92	·83	6·17	7·95				
	[3000]	·04	·91	·83			41·95	20071	49	18776
	3200	2·93	·91	·84	5·70	7·92				
	[3500]	·75	·90	·85			44·27	22671	48	21196

Stat. **62.** 14 VII, **1914.** 52° 47′ N. 16° 39′ W.

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
12 31	0	13·50	35·45	26·66	6·16	8·22	26·66	0	139	0
	[10]	·38	·45	·68			·73	147	136	138
13 55	25	·17	·45	·73	6·37	8·22	·84	362	133	340
	50	12·67	·46	·83	·01	·18	27·07	702	123	660
	[75]	11·50	·45	27·05			·40	1004	104	945
	100	10·54	·44	·22	5·78	8·08	·69	1258	88	1186
	[150]	·40	·44	·25			·95	1720	86	1621
	200	·33	·44	·26	5·92	8·08	28·19	2181	87	2054
	[300]	·20	·44	·28			·68	3103	88	2928
	400	·06	·44	·31	5·83	8·05	29·17	4023	88	3807
	[500]	9·82	·40	·32			·64	4953	88	4687
	600	·57	·36	·33	5·76	8·05	30·13	5895	89	5574
	[700]	·25	·35	·37			·63	6826	87	6456
	800	8·79	·35	·45	4·85	8·02	31·18	7717	80	7293
	[900]	·05	·33	·55			·76	8527	71	8050

Table II (Continued.)

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
12 31	1000	7·21	35·30	27·65	4·87	8·02	32·34	9239	62	8714
	1200	5·58	·12	·72	5·39	·02	33·40	10479	53	9868
	[1400]	4·50	34·98	·74			34·37	11613	51	10912
	1600	3·96	·95	·77	6·03	7·95	35·35	12703	48	11902
	[1800]	·78	·94	·79			36·32	13743	48	12862
	2000	·49	·93	·80	6·35	7·95	37·27	14753	47	13816
	2400	·32	·96	·84	·17	·95				
	[2500]	·29	·97	·86			39·65	17228	45	16141
	2800	·09	·98	·89	6·00	7·95				
	[3000]	·00	·98	·89			42·00	19603	44	18376
	3200	2·77	·98	·91	5·61	7·99				
	[3500]	·66	·98	·92			44·34	21888	41	20511

Stat. **63.** 16 VII, **1914.** 56° 30′ N. 13° 37′ W. 1075 meters.

4 33	0	13·00	35·38	26·71	6·23	8·24	26·71	0	134	0
	[10]	12·89	·38	·73			·78	142	132	133
	[25]	·51	·38	·80			·92	347	126	327
	50	10·72	·38	27·14	6·38	8·16	27·38	639	94	602
	[75]	·31	·39	·21			·57	881	89	830
	100	·00	·40	·28	6·20	8·16	·75	1106	83	1045
	[150]	9·75	·39	·32			28·03	1534	79	1449
	200	·59	·38	·34	6·01	8·11	·28	1954	79	1845
	[300]	·36	··36	·36			·76	2791	79	2637
	400	·23	·35	·37	6·09	8·11	29·24	3638	80	3437
	[500]	·10	·33	·38			·72	4498	80	4242
	600	8·94	·31	·39	5·83	8·08	30·20	5368	82	5057
	[700]	·68	·30	·42			·69	6235	81	5875
	800	·24	·28	·47	5·53	8·08	31·22	7077	77	6664
	[900]	7·72	·27	·54			·76	7869	71	7402
	1000	·12	·25	·62	5·15	8·05	32·31	8594	64	8077

Stat. **64.** 16 VII, **1914.** 56° 33′ N. 12° 52′ W. 2515 meters.

11 00	0	12·80	35·32	26·70	6·21	8·22	26·70	0	135	0
	[10]	·30	·33	·80			·85	139	125	130
	[25]	11·41	·34	·98			27·10	325	109	306
9 50	50	10·48	·36	27·17	5·98	8·13	·41	591	91	556
	[75]	·20	·37	·23			·58	828	87	780
	100	·07	·38	·26	5·80	8·13	·73	1055	88	998
	[150]	·00	·38	·27			·97	1503	84	1428
	200	9·89	·39	·29	5·93	8·11	28·22	1954	85	1851
	[300]	·65	·36	·31			·71	2851	84	2699
	400	·37	·34	·34	6·03	8·08	29·21	3738	84	3541
	[500]	·25	·34	·36			·69	4625	83	4376
	600	·17	·34	·37	6·07	8·11	30·18	5515	84	5211
	[700]	·00	·30	·37			·64	6417	86	6063
	800	8·83	·25	·36	5·87	8·08	31·10	7347	88	6935
	[900]	9·00	·28	·36			·56	8302	90	7827
	1000	·20	·32	·36	5·43	8·05	32·01	9282	93	8744
11 00	1200	6·86	·23	·64	4·96	·05	33·27	10976	64	10318
	1400	5·53	·11	·72	5·41	·02	34·33	12280	55	11516
	1600	4·55	·03	·77	·87	·02	35·34	13430	50	12570
	1800	3·97	·01	·82	6·12	7·99	36·34	14470	47	13536
	2000	·62	34·95	·82	·25	8·02	37·28	15464	47	14468
	2200	·46	·95	·82	·30	·02				
	2450	2·93	·97	·89	5·81	7·99				
	[2500]	·80	·97	·90			39·72	17739	39	16608

Stat. **65.** 16 VII, **1914.** 56° 37′ N. 12° 09′ W.

16 43	0	13·40	35·34	26·59	6·15	8·26	26·59	0	146	0
	[10]	12·45	·36	·80			·85	144	125	135
	[25]	11·45	·40	27·02			27·14	327	106	308
16 00	50	10·39	·43	·24	6·27	8·13	·48	579	84	545
	[75]	·06	·39	·26			·62	802	84	756
	100	9·88	·37	·28	6·04	8·13	·75	1021	83	965
	[150]	·60	·36	·32			28·02	1451	80	1372
	200	·45	·36	·35	6·02	8·08	·28	1871	78	1768
	[300]	·36	·36	·36			·76	2706	79	2558
	400	·30	·36	·37	6·04	8·08	29·24	3553	81	3360
	[500]	·16	·36	·39			·73	4408	79	4162

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
16 00	600	9·06	35·35	27·40	6·04	8·08	30·21	5268	81	4967
	[700]	8·90	·34	·42			·68	6135	82	5785
	800	·73	·32	·43	5·98	8·08	31·17	7005	81	6602
	[900]	·62	·31	·44			·65	7877	82	7418
	1000	·53	·30	·45	5·85	8·08	32·11	8759	83	8243
16 51	1200	6·84	·21	·62	·01	·08	33·25	10369	66	9735
	1400	5·58	·11	·72	·58	·02	34·32	11699	56	10957
	1600	4·59	·03	·77	·95	7·99	35·33	12863	51	12027
	1800	3·95	34·97	·80	6·22	·95	36·32	13933	48	13021
	[2000][1]	·58	·97	·83	·25	·95	37·29	14937	46	13965
	2200	·38	·97	·84	·33	·95				
	2500	2·80	·99	·92	5·75	·95	39·74	17147	37	16075

Stat. **66.** 16 VII, **1914.** 56° 40′ N. 11° 25′ W.

22 00	0	13·20	35·30	26·60	6·91		26·60	0	145	0
	[10]	12·90	·31	·67			·72	150	137	141
	[25]	11·75	·32	·90			27·02	352	116	331
23 23	50	10·19	·33	27·20	6·54		·44	625	88	587
	[75]	9·81	·34	·27			·63	853	83	802
	100	·63	·35	·32	6·07		·79	1066	79	1005
	[150]	·45	·35	·34			28·05	1481	78	1398
	[200][2]	·38	·35	·35	6·00		·29	1893	78	1787
	[300]	·21	·35	·37			·77	2720	78	2567
	400	·09	·34	·39	5·94		29·25	3555	79	3352
	[500]	8·94	·34	·41			·75	4392	78	4135
	600	·75	·33	·44	6·64		30·24	5224	78	4914
	[700]	·60	·32	·45			·72	6054	78	5698
	800	·42	·31	·47	6·05		31·21	6884	77	6476
	[900]	·20	·28	·48			·69	7714	78	7251
	1000	7·91	·24	·50	5·68		32·17	8544	77	8027
22 09	1200	6·47	·17	·65	·32		33·26	10084	63	9435
	1400	5·46	·11	·73	·57		34·34	11388	54	10613
	1600	4·53	·01	·76	·89		35·33	12538	51	11667
	1800	3·88	34·95	·78	6·23		36·31	13618	49	12671
	2000	·57	·94	·80	·23		37·27	14658	48	13645
	2200	·38	·96	·84	·32					
	2500	2·97	·97	·88	·03		39·69	17043	42	15890

Stat. **67.** 17 VII, **1914.** 56° 43′ N. 10° 40′ W. Between 2300 and 2400 meters.

5 50	0	13·60	35·31	26·53		8·24	26·53	0	152	0
	[10]	·40	·32	·57			·62	159	147	149
	[25]	12·60	·34	·75			·87	380	131	358
	50	11·35	·36	27·01		8·16	27·25	694	106	654
	[75]	10·30	·37	·20			·56	954	89	898
	100	9·80	·37	·30		8·08	·77	1179	81	1112
	[150]	·41	·37	·36			28·07	1593	77	1509
	200	·23	·36	·38		8·05	·32	1992	75	1891
	[300]	·09	·35	·39			·79	2792	76	2646
	400	8·97	·33	·40	6·09	8·05	29·27	3609	77	3413
	[500]	·81	·31	·41			·75	4439	78	4188
	600	·63	·29	·43	6·02	8·05	30·25	5274	79	4969
	[700]	·21	·27	·47			·75	6094	76	5743
	800	7·84	·25	·51	5·93	7·99	31·26	6886	72	6486
	[900]	·64	·23	·53			·75	7661	71	7203
	1000	·44	·21	·54	5·11	7·99	32·23	8433	72	7918
4 40	1200	5·55	·12	·73	·38	·99	33·40	9777	53	9168
	1400	4·63	·03	·76	·75	·99	34·29	10887	49	10188
	1600	·03	34·97	·78	6·22	·99	35·36	11947	47	11148
	1800	3·61	·94	·80	·17	·95	36·34	12961	45	12082
	2000	·40	·96	·84	·25	·99	37·31	13925	44	12984
	2200	·21	·98	·87	·23	·95				
6 37	2300	2·97	·99	·90	·49					
	(2400)*	·93								
	(2490)*	·85			6·12	7·95				

* The water-bottles struck the bottom.

Table II. (Continued.)

GMT	a	$t°C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
Stat. 68. 17 VII, **1914.** 56°45′ N. 9°56′ W. 2020 meters.										
12 08	0	14·60	35·39	26·38	6·07		26·38	0	166	0
	[10]	·02	·39	·51	·		·56	169	153	159
12 21	25	12·44	·39	·83	6·72	8·08	·94	389	124	366
	50	10·32	·41	27·24	·24	·02	27·47	666	85	627
	[75]	·02	·40	·28			·64	887	82	836
	100	9·82	·39	·31	6·16	7·95	·78	1101	80	1040
	[150]	·58	·38	·34			28·05	1518	77	1433
	200	·43	·38	·37	6·17	7·95	·30	1926	76	1817
	[300]	·30	·38	·39			·79	2736	76	2582
	400	·17	·38	·41	6·03	7·95	29·27	3551	77	3349
	[500]	·05	·37	·42			·76	4373	77	4117
	600	8·93	·36	·43	6·68	7·95	30·24	5203	79	4895
	[700]	·84	·35	·44			·71	6043	79	5691
	800	·58	·34	·47	6·66	7·89	31·21	6881	77	6473
	[900]	·25	·32	·50			·71	7701	76	7245
13 05	1000	7·80	·28	·54	5·38	7·89	32·22	8496	73	7990
	1200	6·21	·20	·70	·47	·89	33·35	9896	58	9300
	1400	5·03	·08	·75	·70	·86	34·38	11071	48	10385
	1600	4·18	·02	·81	6·08	·86	35·38	12126	45	11332
	1800	3·65	34·97	·82	·31	·86	36·35	13106	45	12240
	2000	·35	·98	·86	·67	·89	37·33	14036	41	13106
Stat. 69. 17 VII, **1914.** 56°48′ N. 9°12′ W. 1360 meters.										
18 23	0	14·40	35·37	26·41	6·48	8·18	26·41	0	163	0
	[10]	13·45	·37	·60			·65	163	144	154
	25	12·55	·36	·78	6·48	8·18	·90	380	129	358
	[50][2]	11·32	·37	27·02	·12	·18	27·26	689	105	650
	[75]	10·45	·37	·18			·54	950	91	896
	100	9·88	·37	·28	6·16	8·13	·75	1181	84	1115
	[150]	·58	·37	·33			28·04	1611	78	1520
	200	·43	·37	·36	6·22	8·02	·29	2024	77	1909
	[300]	·31	·37	·37			·77	2859	78	2689
18 58	400	·16	·36	·39	6·22	7·95	29·25	3691	78	3474
	[500]	·08	·36	·41			·74	4528	78	4256
18 23	600	·00	·36	·42	6·11	7·95	30·23	5370	80	5044
	[700]	8·75	·35	·45			·72	6210	79	5837
	[800][1]	·35	·32	·49	6·12	7·95	31·23	7037	75	6606
	[900]	7·84	·29	·54			·76	8824	71	7335
18 58	1000	·20	·23	·59	5·19	7·95	32·28	9566	66	8022
19 32	1200	5·74	·12	·69	·48	·92	33·36	10896	57	9256
	1300	·25	·06	·71	·65					
	[1400]	·10	·05	·72			34·34	12100	54	10370
Stat. 70. 17 VII, **1914.** 56°51′ N. 8°47′ W. 120 meters.										
23 00	0	14·10	35·39	26·49	6·62		26·49	0	155	0
	[10]	13·67	·36	·55			·60	162	149	152
	25	12·75	·34	·72	6·52		·84	387	134	364
	50	11·31	·34	27·00	5·97		27·24	706	107	665
	75	9·95	·34	·25	3·28		·60	961	85	905
	100	·60	·35	·31	5·69		·78	1179	80	1112
Stat. 1. 8 V, **1922.** 49°58′ N. 3°50′ W.										
15 35	0	14·70	35·48	26·42	7·35		26·42	0	161	0
15 20	5	10·37	·45	27·26						
	10	·14	·47	·31	6·61		27·36	127	77	119
	25	·02	·47	·33	·62		·45	248	76	236
	50	·01	·45	·32	·94		·56	451	—52	426
Stat. 2. 9 V, **1922.** 49°0′ N. 5°35′ W. 109 meters.										
7 55	0	11·22	35·42	27·08	7·31		27·08	0	100	0
7 45	5	10·55	·38	·17						
	[10][1]	·53	·38	·17	6·92		·22	101	90	95
	25	·48	·38	·18	·43		·30	244	90	230
	50	·49	·37	·17	·56		·42	485	90	456
	[75]	·49	·37	·17			·53	726	92	684
	100	·50	·36	·16	6·76		·64	971	93	916

GMT	a	$t°C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
Stat. 3. 9 V, **1922.** 48°35′ N, 6°2′ W. 118 meters.										
15 10	0	14·44	35·44	26·45	6·77		26·45	0	159	0
	5	11·24	·45	27·10						
	10	10·72	·44	·18	7·91		27·23	132	89	124
	25	·58	·48	·24	6·85		·36	270	84	254
	50	·57	·43	·21	·38		·45	498	87	463
	[75]	·57	·44	·21			·57	732	89	683
	100	·57	·44	·21	6·68		·68	966	89	906
Stat. 4. 10 V, **1922.** 47°19′ N. 7°6′ W.										
13 30	0	14·02	35·61	26·68	8·73		26·68	0	137	0
12 55	5	13·42	·55	·75						
	10	12·30	·61	27·02	7·35		27·07	128	104	121
	25	11·78	·60	·10	·27		·22	289	98	272
	50	·36	·55	·15	6·91		·40	542	92	511
	[75]	·31	·55	·16			·52	788	93	743
	100	·26	·55	·17	6·85		·65	1033	92	976
	[150]	·25	·55	·18			·88	1524	93	1440
13 50	200	·24	·55	·18	6·36		28·11	2021	94	1909
	[300]	·05	·53	·20			·60	3021	95	2856
	400	10·77	·52	·24	5·62		29·10	4018	94	3803
	[500]	·50	·52	·29			·61	5000	91	4729
	600	·22	·53	·34	5·03		30·14	5950	88	5623
	[700]	9·91	·57	·43			·69	6847	82	6472
	800	·70	·61	·50	4·90		31·22	7689	76	7261
	[900]	·52	·69	·59			·78	8471	69	7987
	1000	·37	·76	·67	4·41		32·31	9188	69	8649
Stat. 5. 11 V, **1922.** 46°0′ N. 8°36′ W.										
15 50	0	13·96	35·63	26·70			26·70	0	135	0
	5	·75	·61	·72						
	10	12·44	·57	·96	7·46		27·02	130	109	122
	[25][1]	11·77	·57	27·09	·64		·21	296	99	278
	[50][1]	·56	·57	·13	·26		·38	552	94	520
	[75]	·51	·57	·14			·49	804	96	758
	100	·46	·58	·16	6·13		·63	1054	94	996
	[150]	·40	·57	·16			·87	1551	94	1466
15 15	200	·35	·56	·16	6·02		28·10	2054	96	1941
	[300]	11·06	·52	·19			·59	3069	96	2903
	400	10·79	·49	·21	5·46		29·07	4089	97	3871
	[500]	·45	·50	·28			·61	5089	91	4813
	600	·21	·52	·34	5·06		30·14	6044	88	5712
	[700]	·05	·59	·42			·68	6946	82	6567
	800	·06	·66	·47	4·52		31·19	7806	79	7371
	[900]	·30	·72	·48			·65	8666	81	8168
	1000	·67	·78	·46	4·86		32·08	9563	86	9000
Stat. 6. 20 V, **1922.** 38°20′ N. 9°20′ W.										
19 30	0	15·46	35·48	26·26			26·26	0	177	0
	5	·37	·56	·34						
	10	14·47	·67	·62			·67	170	142	160
	25	·03	·71	·74			·86	386	131	365
	50	13·44	·81	·95			27·18	711	112	669
Stat. 7. 21 V, **1922.** 38°20′ N. 9°2′ W. 168 meters.										
14 20	0	17·02	35·78	26·12	6·20		26·12	0	190	0
	5	15·64	·71	·39						
	10	14·78	·79	·64	6·30		·69	175	140	165
	25	13·84	·91	·94	5·66		27·06	376	113	354
	[50][1]	·68	·89	·96			·20	674	111	634
	[75]	·40	·84	·98			·33	968	111	911
	100	·12	·80	·99	5·21		·45	1261	111	1188
	150	12·58	·77	27·11	·97		·81	1818	100	1715
Stat. 8. 21 V, **1922.** 38°9′ N. 9°12′ W. 790 meters.										
19 20	0	16·92	35·73	26·11	6·08		26·11	0	191	0
20 25	5	·29	·59	·15						
	[10]	15·90	·60	·25			·30	195	177	184
	25	·22	·78	·54			·65	456	151	430

Table II. (Continued.)

GMT	a	$t^\circ C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
20 25	50	14·17	35·83	26·81			27·05	809	125	774
	[75]	13·62	·86	·95			·30	1125	113	1073
	100	·28	·85	27·01			·48	1417	108	1350
	150	12·68	·77	·07			·77	1978	103	1880
19 40	200	·38	·73	·10	4·88		28·02	2524	103	2397
	300	11·65	·70	·22	·68		·61	3562	93	3380
	400	·24	·66	·26	·79		29·12	4544	92	4310
	500	·41	·81	·35			·66	5494	86	5202
	600	81	36·02	·44	4·60		30·21	6387	81	6037
	700	12·19	·24	·53	·81		·76	7214	75	6817
Stat. 9. 22 V, **1922.** 37° 45′ N. 9° 45′ W.										
15 15	0	16·70	36·06	26·42			26·42	0	162	0
	5	·57	·05	·44						
	10	·54	·05	·45			·50	170	158	160
	25	15·73	·04	·63	6·06		·74	409	143	386
	50	·33	·18	·82	5·79		27·06	764	124	720
	[75]	14·81	·14	·91			·26	1084	117	1022
	100	·41	·11	·97	6·69		·43	1388	113	1310
	[150]	13·75	·00	27·03			·73	1971	107	1860
	200	·32	35·89	·04	6·11		·97	2544	108	2399
Stat. 10. 23 V, **1922.** 37° 34′ N. 10° 32′ W.										
20 50	0	16·49	35·99	26·41			26·41	0	163	0
	5	·49	·98	·40						
	10	·42	36·00	·44			·49	171	159	161
	25	15·81	·03	·60			·71	414	146	390
	50	14·99	·05	·80			27·04	775	126	731
	[75]	·67	·05	·87			·22	1104	121	1041
	[100][2]	·45	·06	·92			·39	1419	117	1339
	[150][2]	·12	35·98	·93			·63	2037	116	1920
19 15	200	13·73	·96	27·00			·92	2645	112	2491
	300	12·52	·75	·09			28·47	3805	107	3588
	[400][1]	11·64	·77	·27			29·12	4855	92	4583
	[500]	·45	·85	·37			·68	5790	84	5464
	[600][2]	·40	·97	·47			30·25	6650	77	6270
	[700]	·35	36·09	·57			·81	7430	70	7006
	800	·30	·16	·64			31·33	8155	65	7680
	[900]	·15	·17	·68			·83	8857	64	8323
	1000	10·81	·17	·74			32·35	9532	69	8936
Stat. 11. 24 V, **1922.** 36° 29′ N. 11° 42′ W.										
19 15	0	16·28	36·10	26·54			26·54	0	150	0
	5	·28	·13	·57						
	10	·28	·13	·57			·62	158	147	149
	25	·20	·14	·60			·71	400	146	368
	50	15·21	·12	·81			27·04	761	121	703
	[75]	14·80	·11	·89			·24	1086	119	1004
	100	·56	·09	·95			·41	1395	114	1297
	150	·08	·04	·99			·69	1993	111	1860
19 55	[200][1]	13·80	·03	27·04			·96	2577	109	2409
	[300]	12·63	35·82	·12			28·50	3699	104	3474
	400	11·64	·68	·20			29·05	4764	98	4483
	[500]	·42	·74	·29			·60	5769	91	5430
	600	·31	·86	·40			30·18	6701	84	6203
Stat. 12. 25 V, **1922.** 35° 38′ N. 10° 34 W.										
9 00	[0][1]	17·43	36·38	26·49			26·49	0	155	0
9 15	5	·37	·38	·50						
	10	·38	·35	·48			·52	165	156	156
	25	·37	·36	·49			·60	413	156	390
	50	16·13	·36	·78			27·02	791	128	746
	[75]	15·70	·32	·85			·19	1125	124	1061
	100	·38	·27	·88			·34	1449	121	1367
	150	14·94	·21	·94			·63	2079	116	1960
10 05	200	·05	·06	27·01			·93	2684	112	2530
	[300]	12·90	35·83	·07			28·46	3846	108	3629
	400	·08	·67	·11			·96	4983	107	4707
	[500]	11·40	·61	·20			29·51	6083	100	5744
10 05	600	10·78	35·58	27·29			30·07	7118	95	6718
	[700]	·35	·59	·37			·62	8083	88	7632
	800	9·93	·61	·41			31·14	8998	85	8497
	[900]	·82	·67	·54			·72	9848	74	9294
	1000	·70	·77	·62			32·25	10623	69	10010
Stat. 13. 25 V, **1922.** 35° 13′ N. 9° 58′ W.										
19 00	0	17·49	36·38	26·47			26·47	0	157	0
19 20	5	·44	·36	·47						
	10	·47	·34	·44			·49	168	159	158
	25	·08	·33	·54			·65	415	151	391
	50	16·12	·30	·74			·97	792	133	745
	[75]	15·91	·28	·77			27·12	1141	131	1074
	100	·69	·27	·81			·27	1483	128	1399
	150	·08	·18	·88			·58	2143	121	2022
18 50	200	14·37	·03	·92			·84	2784	120	2626
	[300]	12·90	35·78	27·04			28·42	4011	112	3783
	400	11·95	·66	·13			·98	5161	106	4872
	[500]	·25	·61	·22			29·54	6241	98	5890
	600	10·76	·56	·27			30·06	7271	96	6859
Stat. 14. 26 V, **1922.** 34° 41′ N. 9° 30′ W.										
12 00	0	18·74	36·38	26·16			26·16	0	187	0
12 15	5	·50	·36	·20						
	10	·26	·37	·28			·32	192	175	181
	25	17·84	·38	·39			·50	463	166	437
	50	16·33	·31	·70			·93	864	136	814
	[75]	15·90	·27	·76			27·11	1219	132	1149
	[100][1]	·52	·23	·83			·29	1560	126	1473
	[150]	14·90	·13	·88			·58	2217	121	2093
11 30	200	·38	·04	·93			·85	2856	119	2694
	[300]	13·05	35·81	27·03			28·41	4083	113	3851
	400	12·00	·62	·09			·94	5255	109	4961
	[500]	11·15	·55	·20			29·51	6365	100	6008
	600	10·52	·53	·29			30·08	7395	94	6977
	[700]	·15	·55	·37			·63	8357	87	7884
	800	·01	·61	·45			31·16	9259	79	8728
	[900]	·04	·73	·53			·71	10106	75	9512
	1000	·08	·87	·63			32·26	10886	68	10231
10 10	1200	·44	36·12	·77			33·30	12306	61	11529
	1400	8·61	35·85	·87			34·37	13540	52	12659
	1600	6·56	·48	·88			35·36	14620	47	13647
	[1800]	5·50	·36	·92			36·36	15610	43	14555
	2000	4·66	·31	·98			37·39	16474	36	15355
Stat. 17. 30 V, **1922.** 33° 44′ N. 7° 55′ W. 115 meters.										
6 00	0	19·04	36·17	25·92			25·91	0	210	0
6 30	5	·02	·16	·92						
	10	18·46	·18	26·08			26·13	214	193	202
	25	16·62	·19	·53			·64	489	152	461
	50	14·44	·02	·90			27·13	846	117	797
	[75]	13·70	35·92	·98			·33	1149	111	1083
	100	·22	·84	27·02			·48	1439	108	1357
Stat. 19. 30 V, **1922.** 33° 16′ N. 8° 20′ W.										
20 00	0	19·35	36·19	25·86			25·86	0	215	0
	5	·66	·19	·78						
	10	18·28	·19	26·13			26·18	214	189	202
	25	16·25	·18	·61			·72	479	145	452
	50	15·43	·18	·80			27·04	839	126	791
	[75]	14·70	·12	·92			·26	1162	117	1096
	100	·21	·01	·94			·40	1469	115	1387
Stat. 20. 31 V, **1922.** 33° 22′ N. 9° 12′ W. 704 meters.										
14 00	[0][1]	20·00	36·30	25·77			25·77	0	224	0
13 45	5	19·88	·30	·80						
	10	·52	·30	·90			·95	230	210	217
	25	18·36	·30	26·20			26·31	543	184	513
	50	16·61	·27	·60			·83	980	146	925

Table II. (Continued.)

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
13 45	[75]	16·00	36·27	26·74			27·09	1351	134	1275
	100	15·54	·27	·85			·31	1692	124	1599
	150	14·84	·15	·91			·61	2339	119	2206
	200	·19	·00	·94			·86	2968	118	2798
	300	12·32	35·70	27·09			28·47	4158	107	3924
	400	11·37	·59	·19			29·04	5248	99	4958
	[500]	10·75	·57	·28			·60	6265	92	5917
	600	·23	·55	·36			30·15	7217	87	6813
	Stat. **23.** 2 VI, **1922.** 33° 12′ N. 10° 20′ W.									
8 00	0	19·15	36·43	26·09			26·09	0	193	0
	5	·14	·42	·09						
	10	·08	·43	·11			·16	204	191	192
	25	17·83	·42	·42			·53	484	163	457
	50	16·61	·43	·72			·95	878	134	828
	[75]	·20	·38	·78			27·13	1229	130	1158
	100	15·89	·34	·82			·28	1568	127	1479
	[150]	·35	·20	·84			·53	2237	126	2103
7 15	200	14·83	·09	·87			·79	2903	125	2732
	[300]	13·50	35·85	·97			28·34	4195	119	3953
	400	12·19	·68	27·10			·95	5395	108	5088
	[500]	11·25	·57	·19			29·50	6505	101	6136
	600	10·59	·54	·29			30·08	7540	94	7111
	[700]	·35	·56	·35			·60	8512	90	8033
	800	·24	·65	·43			31·15	9437	83	8899
	[900]	9·85	·69	·54			·72	10287	75	9688
	1000	·51	·72	·62			32·25	11064	69	10406
6 00	1200	·40	·86	·74			33·31	12478	61	11708
	1400	7·72	·61	·81			34·34	13732	54	12864
	1600	6·52	·45	·86			35·34	14866	49	13900
	[1800]	5·50	·29	·87			36·31	15936	49	14882
	2000	4·69	·17	·87			37·28	16966	48	15844
	Stat. **24.** 3 VI, **1922.** 33° 12′ N. 11° 17′ W.									
9 00	[0][1]	18·88	36·48	26·20			26·20	0	183	0
	5	·89	·48	·20						
	10	·84	·48	·21			·25	193	182	183
	25	·05	·45	·38			·49	470	167	444
	50	17·75	·43	·45			·68	903	160	852
	[75]	16·75	·39	·67			27·01	1302	141	1228
	100	·16	·35	·77			·23	1663	132	1570
	[150]	15·56	·27	·84			·54	2345	125	2217
8 20	200	·09	·18	·88			·80	3006	124	2841
	[300]	13·70	35·90	·96			28·34	4293	129	4057
	400	12·34	·70	27·09			·93	5505	110	5204
	[500]	11·35	·59	·19			29·50	6625	101	6260
	600	10·67	·52	·26			30·05	7675	97	7248
	[700]	·20	·53	·35			·61	8657	89	8178
	800	9·85	·59	·46			31·18	9562	80	9028
	[900]	·88	·74	·57			·75	10382	71	9788
	1000	10·18	·92	·65			32·29	11127	66	10476
7 05	1200	·42	36·11	·76			33·29	12521	62	11756
	1400	8·59	35·81	·84			34·35	13785	54	12916
	1600	6·93	·55	·88			35·35	14905	49	13944
	[1800]	5·75	·35	·88			36·31	15959	48	14906
	2000	4·73	·19	·88			37·29	16969	46	15838
	Stat. **25.** 4 VI, **1922.** 33° 8′ N. 13° 13′ W.									
8 15	0	18·28	36·47	26·34			26·34	0	169	0
	5	·38	·47	·32						
	10	·30	·46	·33			·38	180	170	169
	25	17·73	·46	·47			·58	440	158	415
	50	·22	·43	·57			·81	846	148	797
	[75]	16·75	·40	·67			27·01	1228	141	1158
	100	·34	·36	·73			·19	1593	135	1503
	[150]	15·57	·27	·84			·54	2284	125	2155
	[200][1]	14·91	·16	·91			·83	2939	121	2773
	[300]	13·55	35·96	27·04			28·42	4174	112	3940

GMT	a	t° C	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
7 35	400	12·41	35·84	27·18			29·02	5301	101	5007
	[500]	11·45	·81	·34			·65	6301	87	5950
	600	10·86	·81	·45			30·23	7186	79	6783
	[700]	·56	·75	·46			·71	8028	80	7581
	800	·40	·72	·46			31·17	8885	81	8385
	[900]	·07	·73	·53			·71	9727	75	9166
	1000	9·85	·81	·63			32·26	10504	68	9885
	1200	·79	·98	·74			33·29	11928	62	11193
	Stat. **26.** 5 VI, **1922.** 31° 56′ N. 14° 53′ W.									
8 50	0	18·42	36·59	26·40			26·40	0	164	0
8 45	5	·42	·55	·37						
	10	·43	·55	·37			·42	175	166	165
	25	·41	·55	·37			·49	440	167	416
	[50][1]	17·37	·52	·61			·84	853	145	807
	[75]	·00	·49	·68			27·02	1230	140	1163
	100	16·72	·46	·72			·17	1597	137	1509
	[150]	·35	·41	·77			·46	2312	133	2182
8 05	200	·00	·38	·83			·74	3010	130	2839
	[300]	14·50	·05	·91			28·28	4357	124	4110
	400	12·82	35·77	27·05			·88	5622	115	5305
	[500]	11·75	·64	·15			29·46	6787	105	6405
	600	10·98	·56	·31			30·10	7834	92	7392
	[700]	·30	·51	·32			·57	8814	93	8322
	800	9·75	·50	·41			31·13	9764	85	9214
	[900]	·36	·53	·49			·68	10641	79	10034
	1000	·13	·58	·57			32·21	11456	73	10794
6 35	1200	8·82	·72	·73			33·31	12906	61	12234
	1400	7·94	·70	·85			34·37	14126	52	13364
	1600	6·48	·46	·87			35·35	15216	48	14366
	[1800]	5·42	·28	·87			36·30	16280	48	15326
	2000	4·62	·15	·86			37·28	17320	48	16280
	Stat. **27.** 8 VI, **1922.** 32° 33′ N. 17° 3′ W.									
18 00	0	19·19	36·56	26·18						
	5		·55							
	10	18·68	·55	·30						
	25	·17	·50	·40						
17 05	400	12·92								
	600	11·12	35·56	27·21						
	800	9·82	·54	·42						
	1000	·13	·64	·61						
	1200	8·25	·65	·76						
	Stat. **28.** 9 VI, **1922.** 32° 16′ N. 17° 30′ W.									
18 05	0	19·50	36·56	26·10			26·10	0	192	0
	5	·28	·56	·16						
	10	·08	·56	·21			·26	198	181	187
	[25][1]	·01	·56	·25			·36	484	179	457
	[50][2]	18·20	·48	·37			·60	943	167	889
	[75]	17·30	·48	·60			·94	1360	148	1283
	100	16·57	·48	·77			27·22	1730	132	1634
	[150]	15·95	·33	·80			·49	2426	130	2289
17 05	200	·38	·17	·80			·72	3119	132	2944
	[300]	14·05	35·91	·90			28·27	4479	125	4229
	400	12·76	·71	27·01			·85	5764	118	5442
	[500]	11·68	·59	·13			29·44	6954	107	6565
	600	10·96	·51	·20			·99	8066	102	7612
	[700]	·65	·50	·25			30·50	9136	100	8624
	800	9·99	·53	·39			31·10	10133	87	9558
	[900]	·70	·62	·57			·69	11020	77	10380
	1000	·31	·68	·62			32·27	11805	68	11108
15 40	1200	8·19	·60	·74			33·33	13179	59	12380
	1400	7·02	·45	·79			34·34	14409	54	13510
	1600	6·07	·38	·87			35·37	15513	47	14520
	[1800]	5·10	·25	·88			36·34	16543	46	15454
	2000	4·46	·17	·89			37·31	17514	44	16360

Table II. (Continued.)

GMT	a	$t°C$	S ‰	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
	Stat. 29. 10 VI, **1922.** 32°48′ N. 18°23′ W.									
19 55	0	19·35	36·57	26·15			26·15	0	188	0
	[10][2]	18·94	·54	·23			·28	195	179	184
	25	·58	·52	·31			·42	475	173	448
	[50][2]	17·70	·41	·44			·67	918	160	865
	[75]	·10	·36	·55			·90	1333	152	1256
	[100]	16·70	·31	·61			27·07	1728	147	1630
	[150]	·00	·27	·74			·43	2476	135	2335
	200	15·54	·25	·83			·74	3178	129	2996
	[300]	14·30	·02	·93			28·31	4510	122	4253
18 55	400	12·90	35·75	27·01			·85	5780	118	5453
	[500]	11·90	·80	·25			29·56	6915	96	4524
	600	·02	·97	·55			30·33	7800	70	7357
	[700]	10·50	·88	·57			·81	8542	70	8059
	[800]	·13	·80	·57			31·28	9292	70	8759
	[900]	9·85	·76	·59			·76	10052	70	9461
	1000	·58	·71	·60			32·23	10817	70	10171
	1200	·04	·76	·73			33·30	12257	62	11495
	Stat. 30. 11 VI, **1922.** 33°14′ N. 19°38′ W.									
16 45	0	19·22	36·53	26·15			26·15	0	188	0
	5	·20	·48	·12						
	10	18·90	·53	·23			·28	196	179	185
17 20	25	·56	·48	·28			·39	478	176	451
	50	17·65	·39	·44			·67	925	160	872
	[75]	16·85	·29	·56			·90	1338	151	1262
16 45	100	·42	·24	·62			27·08	1731	146	1634
	[150]	15·90	·23	·73			·42	2478	136	2339
	[200][2]	·45	·22	·83			·75	3180	129	3001
	[300]	14·65	·03	·86			28·23	4547	129	4294
15 45	400	13·69	35·80	·89			·72	5919	129	5589
	[500]	12·25	·64	27·06			29·36	7214	114	6809
	600	11·20	·54	·18			·97	8376	104	7904
	[700]	10·50	·51	·28			30·53	9438	97	8911
	800	9·84	·51	·40			31·12	10410	86	9825
	[900]	·22	·54	·53			·72	11275	75	10630
	1000	8·81	·58	·62			32·28	12040	67	11341
	1200	·35								
	Stat. 31. 12 VI, **1922.** 34°17′ N. 21°51′ W.									
15 30	0	19·21	36·47	26·11			26·11	0	191	0
	5	·18	·45	·10						
	10	·06	·47	·14			·19	201	187	189
	25	18·97	·51	·20			·31	495	184	468
	50	17·73	·40	·43			·66	954	162	900
	[75]	·25	·43	·57			·92	1367	160	1290
	[100][2]	16·85	·47	·69			27·15	1755	139	1652
	[150]	·12	·29	·73			·42	2485	136	2339
14 50	200	15·39	·14	·78			·70	3200	134	3013
	[300]	14·00	35·89	·89			28·27	4572	125	4310
	400	12·67	·68	27·00			·85	5862	118	5527
	[500]	11·62	·54	·10			29·41	7069	110	6667
	600	10·75	·48	·21			·99	8209	102	7727
	[700]	·10	·49	·34			30·59	9229	91	8692
	800	9·55	·53	·46			31·19	10136	80	9545
	[900]	·10	·57	·57			·76	10943	71	10298
	1000	8·75	·60	·65			32·30	11673	65	10978
13 35	1200	7·83	·58	·77			33·38	12967	54	12172
	1400	6·35	·38	·83			34·40	14097	49	13204
	1600	5·13	·20	·84			35·38	15131	46	14156
	[1800]	4·35	·09	·84			36·34	16121	46	15094
	2000	3·80	·01	·84			37·30	17055	45	16022
	Stat. 32. 13 VI, **1922.** 35°9′ N. 22°57′ W.									
15 50	0	19·43	36·53	26·10			26·10	0	191	0
	5	·38	·52	·10						
	10	·35	·52	·11			·15	203	191	191
16 05	25	·18	·54	·17			·28	503	187	474
15 50	50	18·58	·50	·29			·52	982	174	931
15 50	[75]	17·50	36·40	26·49			26·83	1424	158	1446
	100	16·88	·33	·58			27·04	1831	150	1731
	[150]	·20	·22	·66			·35	2608	143	2463
	200	15·67	·13	·71			·62	3362	140	3172
	[300]	14·50	35·95	·83			28·20	4807	132	4535
14 55	400	13·41	·80	·95			·78	6162	124	5815
	[500]	12·40	·67	27·06			29·36	7427	114	7007
	600	11·43	·55	·14			·92	8612	108	8122
	[700]	10·60	·47	·23			30·48	9722	101	9171
	800	9·99	·43	·31			31·02	10767	95	10153
	[900]	·45	·46	·42			·61	11734	85	11054
	1000	·00	·54	·56			32·21	12586	73	11850
	1200	8·06	·56	·73			33·33	14020	59	13180
	Stat. 33. 14 VI, **1922.** 36°26′ N. 24°41′ W.									
14 45	0	18·99	36·16	25·93			25·93	0	208	0
	10	·78	·14	·97			26·01	219	205	206
	25	17·93	·10	26·15			·26	531	188	501
	50	16·22	·05	·52			·76	983	153	927
	[75]	15·35	·03	·70			27·05	1368	137	1290
	100	14·85	·00	·79			·25	1721	130	1624
	[150]	·32	35·94	·86			·56	2391	123	2256
	200	13·90	·88	·91			·83	3041	121	2867
	[300]	12·95	·74	·99			28·38	4296	115	4049
	400	·00	·61	27·08			·93	5488	110	5177
	Stat. 35. 19 VI, **1922.** 38°38′ N. 25°58′ W.									
9 50	0	18·96	36·09	25·88	5·57		25·88	0	213	0
	5	19·00	·08	·86						
	10	·01	·08	·86	6·15		·91	227	214	214
	25	·00	·08	·86	5·78		·98	567	215	536
	50	16·79	·08	26·39	6·71		26·63	1071	165	1012
9 15	75	15·40	·05	·71	5·53		27·06	1471	137	1389
	100	·02	·01	·76	·47		·22	1827	133	1727
	[150]	14·57	35·96	·82			·52	2514	127	2376
	200	·15	·92	·88	5·43		·80	3179	123	3003
	300	13·30	·81	·97	·17		28·36	4456	117	4207
	400	12·46	·66	27·03	·19		·88	5686	115	5369
	[500]	11·96	·54	·04			29·35	6911	116	6525
8 10	600	10·45	·43	·23	4·98		30·02	8056	100	7603
	[700]	9·55	·34	·31			·57	9073	93	8567
	800	8·77	·31	·42			31·15	10008	83	9445
	[900]	·15	·37	·56			·77	10818	70	10208
	1000	7·67	·38	·64	4·74		32·32	11545	63	10873
	1200	6·24	·25	·74	5·13		33·36	12845	54	12047
	1400	5·11	·12	·78	·61		34·39	13999	49	13081
	Stat. 36. 20 VI, **1922.** 39°37′ N. 25°52′ W.									
10 25	0	19·68	35·93	25·57	6·22		25·57	0	243	0
	5	18·66	·90	·81						
	10	·66	·90	·81	6·29		·85	245	220	231
	25	16·96	·84	36·19	·76		26·30	566	185	535
	50	14·54	·87	·76	·02		27·00	983	130	928
	75	13·90	·87	·89	5·90		·25	1313	118	1239
	100	·57	·81	·92			·38	1625	117	1534
	[150]	·12	·77	·98			·68	2232	112	2106
9 35	200	12·82	·74	27·02	5·44		·95	2820	110	2662
	300	·49	·66	·03	·92		28·41	3997	113	3776
	400	11·68	·61	·14			·99	5142	104	4862
	[500]	10·50	·37	·17			29·49	6237	102	5894
	600	9·40	·28	·29	4·61		30·09	7274	93	6871
	[700]	8·90	·32	·40			·67	8206	83	7753
	800	·56	·36	·49	4·68		31·23	9051	75	8545
	[900]	7·92	·34	·57			·79	9823	68	9265
8 00	1000	·12	·31	·63	6·13		32·32	10530	63	9924
	[1200]	5·75	·21	·77			33·43	11750	49	11046
	1400	4·84	·11	·80	5·80		34·43	12794	45	11990
	1600	·09	·02	·82	·99		35·39	13788	44	12882
	[1800]	3·75	34·98	·82			36·35	14762	46	13774
	2000	·40	·94	·82	6·61		37·30	15732	45	14682

Table II. (Continued.)

Stat. **37.** 21 VI, **1922.** 40° 58′ N. 26° 2′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
10 45	0	18·44	35·95	25·91	5·73		25·91	0	210	0
	5	·38	·94	·92						
	10	·38	·94	·92	5·75		·96	223	209	210
	25	·32	·94	·93	·91		26·04	555	209	523
	50	15·08	·94	26·70	6·00		·93	1012	136	955
	75	14·31	·88	·82	5·46		27·17	1360	126	1283
10 05	100	13·94	·86	·88	·82		·34	1687	121	1592
	[150]	·47	·81	·94			·64	2314	115	2183
	200	·03	·77	27·00	5·59		·93	2918	112	2752
	300	12·38	·70	·08	·48		28·47	4083	108	3851
	400	11·57	·55	·11	·21		·96	5215	107	4927
	[500]	10·75	·44	·18			29·50	6322	101	5972
8 55	600	9·96	·38	·28			30·08	7362	94	6951
	[700]	·23	·37	·39			·66	8307	84	7845
	800	8·71	·39	·47	5·02		31·21	9169	78	8656
	[900]	·50	·48	·59			·80	9946	67	9383
	1000	·15	·54	·69	5·02		32·36	10628	59	10016
	1200	6·58	·35	·77	·06		33·41	11828	51	10815
	[1400]	5·60	·21	·79			34·39	12932	49	11825
	1600	3·83	34·97	·80	6·27		35·39	13972	44	12765

Stat. **38.** 22 VI, **1922.** 42° 13′ N. 25° 49′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
10 40	0	18·28	35·95	25·95	7·94		25·95	0	206	0
	5	·29	·95	·95						
	10	·27	·92	·93	5·64		·98	220	208	207
	25	·26	·92	·93	6·70		26·04	550	209	520
	50	14·89	·82	26·64	·64		·88	1014	141	957
	[75][2]	13·95	·86	·88	5·64		27·23	1361	120	1284
9 55	100	·49	·81	·94	·58		·40	1672	115	1578
	[150]	·09	·79	·98			·68	2275	112	2147
	200	12·88	·76	27·03	5·66		·95	2864	110	2702
	300	·02	·62	·08			28·47	4009	108	3789
	400	11·47	·55	·14	5·16		·99	5124	104	4850
	[500]	10·81	·48	·20			29·52	6206	99	5870
	600	·22	·43	·27	4·84		30·06	7243	96	6845
	[700]	9·50	·39	·36			·62	8213	88	7763
8 25	800	8·85	·38	·46	5·00		31·20	9100	79	8598
	[900]	·37	·42	·57			·78	9892	69	9338
	1000	7·94	·48	·66	4·71		32·33	10597	62	9993
	[1200][2]	·00	·42	·77	5·07		33·39	11847	53	11143
	1400	5·00	·13	·80	·71		34·42	12941	46	12137
	1600	4·24	·04	·81	6·07		35·39	13951	46	13053

Stat. **40.** 23 VI, **1922.** 43° 32′ N. 24° 45′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,P}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
11 40	0	17·85	35·89	26·01	6·15		26·01	0	201	0
	5	·83	·89	·01						
	10	·77	·88	·02	5·98		·07	212	199	200
	25	·52	·87	·07	6·81		·19	525	195	496
	50	15·32	·87	·59	·80		·82	979	147	924
	75	14·16	·87	·85	7·08		27·20	1337	123	1261
10 50	100	13·88	·86	·90	5·75		·36	1658	119	1565
	[150]	·59	·84	·94			·63	2283	116	2153
	200	·20	·81	·99	5·61		·92	2891	112	2724
	300	12·67	·73	27·04	·94		28·43	4073	111	3843
	400	11·85	·62	·12	·12		·97	5223	107	4935
	[500]	·20	·57	·20			29·52	6318	99	5967
	600	10·51	·53	·29	5·15		30·08	7345	94	6934
	[700]	9·88	·48	·36			·62	8307	88	7846
9 30	800	·36	·45	·43	5·71		31·16	9214	82	8700
	[900]	8·96	·47	·51			·71	10061	76	9494
	1000	·54	·49	·60	4·69		32·26	10841	69	10221
	1200	7·94	·57	·75	5·09		33·35	12205	57	11481
	[1400][2]	5·60	·19	·78	·32		34·37	13385	54	12591
	1600	4·29	·01	·79	6·01		35·36	14469	48	13615

Stat. **41.** 24 VI, **1922.** 45° 15′ N. 23° 9′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,H}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
12 15	0	17·09	35·72	26·06			26·06	0	196	0
	5	·13	·74	·07						
	10	·17	·74	·06			·11	208	195	196
	25	·02	·73	·09			·20	517	194	488
	50	13·32	·69	·88			27·12	932	118	879
	75	12·75	·71	27·01			·36	1233	108	1162
11 35	[100][1]	·61	·70	·03			·50	1515	106	1430
	[150]	·19	·67	·09			·79	2065	101	1949
	200	11·86	·63	·13			28·05	2600	100	2454
	300	·48	·57	·15			·54	3630	101	3461
	400	10·93	·48	·18			29·04	4717	100	4466
	[500]	·50	·46	·24			·57	5752	95	5440
	600	·11	·45	·30			30·10	6747	92	6377
	[700]	9·48	·43	·39			·65	7684	85	7264
10 25	800	8·73	·40	·49			31·23	8541	76	8068
	[900]	7·96	·37	·60			·81	9303	66	8777
	1000	·17	·34	·69			32·38	9968	58	9398
	1200	5·67	·16	·74			33·41	11152	52	10506
	1400	4·48	·05	·79			34·43	12216	45	11480
	1600	3·75	34·97	·81			35·40	13196	43	12356

Stat. **42.** 26 VI, **1922.** 46° 56′ N. 18° 54′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,H}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
10 25	0	16·50	35·72	26·20	5·77		26·20	0	183	0
	5	·47	·72	21						
	10	·47	·73	·22	6·10		·26	193	181	182
	25	14·86	·63	·50	·57		·62	460	154	434
	[50][1]	12·70	·62	·95			27·19	814	112	767
	75	·35	·62	27·02	6·03		·37	1104	107	1041
9 35	100	·05	·63	·08	5·28		·55	1379	102	1302
	[150]	11·81	·62	·12			·82	1909	98	1803
	200	·67	·61	·15	5·87		28·07	2431	98	2296
	300	·60	·61	·16	6·08		·55	3478	100	3291
	400	·26	·56	·19	5·93		29·04	4530	99	4291
	[500]	10·85	·49	·20			·52	5587	99	5286
	600	·46	·44	·24	5·48		30·03	6642	99	6277
	[700]	·27	·48	·30			·55	7667	95	7248
8 20	800	·13	·54	·37	4·58		31·09	8627	88	8167
	[900]	9·62	·51	·43			·62	9557	84	9031
	1000	8·65	·45	·55	4·62		32·20	10409	74	9825
	1200	7·86	·50	·71	·89		33·32	11863	60	11175
	1400	5·29	·13	·76	5·68		34·37	13077	52	12299
	1600	4·24	34·99	·77	·90		35·35	14171	49	13309

Stat. **44.** 27 VI, **1922.** 47° 44′ N. 15° 40′ W.

GMT	a	$t^\circ C$	$S^0/_{00}$	σ_t	O_2	p_H	$\sigma_{t,H}$	$10^4 \Delta P$	$10^5 \Delta\alpha$	$10^4 \Delta D$
20 45	0	16·20	35·66	26·23			26·23	0	181	0
	5	·18	·66	·23						
	10	·18	·66	·23			·28	191	179	180
	25	15·60	·59	·31			·42	470	173	444
	50	12·10	·57	27·03			27·27	838	104	791
	75	11·75	·61	·13			·48	1105	97	1043
20 05	100	·68	·59	·13			·60	1361	97	1287
	[150]	·50	·57	·14			·85	1873	96	1770
	200	·31	·55	·16			28·10	2383	96	2251
	300	·05	·54	·20			·60	4511	95	3206
	400	10·94	·54	·22			29·08	4395	96	4159
	[500]	·75	·51	·23			·55	5415	96	5119
	600	·46	·45	·24			30·04	6447	98	6090
	[700]	9·95	·41	·30			·56	7462	93	7052
18 55	800	·41	·41	·39			31·12	8422	86	7955
	[900]	·19	·48	·48			·67	9309	80	8781
	1000	8·87	·58	·60			32·25	10111	70	9527
	1200	7·46	·43	·71			33·32	11515	60	10827
	[1400][2]	6·14	·30	·79			34·37	12725	51	11937
	1600	4·90	·14	·82			35·37	13795	47	12919

Table II. (Continued.)

Stat. 45. 29 VI, **1922.** 48° 43′ N. 10° 22 W. 234 meters.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,H}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
9 30	0	14·25	35·57	26·59			26·59	0	145	0
	5	·25	·56	·58						
	10	·23	·55	·58			·63	155	146	140
	25	·24	·54	·57			·69	389	148	366
	50	13·90	·54	·65			·78	784	140	726
	[75]	12·15	·54	27·00			27·45	1116	108	1037
	100	11·54	·54	·11			·58	1379	99	1296
	[150]	·08	·54	·20			·91	1881	89	1766
	200	10·82	·53	·24			28·17	2357	88	2309

Stat. 46. 1 VII, **1922.** 49° 55′ N. 3° 54′ W. 75 meters.

GMT	a	t°C	S‰	σ_t	O_2	p_H	$\sigma_{t,H}$	$10^4 \Delta P$	$10^5 \Delta \alpha$	$10^4 \Delta D$
6 50	0	12·88	35·42	26·76			26·76	0	130	0
	5	·84	·40	·75						
	10	·85	·40	·75			·80	138	129	129
	25	·58	·40	·80			·92	341	126	321
	50	·47	·40	·83			27·07	672	123	633

Table III.
Current Measurements.

Observations from Anchored Boat.

Stat. 2 A. 7—8 VII, **1913.** The Rockall Bank. 320 meters.

Hour G. M. T.	Depth Meters	Instr. No.	v cm/sec.	Direction (True)	Single Directions (Magnetic)
7 VII. h m					
19 58	5	92	4·3	S 80° W	1 N 80° W, 1 N 70° W
20 19	2	»	4·1	N 35° E	1 N 10° E, 1 N 70° E, 1 S 80° E
»	»	82	5·3	N 28° W	1 N 50° W, 2 N 10° E, 1 N 20° E
39	25	92	14·0	3°	1 N 20° W, 5 N 10° W, 2 N, 2 N 10° E, 1 N 20° E, 1 S 50° E, 1 S
42	2	82	19·2	36°	1 N 30° W, 2 N 20° W, 7 N 10° W, 1 N 20° E
21 05	»	»	16·6	N 1° E	1 N, 2 N10° E, 5 N 30° E, 1 N 40° E, 1 N 1 N 50° E
18	50	92	13·2	27°	1 N, 1 N 20° E, 2 N 30° E, 3 N 40° E, 2 N 50° E, 1 N 60° E, 1 N 80° E, 1 S 10° E
39	2	82	13·0	11°	1 N 10° W, 1 N 10° E, 2 N 40° E, 3 N 50° E, 1 N 60° E
»	100	92	13·9	12°	1 N, 2 N 20° E, 1 N 30° E, 2 N 40° E, 4 N 50° E, 1 N 60° E
59	2	82	10·7	15°	1 N 10° E, 1 N 20° E, 1 N 30° E, 1 N 40° E, 1 N 50° E, 1 N 60° E, 1 N 70° E
22 03	200	92	15·4	11°	1 N, 1 N 10° E, 2 N 30° E, 2 N 40° E, 5 N 50° E
59	2	82	11·0	59°	1 N 60° E, 4 N 70° E, 1 E, 2 S 60° E
23 42	»	»	8·9	33°	1 N, 1 N 30° E, 1 N 40° E, 3 N 70° E, 2 E
8 VII.					
0 00	»	»	7·8	30°	1 N 30° E, 1 N 40° E, 1 N 50° E, 3 N 70° E
22	25	92	10·5	S 27° E	1 S 20° E, 4 S 10° E, 2 S, 1 S 10° W, 1 S 30° W
32	2	82	17·6	N 74° E	2 N 70° E, 1 E, 1 S 80° E, 1 S 70° E, 1 S 60° E, 1 S 50° E
1 00	»	»	18·3	S 88° E	2 N 70° E, 3 S 70° E, 1 S 50° E, 1 S 40° E, 1 S 20° W
40	50	92	9·7	55°	1 S 60° E, 2 S 50° E, 2 S 40° E, 1 S 20° E, 1S, 1 S 20° W
59	2	82	14·8	56°	1 S 50° E, 3 S 40° E, 1 S 30° E, 2 S 10° E
2 15	100	92	10·6	35°	1 S 50° E, 1 S 30° E, 1 S 20° E, 2 S 10° E, 3 S, 1 S 10° W
25	2	82	21·0	46°	1 N 50° E, 1 S 40 E, 3 S, 2 S 10° W
48	200	92	11·0	27°	2 S 20° E, 2 S 10° E, 1 S, 2 S 10° W, 1 S 20° W
3 00	2	82	13·0	45°	1 N 80° E, 1 S 60° E, 1 S 40° E, 1 S 10° E, 1 S, 1 S 20° W, 1 S 50° W
25	25	92	9·0	S 5° W	1 S, 1 S 10° W, 2 S 20° W, 1 S 30° W, 1 S 60° W, 1 S 70° W

Observations from Drifting Vessel.

Stat. 23. 13 VI, **1914.** 39° 17′ N. 10° 28′ W.

Hour G. M. T.	Depth Meters	Instr. No.	v cm/sec.	Direction (True)	Single Directions (Magnetic)
h m					
10 48	10	82	28·8	N 12° W	6 N, 5 N 10° E
11 18	»	52	34·1	11°	1 N 10° W, 4 N, 3 N 10° E, 1 N 30° E, (1 S).
20	200	82	28·8	4°	2 N, 5 N 10° E, 4 N 20° E, 1 N 30° E
45	10	52	26·7	21°	1 N 40° W, 1 N 30° W, 1 N 20° W, 5 N 10° W, 1 N, 3 N 10° E, 1 N 20° E, 1 N 30° E
12 04	»	»	19·1	39°	2 N 50° W, 2 N 20° W, 1 N 10° W, 1 N 20° E
18	100	»	25·4	10°	1 N 10° W, 2 N, 3 N 10° E, 2 N 20° E
30	20	»	25·7	N 1° E	2 N, 2 N 10° E, 2 N 20° E, 2 N 40° E
»	»	82	25·3	N 6° W	1 N 10° W, 3 N, 5 N 10° E, 2 N 20° E
15 05	75	30	22·5	19°	2 N 20° W, 6 N 10° W, 2 N, 1 N 10° E, 1 N 30° E, 1 N 40° E
»	1000	52	26·8	11°	1 N 30° W, 3 N 10° W, 2 N, 3 N 10° E, 4 N 20° E, 1 N 30° E
»	2000	82	26·8	36°	1 N 30° W, 10 N 20° W, 3 N 10° W
27	20	53	23·3	26°	4 N 30° W, 3 N 10° W, 4 N, 3 N 10° E
46	»	»	38·4	10°	5 N, 5 N 10° E, 1 N 30° E
»	50	30	35·9	7°	2 N 10° W, 2 N, 4 N 10° E, 1 N 20° E, 1 N 30° E, 1 N 40° E
16 38	20	82	31·6	15°	1 N 20° W, 2 N 10° W, 4 N, 6 N 10° E
»	»	30	30·6	11°	3 N 10° W, 3 N, 4 N 10° E, 1 N 20° E, 1 N 40° E
»	»	52	32·6	14°	1 N 30° W, 1 N 20° W, 2 N 10° W, 2 N, 1 N 20° E, 2 N 40° E
»	»	53	31·5	16°	1 N 20° W, 2 N 10° W, 3 N, 1 N 10° E, 2 N 20° E
17 15	5	82	29·3	26°	3 N 20° W, 3 N 10° W, 2 N, 1 N 10° E, (1 S)
»	20	53	40·6	23°	1 N 30° W, 5 N 10° W, 7 N
»	50	30	20·2	6°	1 N 10° W, 2 N, 2 N 10° E, 1 N 20° E, 2 N 30° E
»	200	52	19·1	15°	1 N 30° W, 1 N 10° W, 2 N, 1 N 10° E, 1 N 40° E
18 46	20	53	36·8	21°	1 N 20° W, 8 N 10° W, 1 N, 3 N 10° E, 1 N 20° E
»	75	30	26·1	30°	2 N 40° W, 2 N 30° W, 4 N 20° W, 1 N 10° W, 3 N, 3 N 10° E
»	1000	52	28·7	26°	1 N 40° W, 2 N 30° W, 2 N 20° W, 3 N 10° W
»	2000	82	19·3	38°	1 N 40° W, 5 N 30° W, 1 N 20° W, 1 N, 1 N 20° E, (1 S)
19 50	20	52	30·1	5°	1 N 20° W, 2 N, 3 N 10° E, 1 N 20° E, 3 N 30° E
»	100	82	30·1	43°	6 N 30° W, 1 N 20° W, 1 N 10° W

Explanation of Plates.

Pl. 1. *Bathymetric Chart.*

Pl. 2. Chart showing the *stations* on the various expeditions.

Pl. 3. Chart showing the *lines of the vertical sections* reproduced in Pls. 4—35. The Roman figures indicate the numbers of the sections. The Arabic figures give the numbers of the plates where the sections are reproduced, the first figure referring to the sections of temperature, salinity, and density, Pls. 4—28, the figures between upright curves to the sections of salinity-anomaly (Pls. 29—33), and the figures between brackets to the sections of smoothed σ_t-values [Pls. 34—35].

Pls. 4—35. *Vertical sections.*
The letter after the number (in Roman figures) of a section indicates the element represented graphically in the section.

A: Temperature and salinity. Isotherms (the broken lines) are drawn for every whole degree Centigrade. Isohalines (lines drawn in full) are drawn for every 0·1 ‰ of salinity. The hatching indicates salinities above 35 ‰, with different shades for 35·0—35·5, 35·5—36·0, and above 36·0 ‰.

B: Density (σ_t). Isopycnals are drawn for every 0·1 of the σ_t-unit.

C: Anomaly of salinity, with curves drawn for every 10 units of the anomaly (see pp. 10 and 37). Hatching with broken lines indicates negative anomalies, while hatching with unbroken lines indicates anomalies above + 50.

D: Smoothed values of σ_t, with curves drawn for every 0·1 unit of $(\sigma_t)_m$ (see p. 27).

The *horizontal scale* of the sections is 1 : 6 000 000 except in the following sections: IV (Pls. 8 and 33) and XIII (Pl. 20) where it is 1 : 3 000 000, and XVI, XVII, XVIII (Pls. 24—28) where it is 1 : 12 000 000.

The *vertical scale* is 1 : 20 000 except in Sect. IV (Pls. 8 and 33) where it is 1 : 30 000. The depths at which observations were made are marked with crosses. As to the construction of the curves see p. 12.

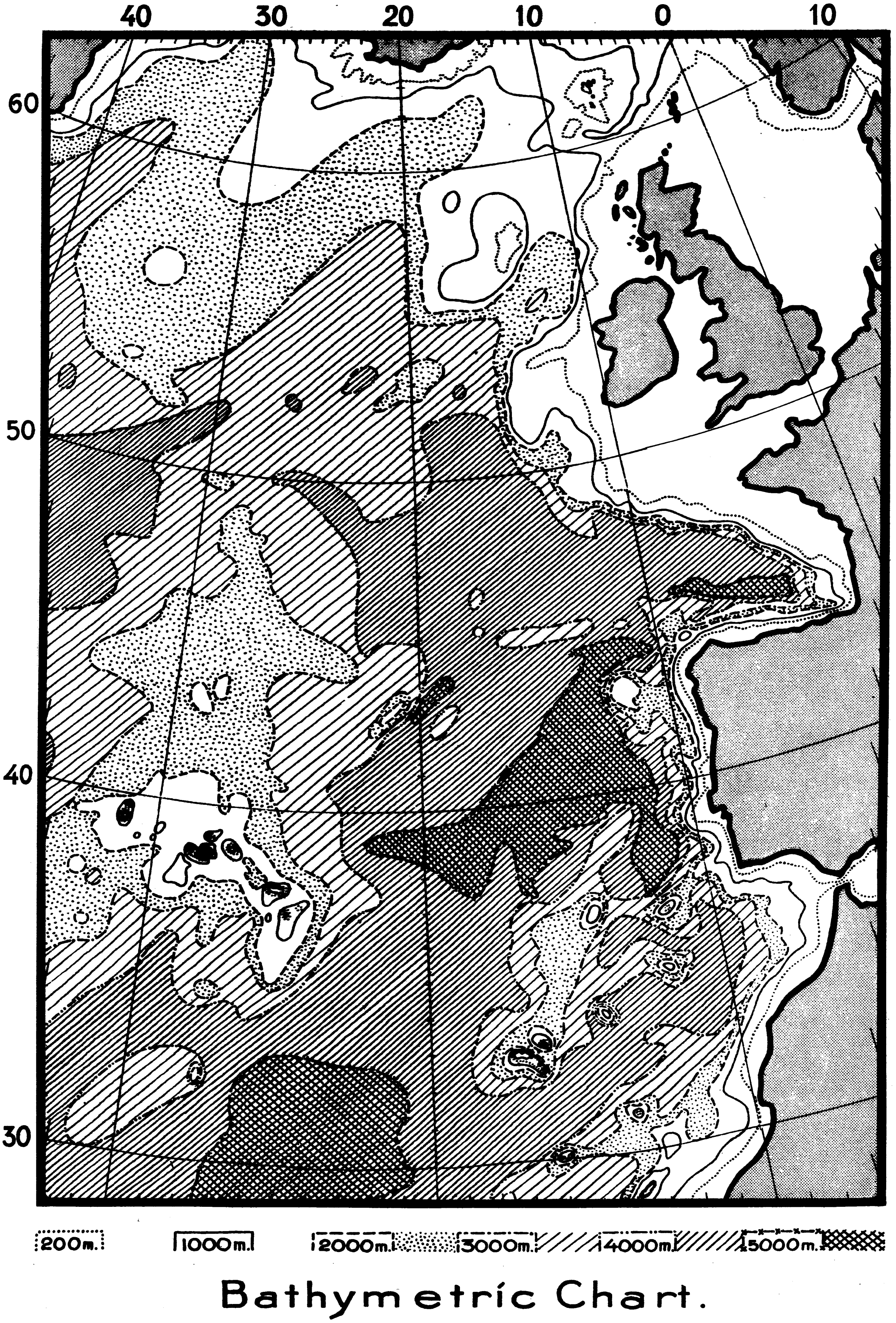
Pls. 36—54. Charts showing the distribution of *temperature* and *salinity* (on the left hand page) and of *density* (on the right hand page), at different depths. Isotherms are drawn for every degree Centigrade, isohalines for every 0·1 ‰ of salinity, and isopycnals for every 0·05 unit of σ_t. The hatching indicates salinities in the same way as in the vertical sections. As to the signs of the stations see p. 5.

Pls. 55—59. Charts showing the distribution of *salinity-anomalies.* Curves are drawn for every 10 units of the anomaly (see pp. 10 and 37).

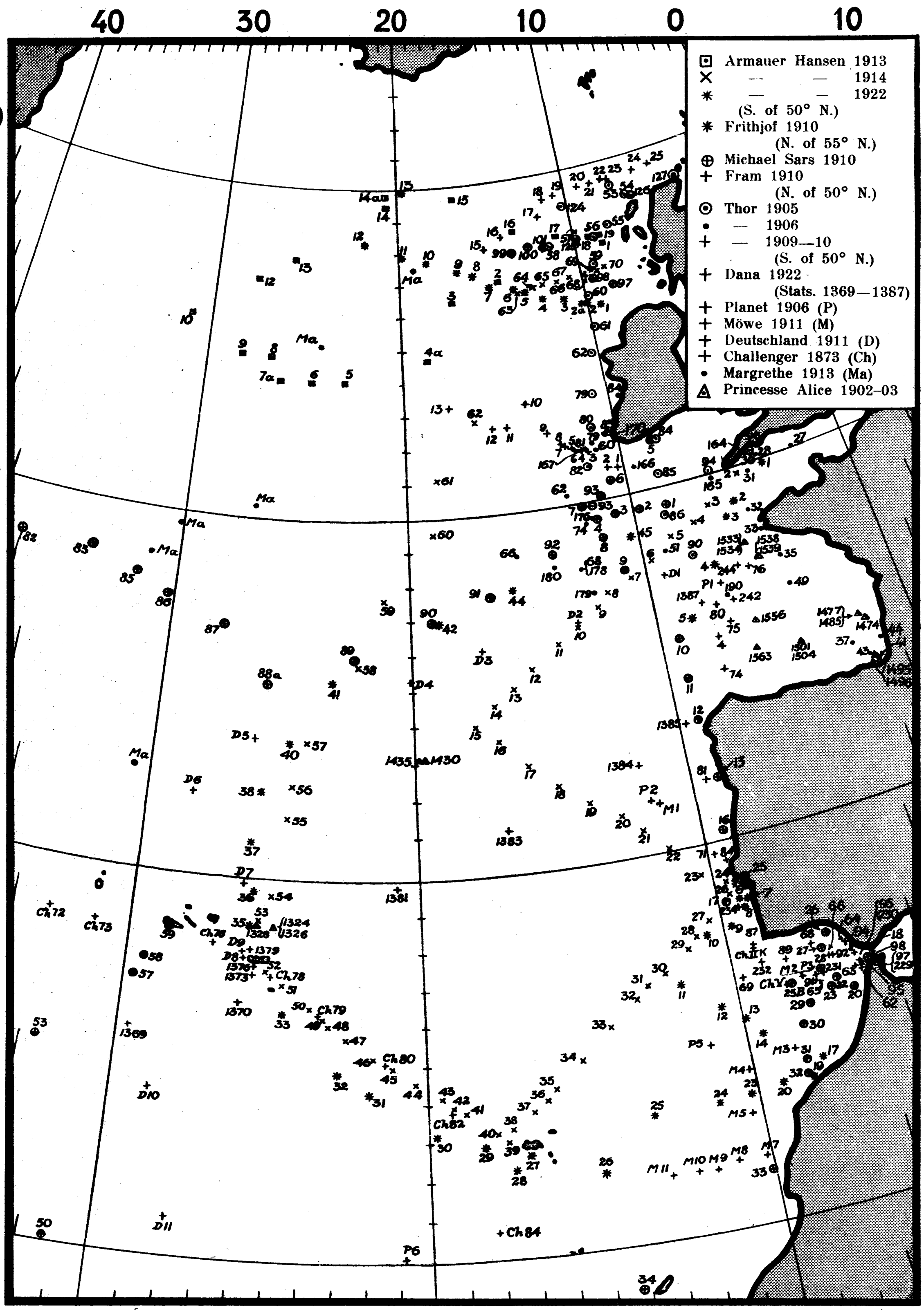
Pls. 60—61. Charts showing the *smoothed values of σ_t.* Curves are drawn for every 0·05 unit of $(\sigma_t)_m$ (see pp. 27—28).

Pls. 62—71. Charts showing the *dynamic topography* of various isobaric surfaces relatively to other isobaric surfaces at greater depths (*e. g.* the chart for 2 000—100 decibars, Pl. 62, represents the horizontal distribution of the variations in the dynamic height of the 100 decibar surface above the 2 000 decibar surface). Isobaths are drawn for every 25 dynamic millimeters. The figures used for the construction of the isobaths are only reproduced in the last chart, Pl. 71. (See pp. 9—10).

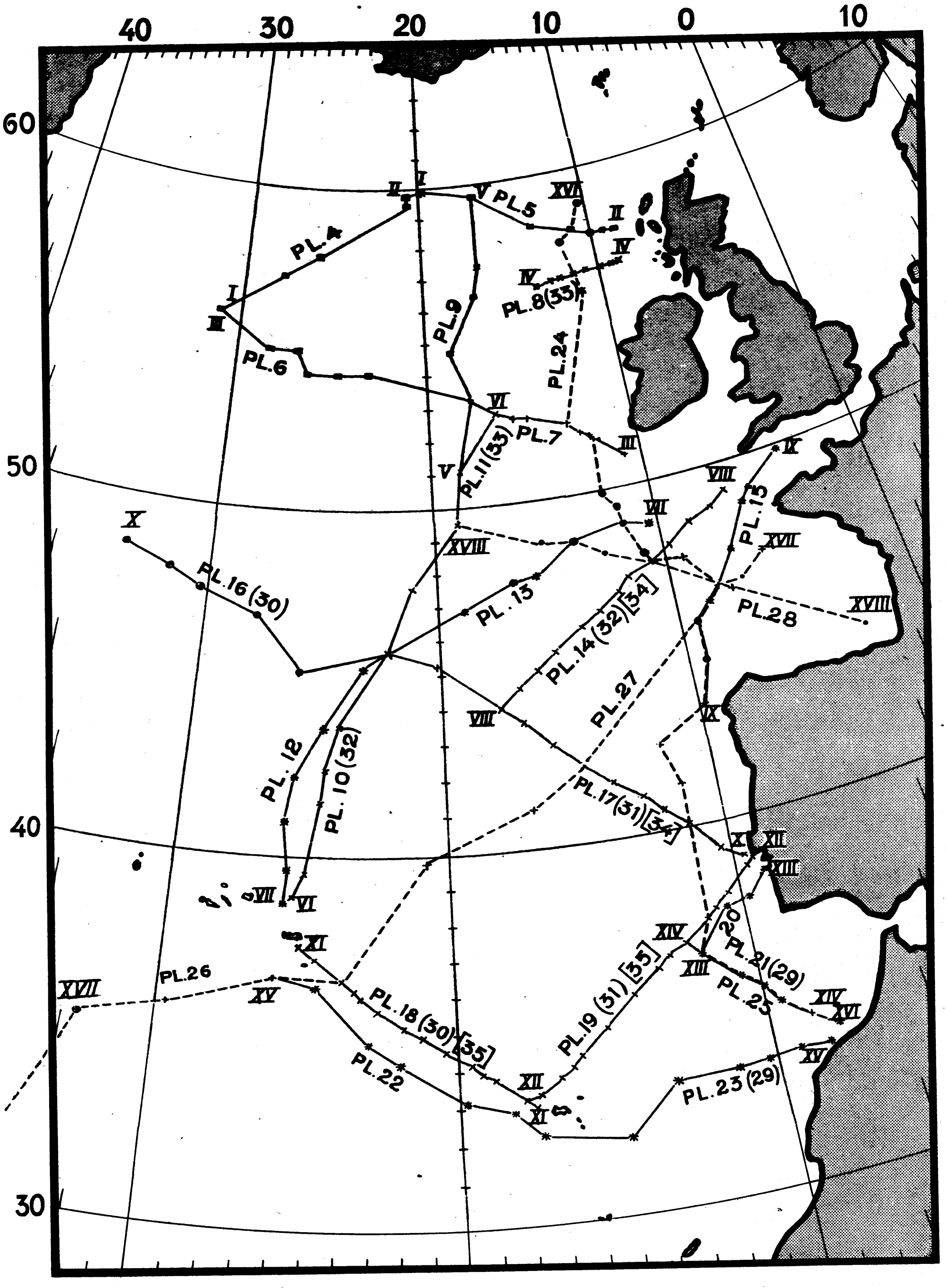
Printed, May 27th, 1926.



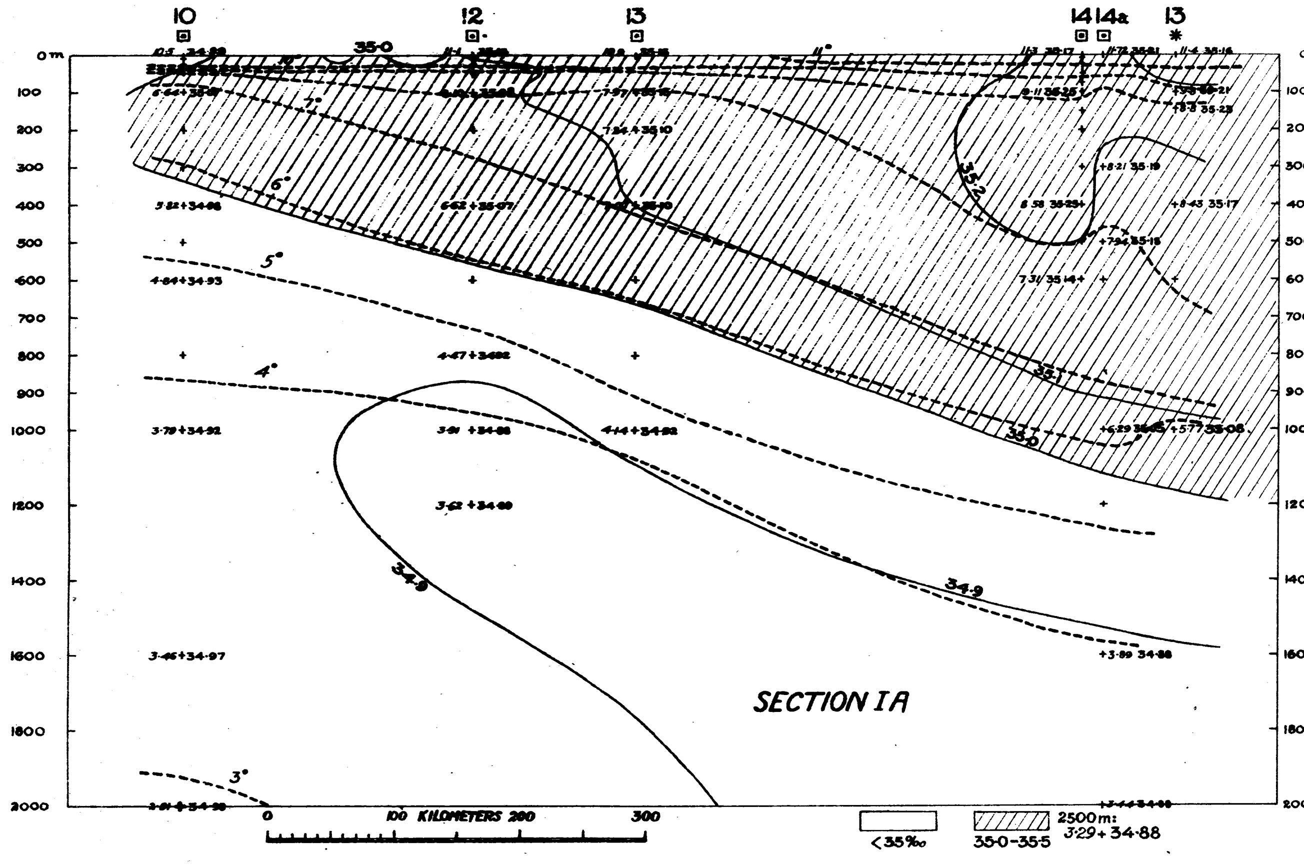
Bathymetric Chart.

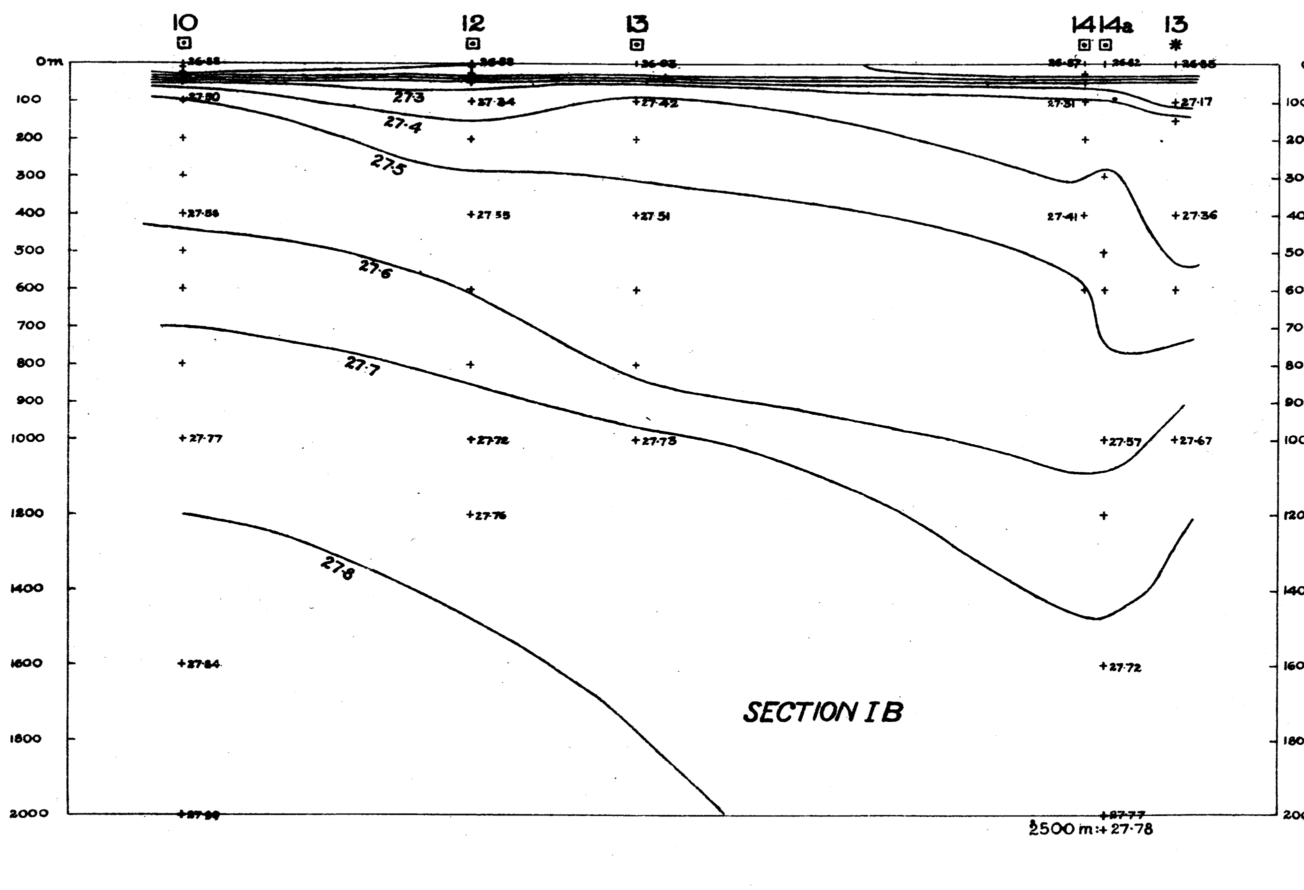


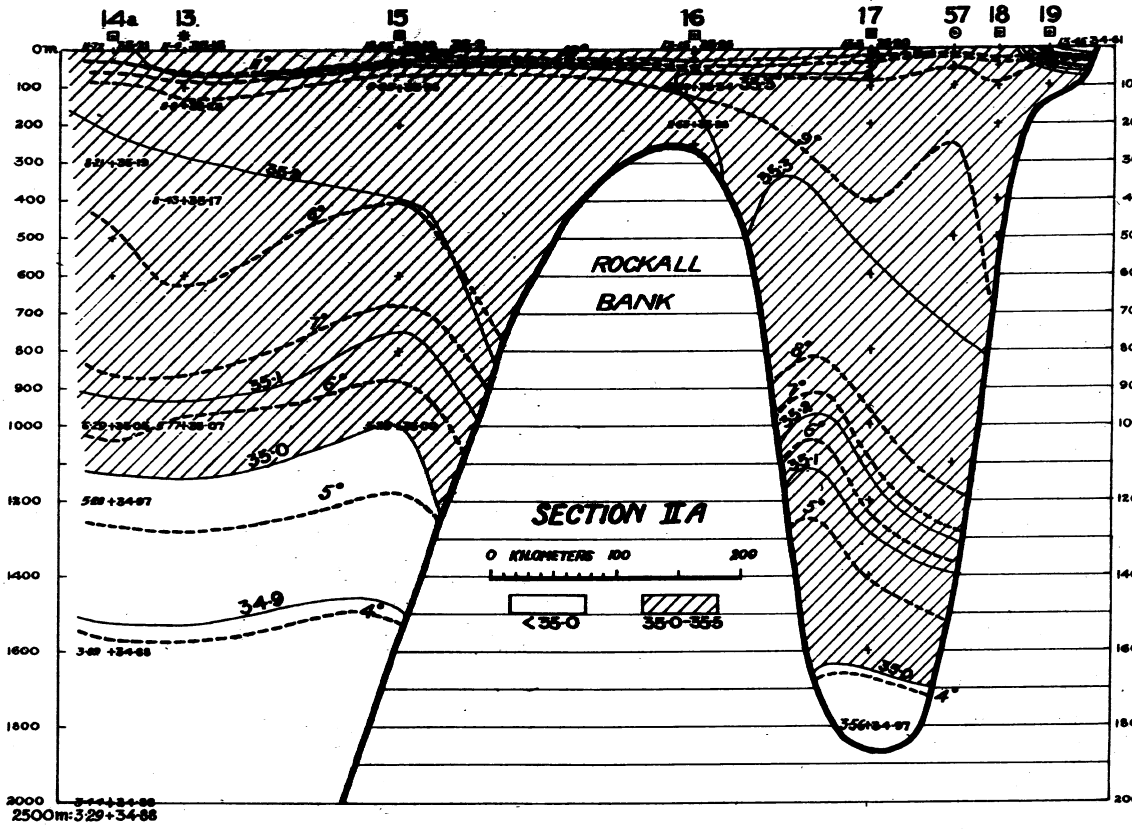
The Stations.



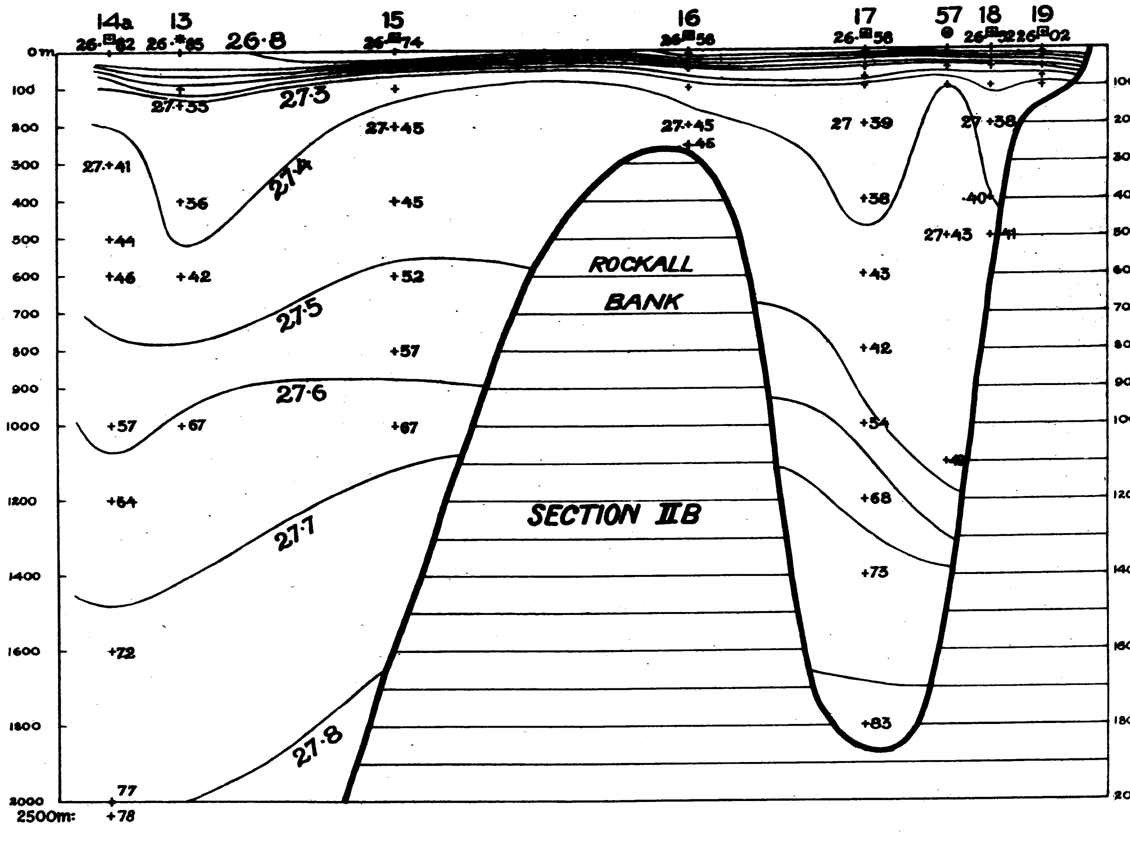
The Sections.


10
12
13
14 14a
13
SECTION IA
KILOMETERS
<35‰
35·0–35·5
2500 m:
3·29 + 34·88

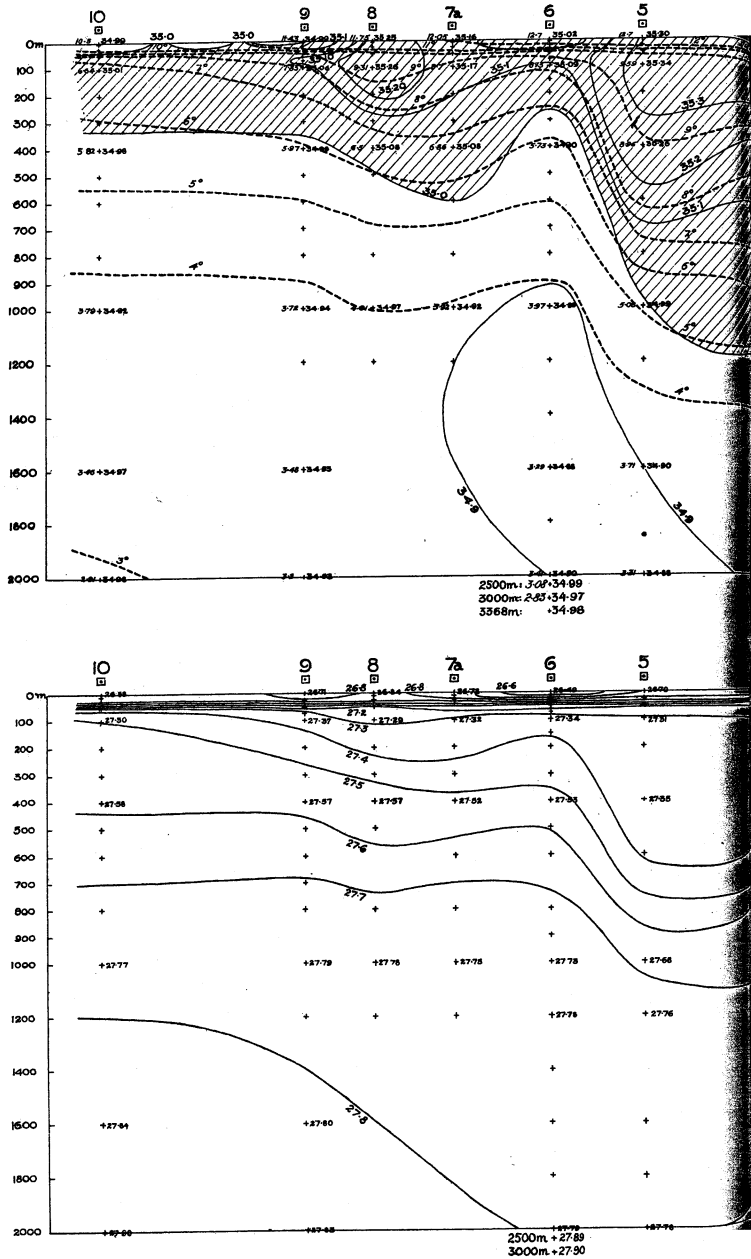

10
12
13
14 14a
13
SECTION IB
2500 m: + 27·78

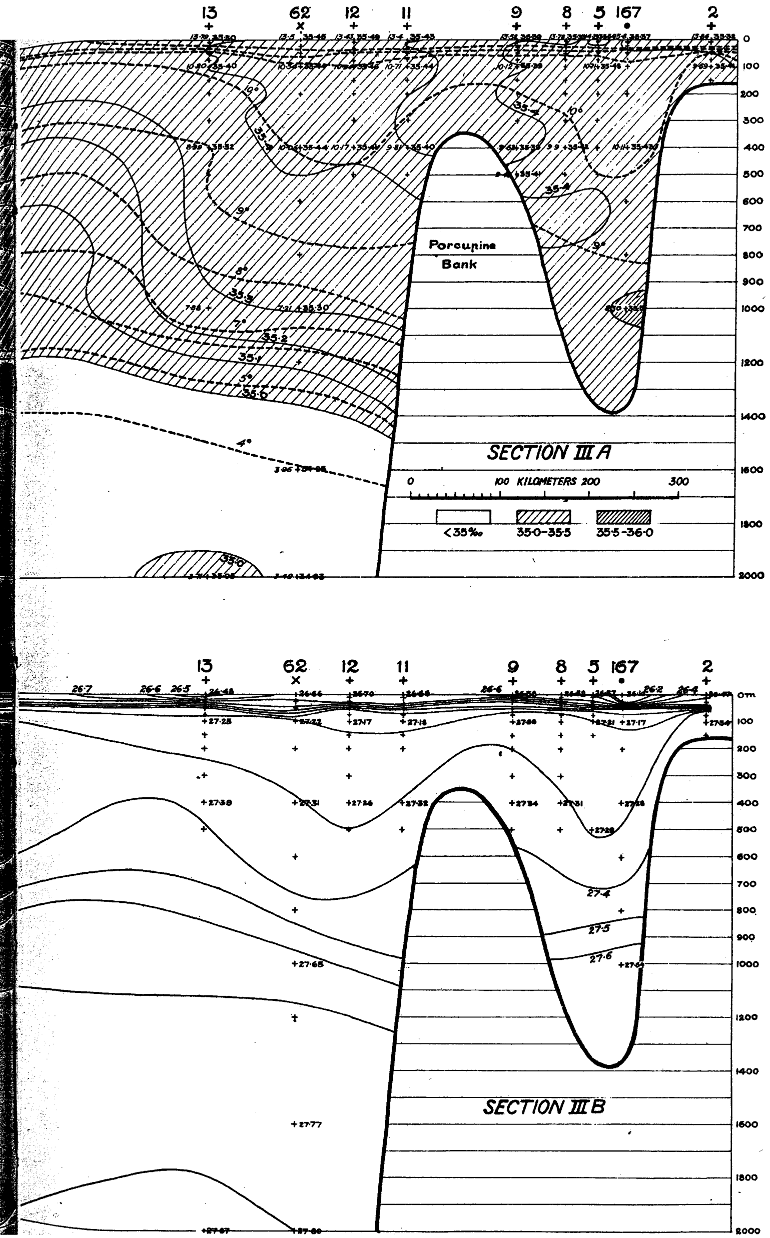


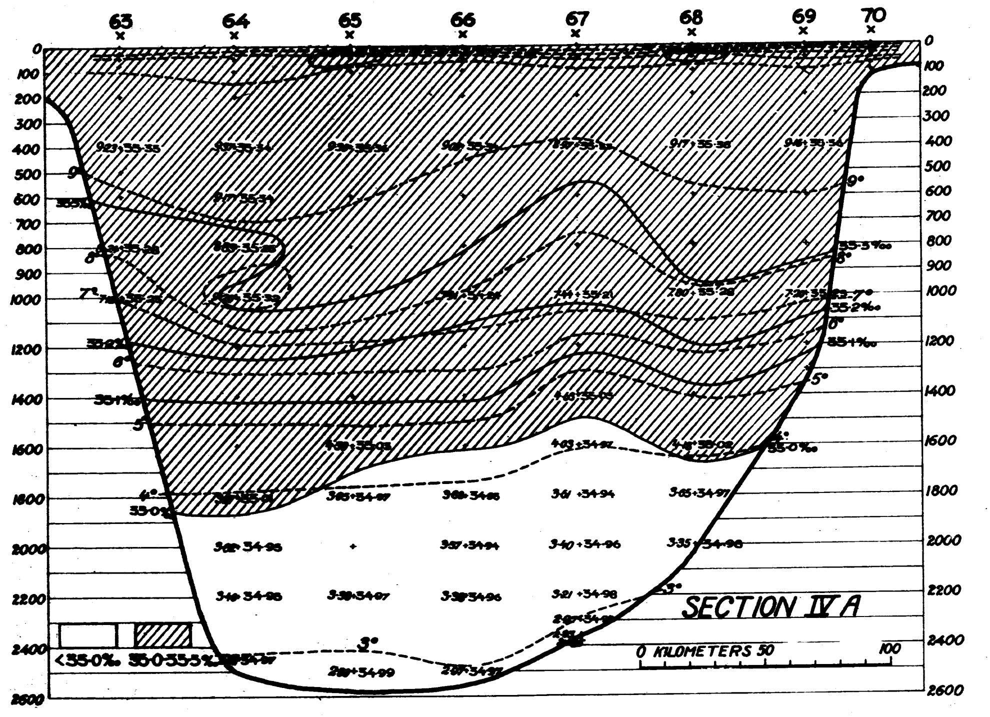
14a
13
15
16
17
57
18
19
ROCKALL
BANK
SECTION IIA
0 KILOMETERS 100 200
<35·0
35·0-35·5
2500m: 3·29+34·88



14a
13
15
16
17
57
18
19
26·8
27·3
27·4
27·5
27·6
27·7
27·8
ROCKALL
BANK
SECTION IIB
2500m: +78


10
9
8
7a
6
5
2500m.: 3·08+34·99
3000m.: 2·83+34·97
3368m.: +34·98
2500m. +27·89
3000m. +27·90


13
62
12
11
9
8
5
167
2
Porcupine Bank
SECTION III A
0
100 KILOMETERS 200
300
<35‰
35·0-35·5
35·5-36·0
SECTION III B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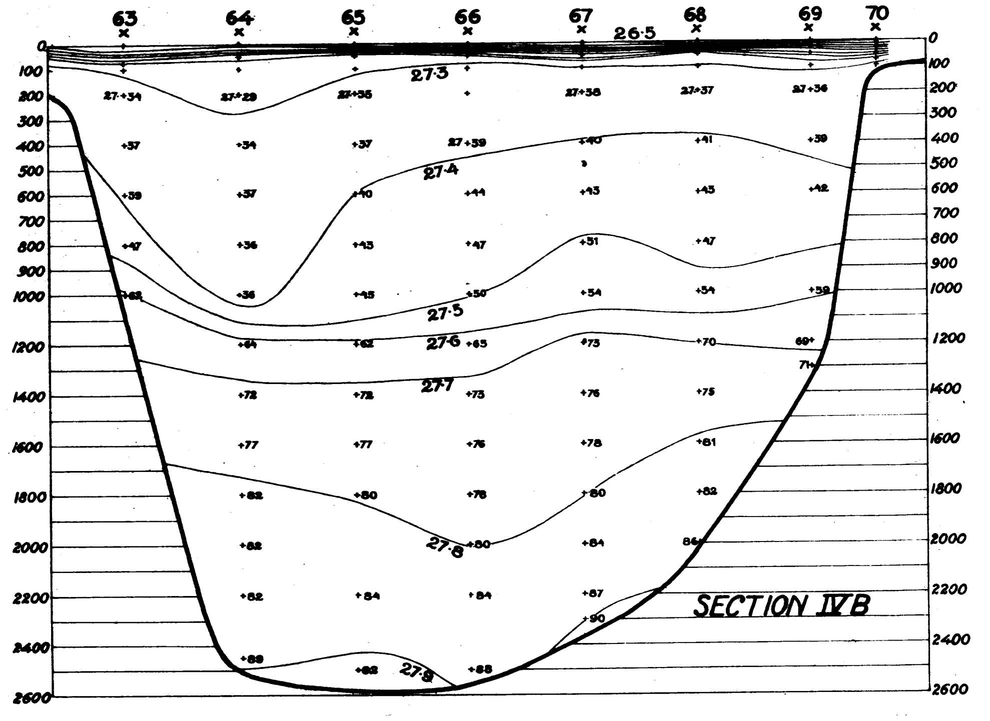
0 KILOMETERS 50 100
<35·0‰ 35·0-35·3‰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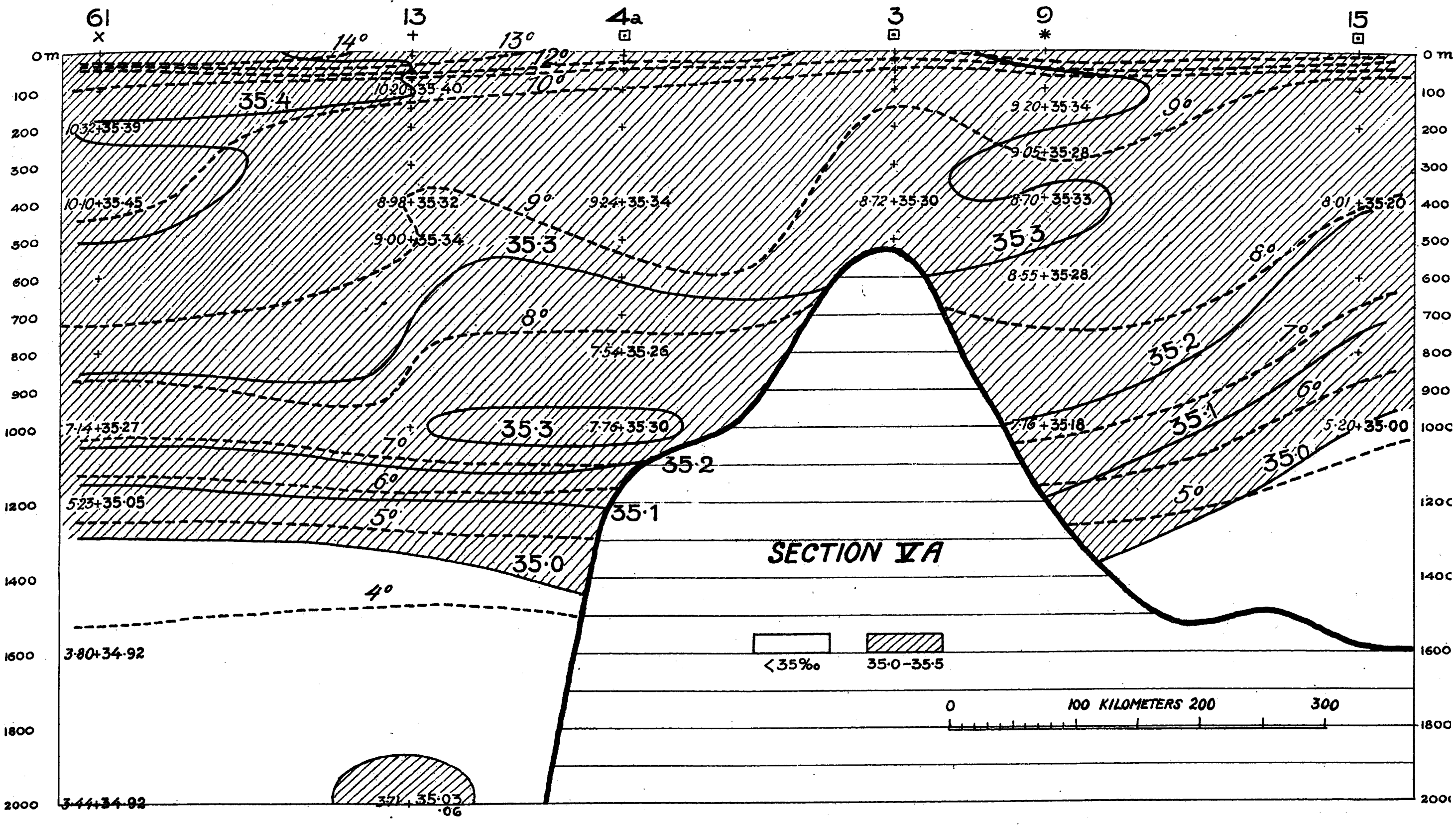
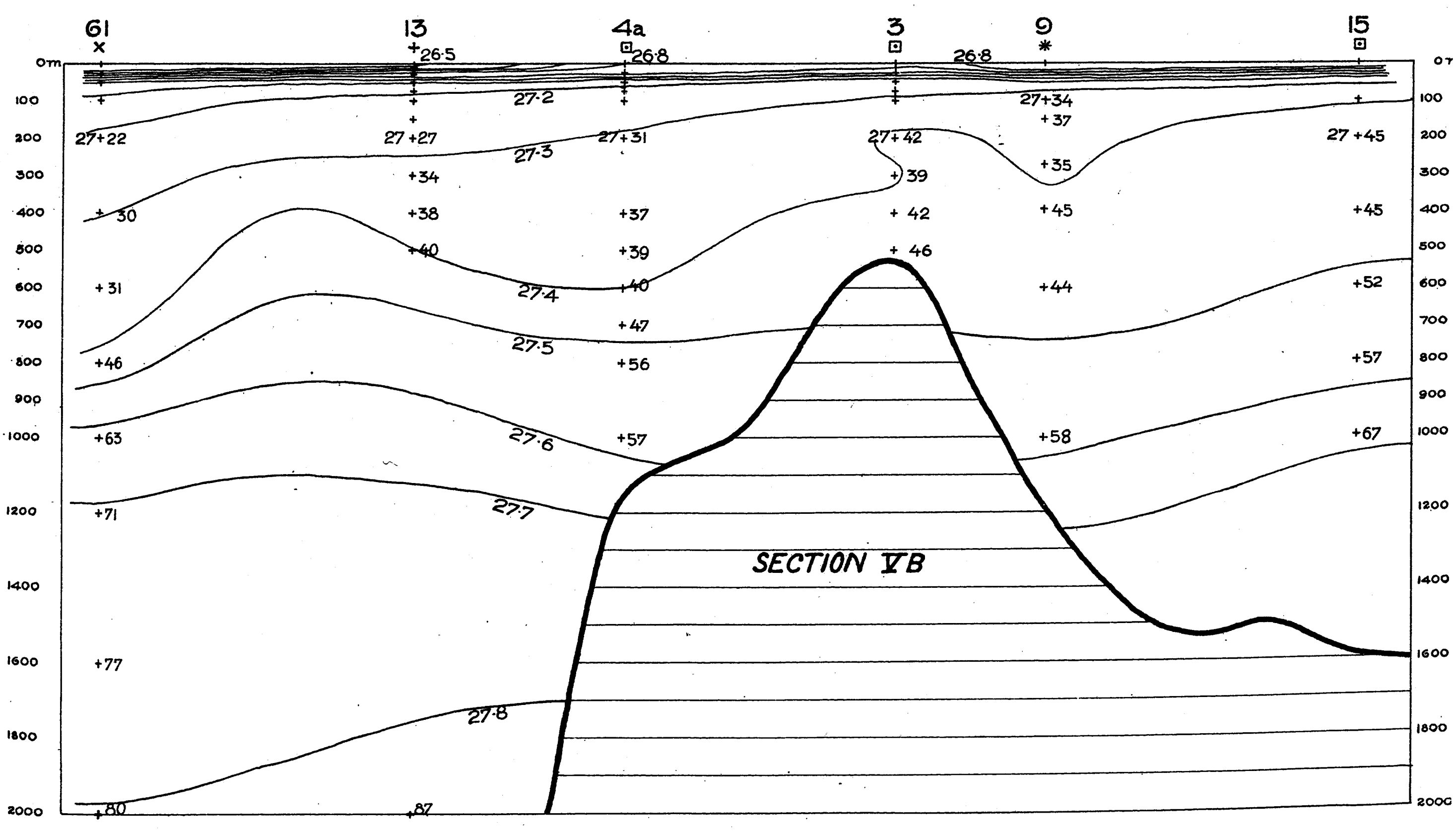

61
13
4a
3
9
15
SECTION VA
<35‰
35·0–35·5
0
100 KILOMETERS 200
300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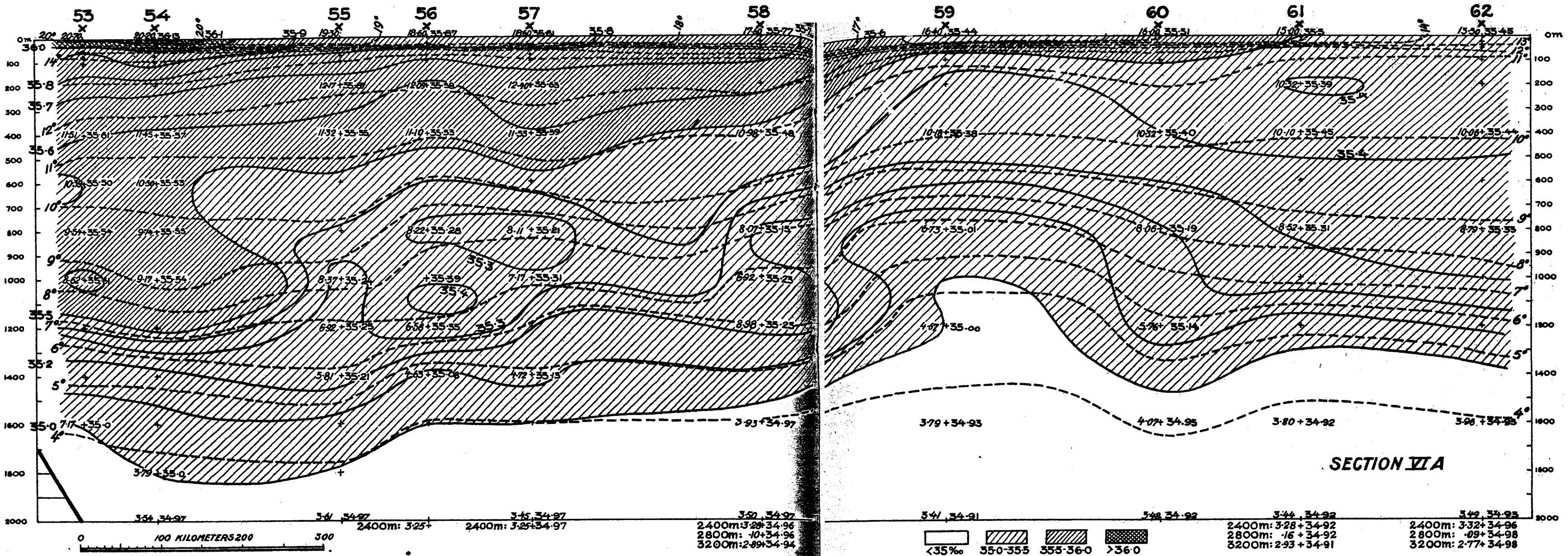
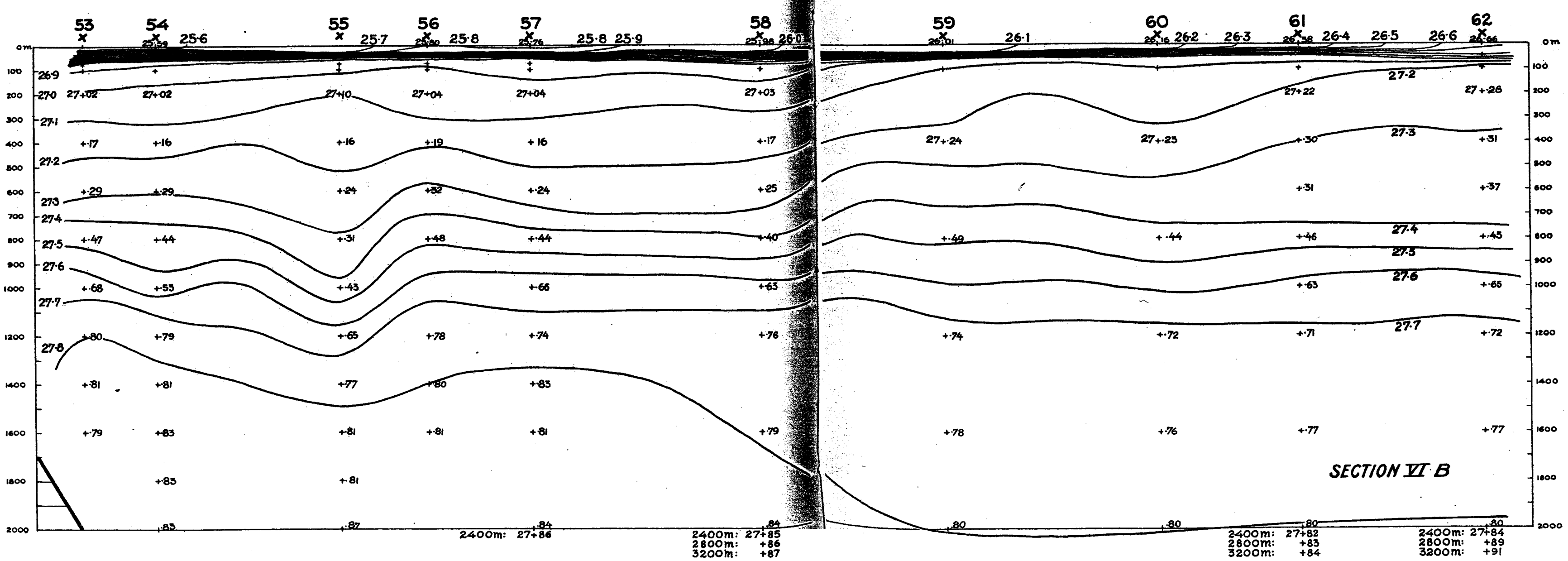
13
4a
3
9
15
SECTION VB


53
54
55
56
57
58
59
60
61
62
100 KILOMETERS 200
300
<35‰
35·0-35·5
35·5-36·0
>36·0
SECTION VI A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54
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56
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58
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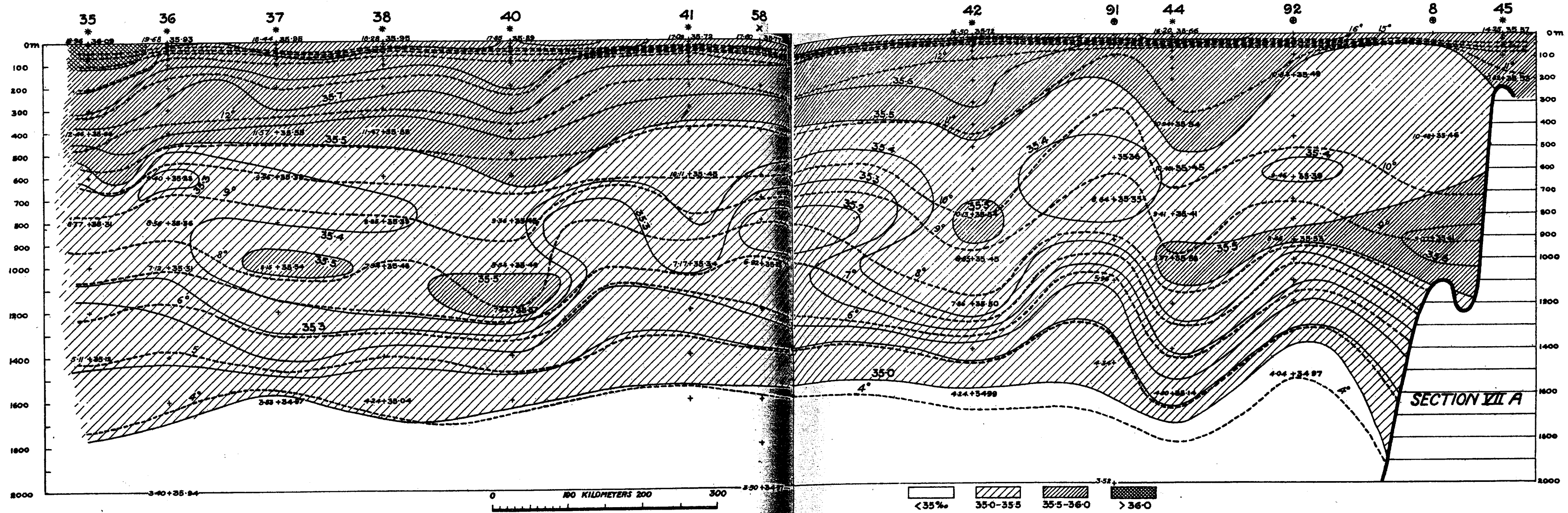
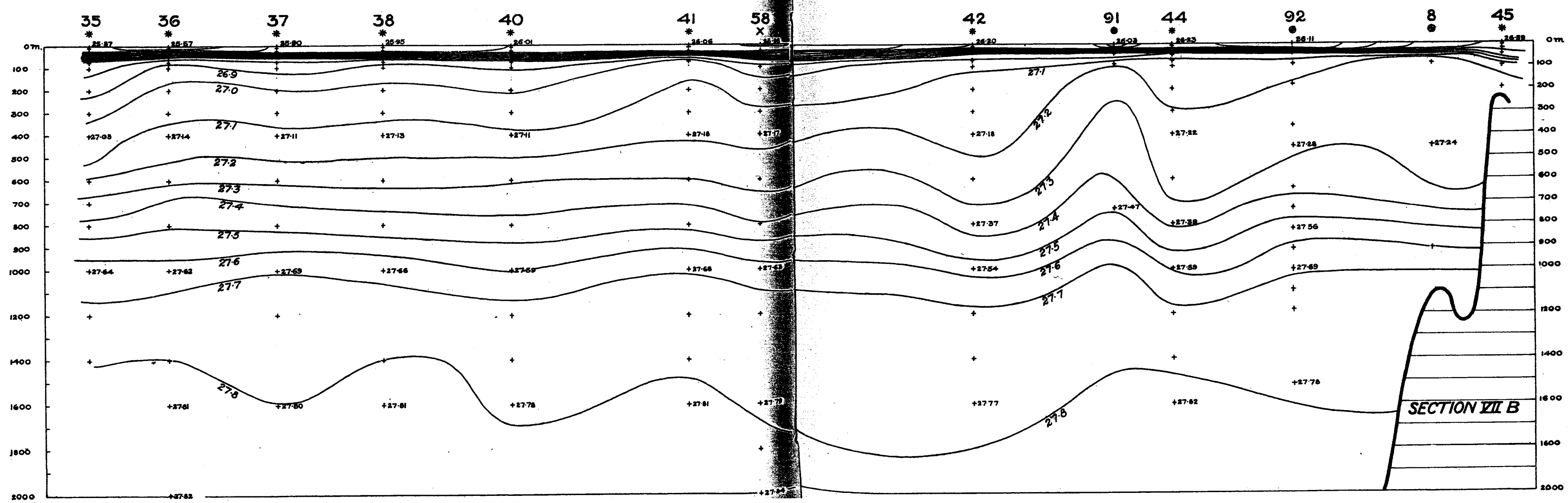
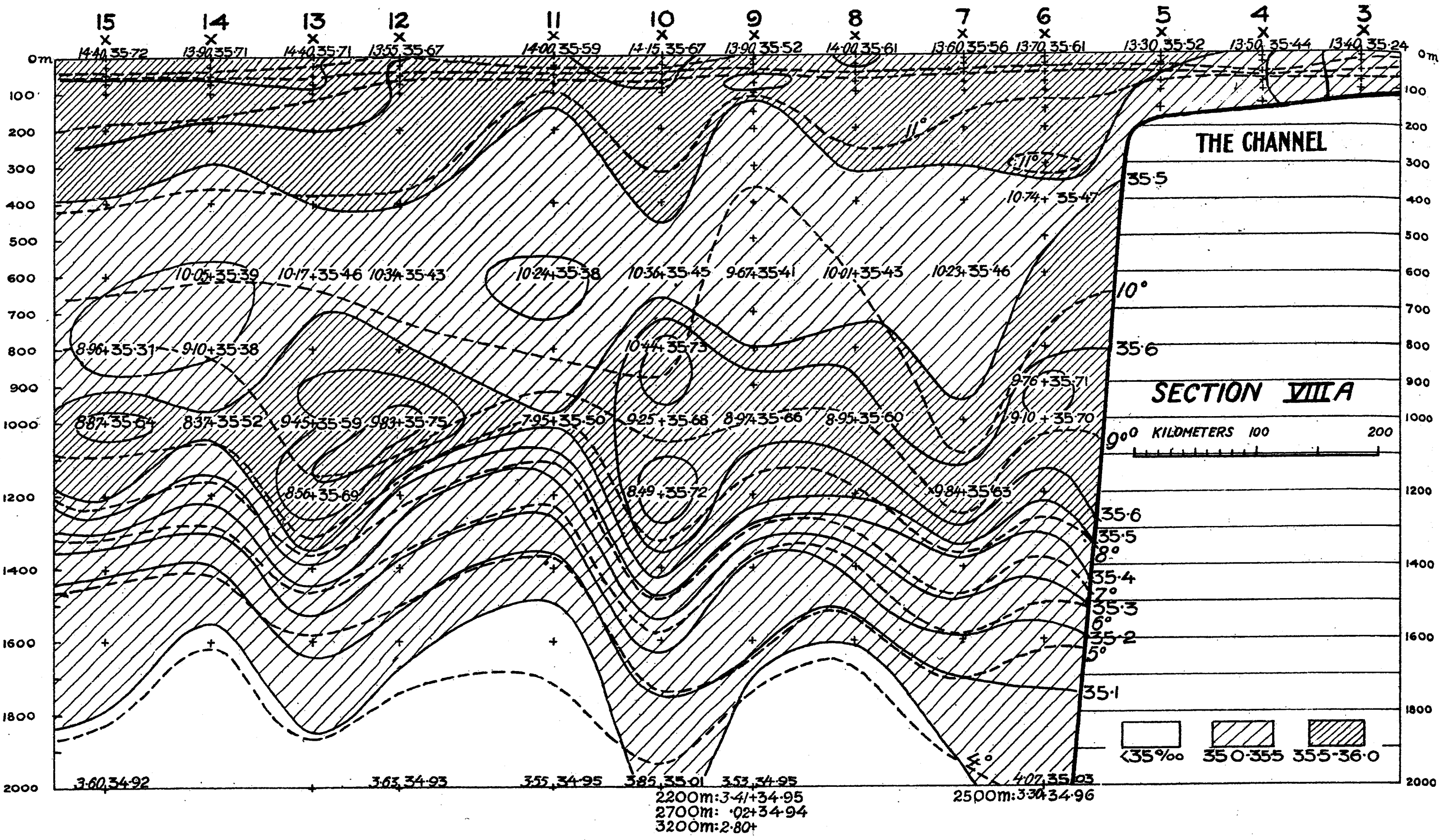
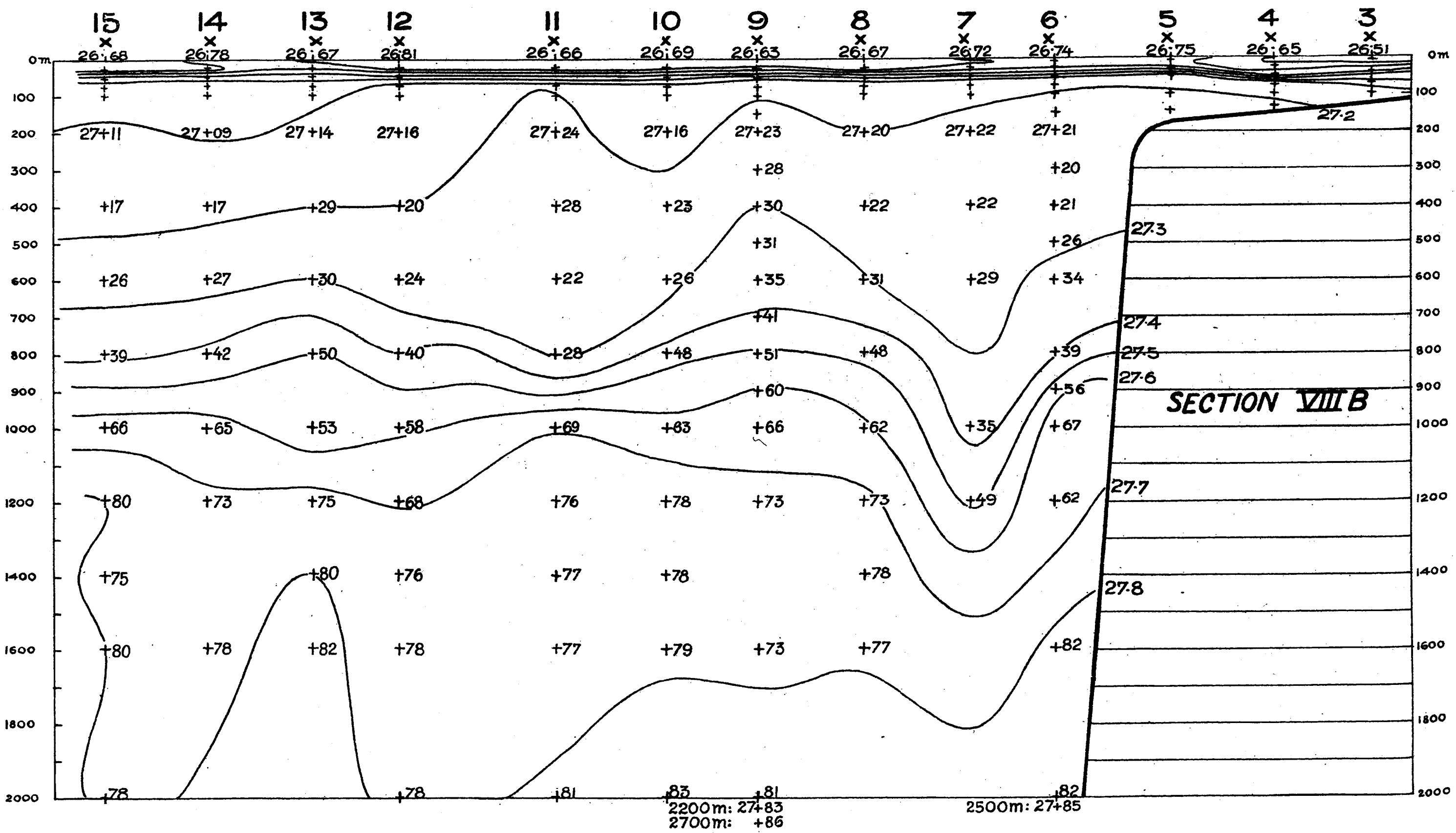
60
61
62
SECTION VI B


35
36
37
38
40
41
58
42
91
44
92
8
45
0 m
100
200
300
400
500
600
700
800
900
1000
1200
1400
1600
1800
2000
0 100 KILOMETERS 200 300
<35‰
35·0–35·5
35·5–36·0
>36·0
SECTION VII A

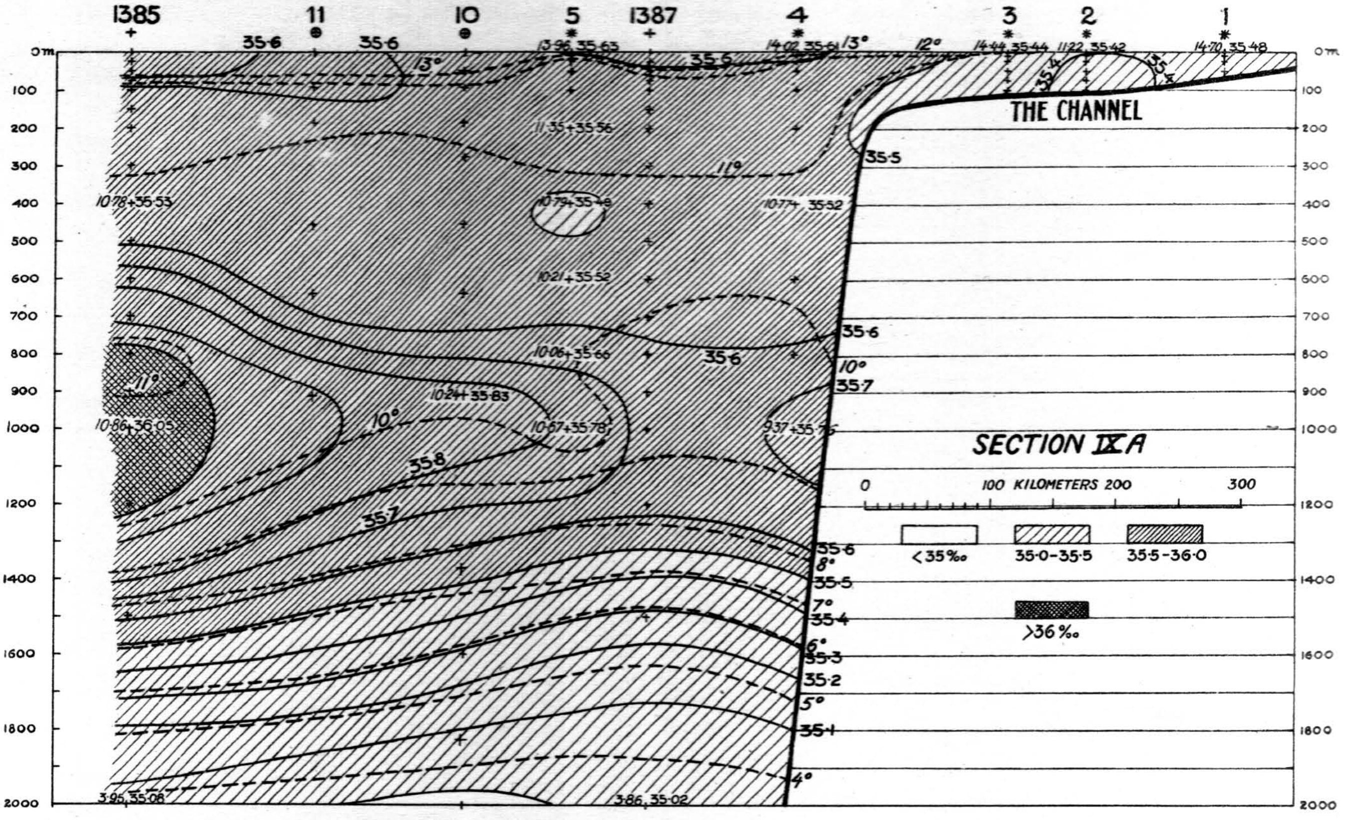

35
36
37
38
40
41
58
42
91
44
92
8
45
0 m
100
200
300
400
500
600
700
800
900
1000
1200
1400
1600
1800
2000
SECTION VII B

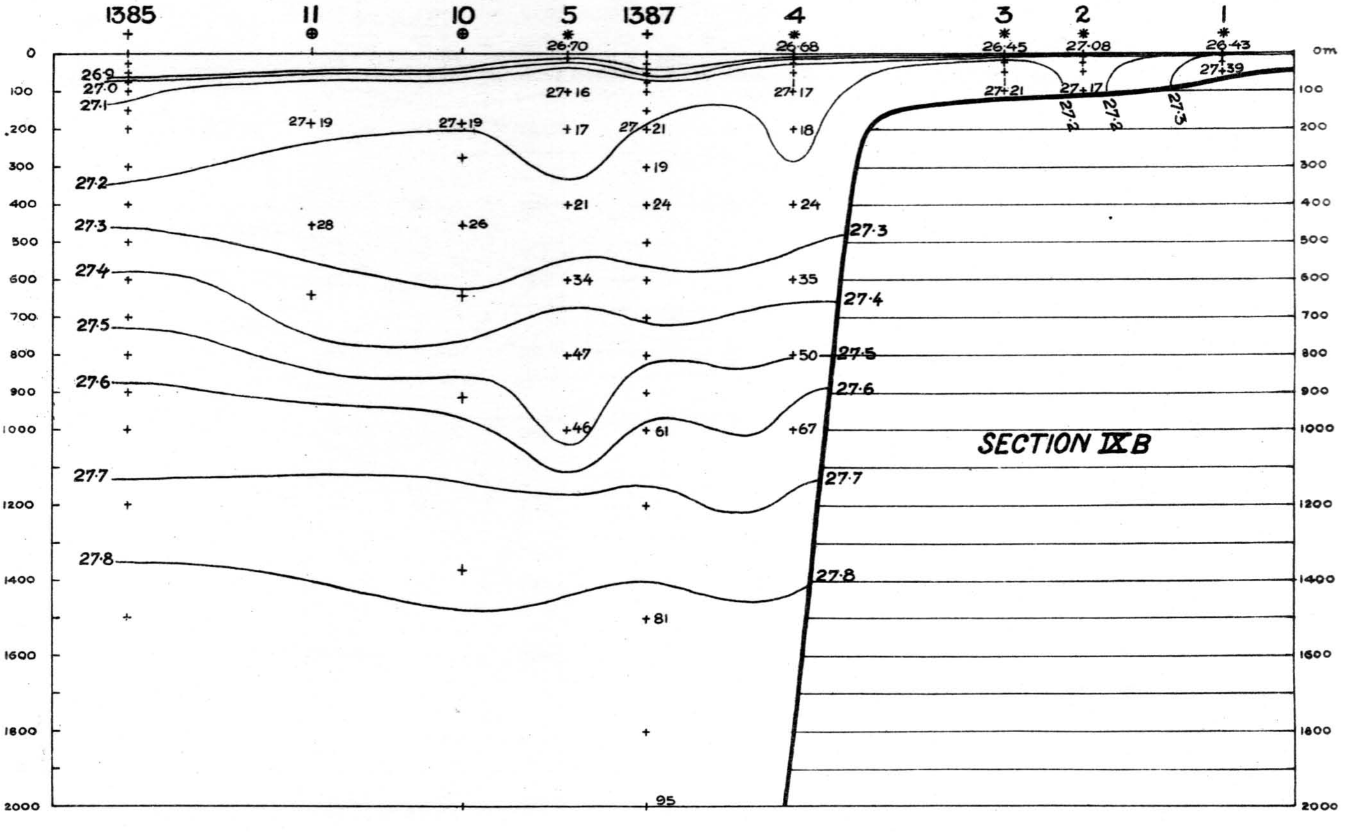


THE CHANNEL
SECTION VIII A
KILOMETERS 0 100 200
<35‰ 35.0-35.5 35.5-36.0
2200m: 3.41+34.95
2700m: .02+34.94
3200m: 2.80+
2500m: 3.30+34.96



SECTION VIII B
2200m: 27+83
2700m: +86
2500m: 27+85


1385
11
10
5
1387
4
3
2
1
THE CHANNEL
SECTION IX A
0 100 KILOMETERS 200 300
<35‰
35·0-35·5
35·5-36·0
>36‰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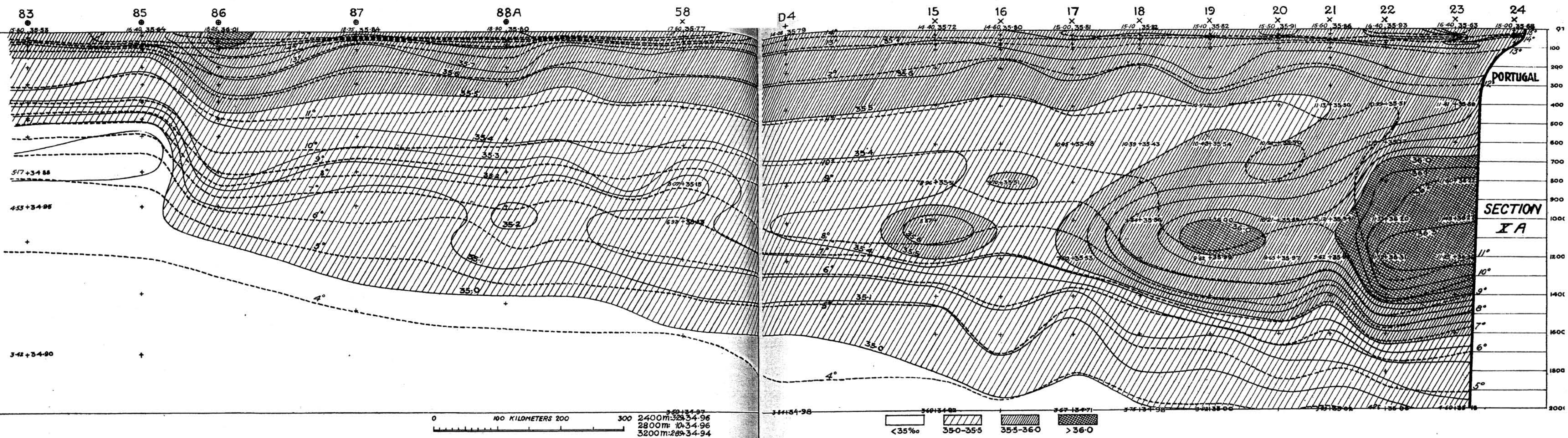
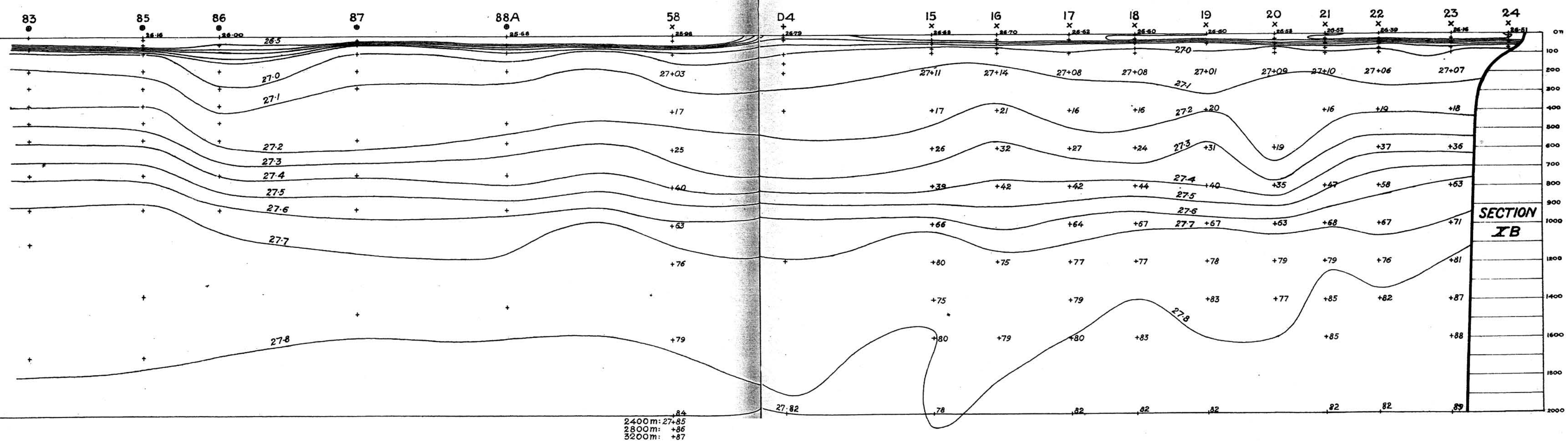
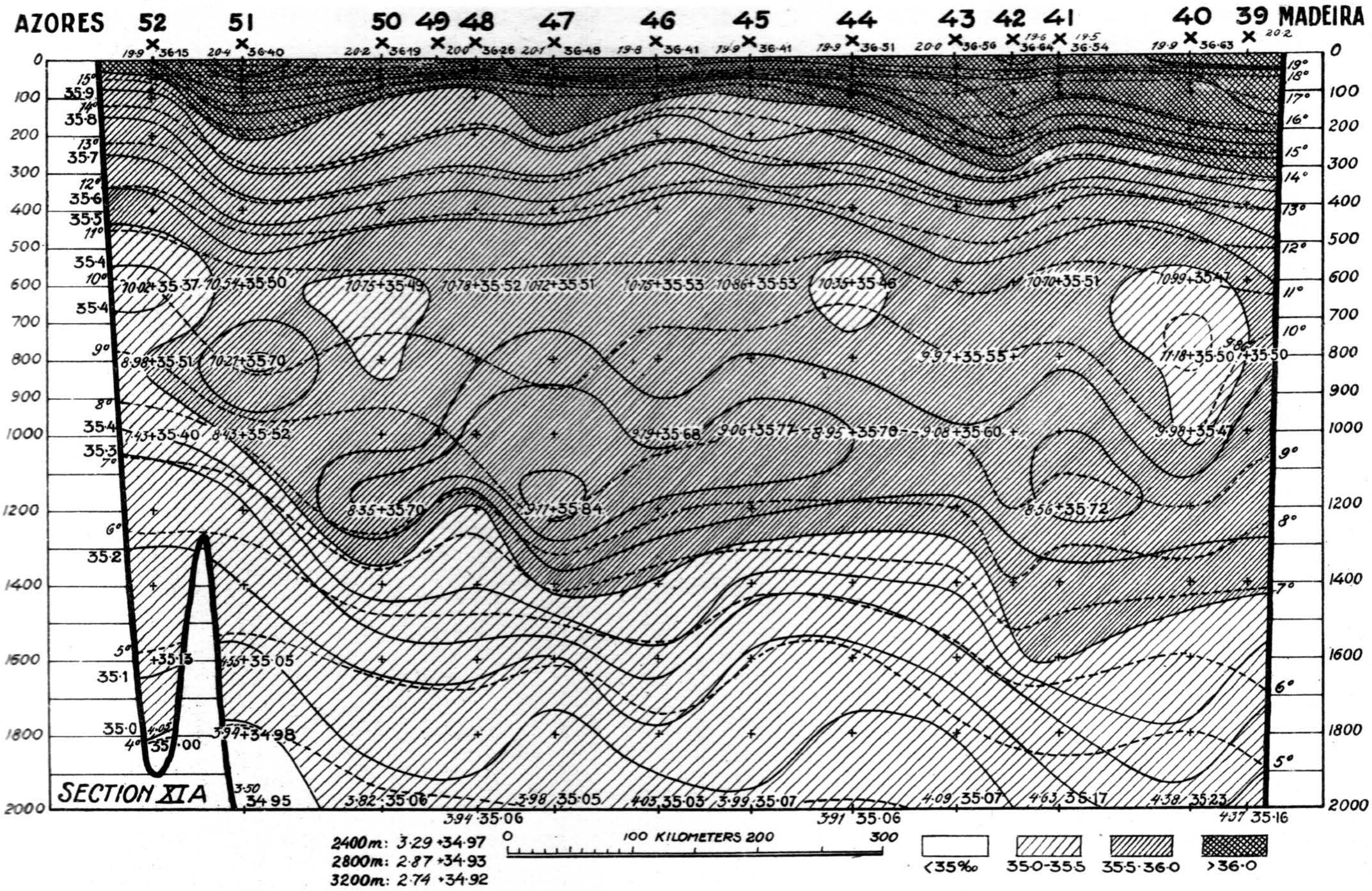
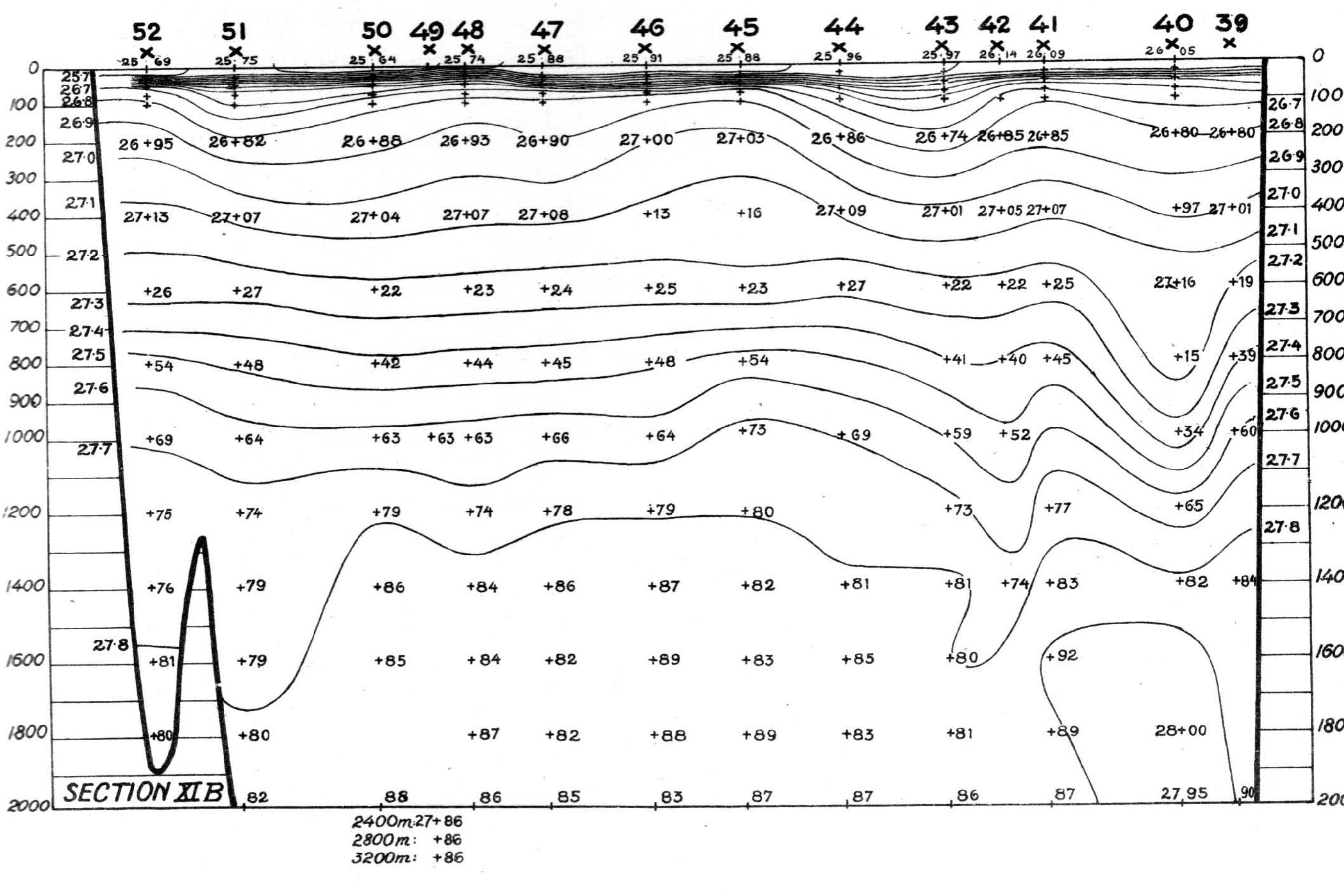
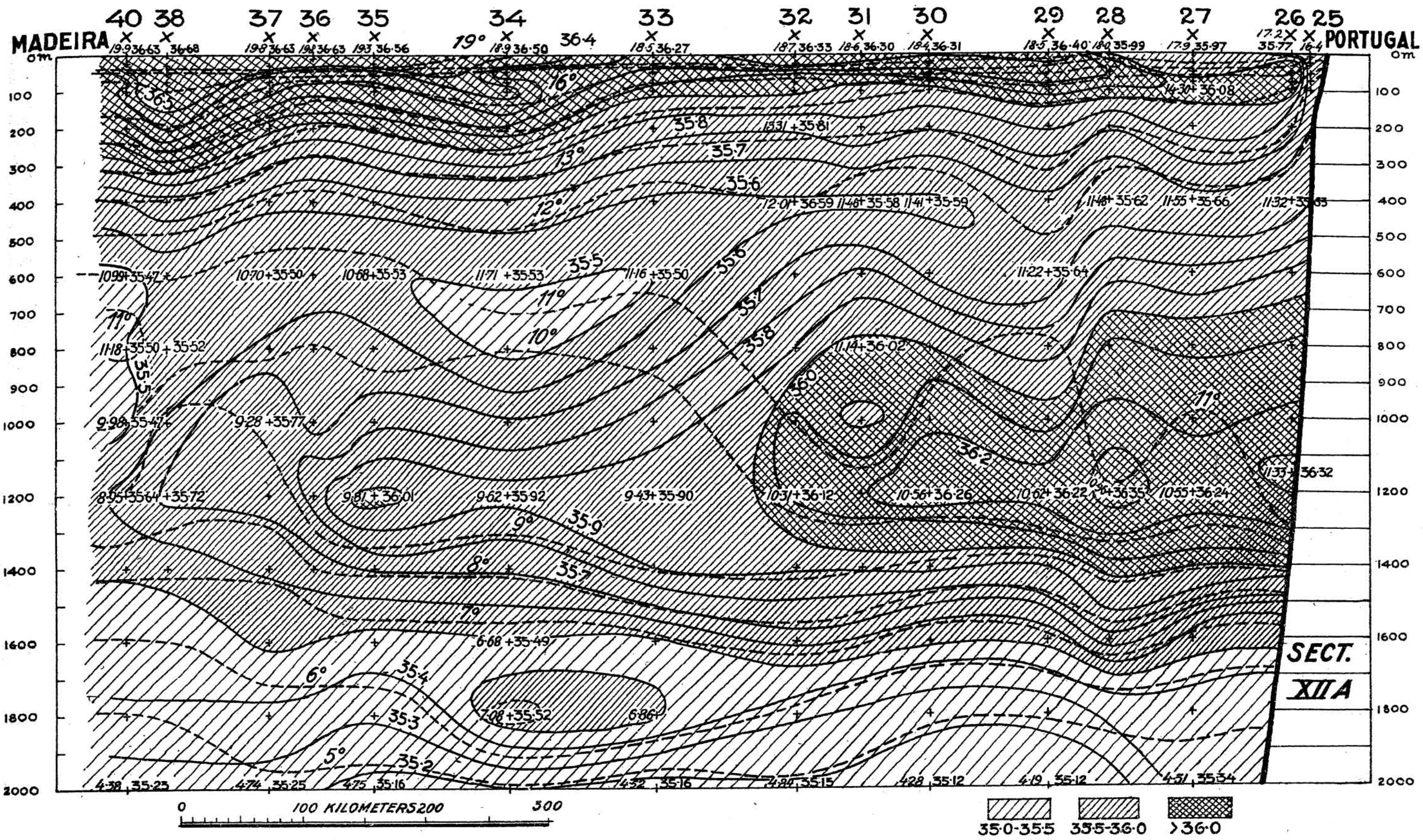
1387
4
3
2
1
SECTION IX B

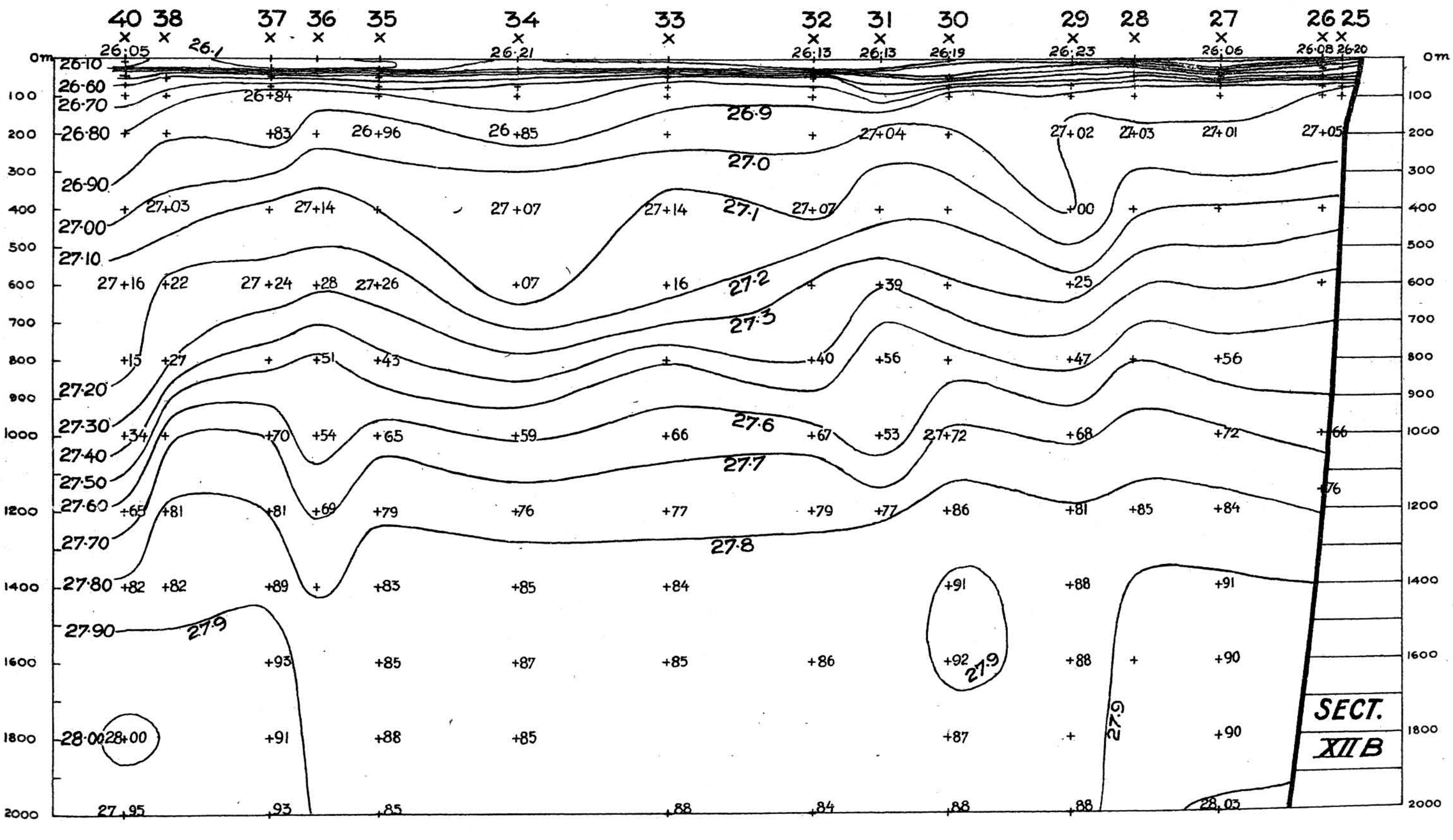

83
85
86
87
88A
58
D4
15
16
17
18
19
20
21
22
23
24
PORTUGAL
SECTION
I A
0 100 KILOMETERS 200 300
2400m: 3·24 34·96
2800m: 3·04 34·96
3200m: 2·86 34·94
<35‰
35·0-35·5
35·5-36·0
>36·0


83
85
86
87
88A
58
D4
15
16
17
18
19
20
21
22
23
24
SECTION
I B
2400m: 27·85
2800m: +86
3200m: +87


AZORES
52
51
50
49
48
47
46
45
44
43
42
41
40
39
MADEIRA
SECTION XI A
2400m: 3·29 +34·97
2800m: 2·87 +34·93
3200m: 2·74 +34·92
0 100 KILOMETERS 200 300
<35‰
35·0-35·5
35·5-36·0
>36·0


52
51
50
49
48
47
46
45
44
43
42
41
40
39
SECTION XI B
2400m: 27+86
2800m: +86
3200m: +86


MADEIRA
PORTUGAL
40 38 37 36 35 34 33 32 31 30 29 28 27 26 25
0 100 KILOMETERS 200 300
35·0-35·5
35·5-36·0
>36·0
SECT.
XII A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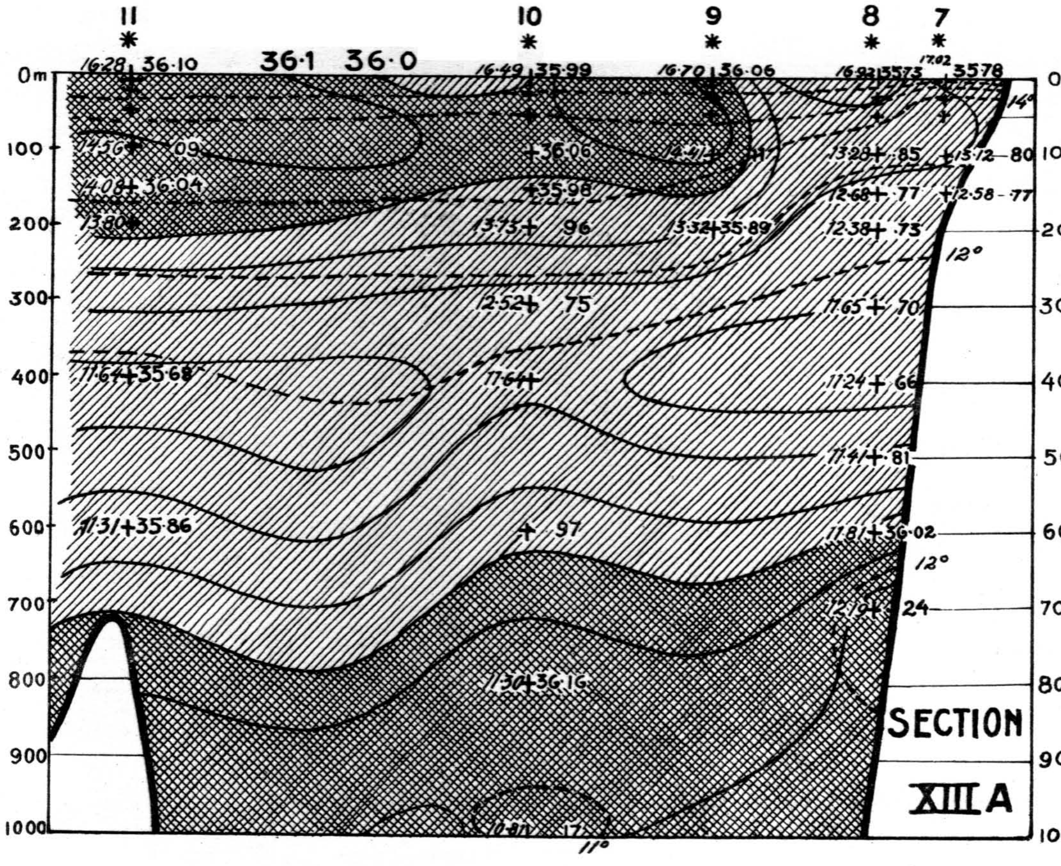
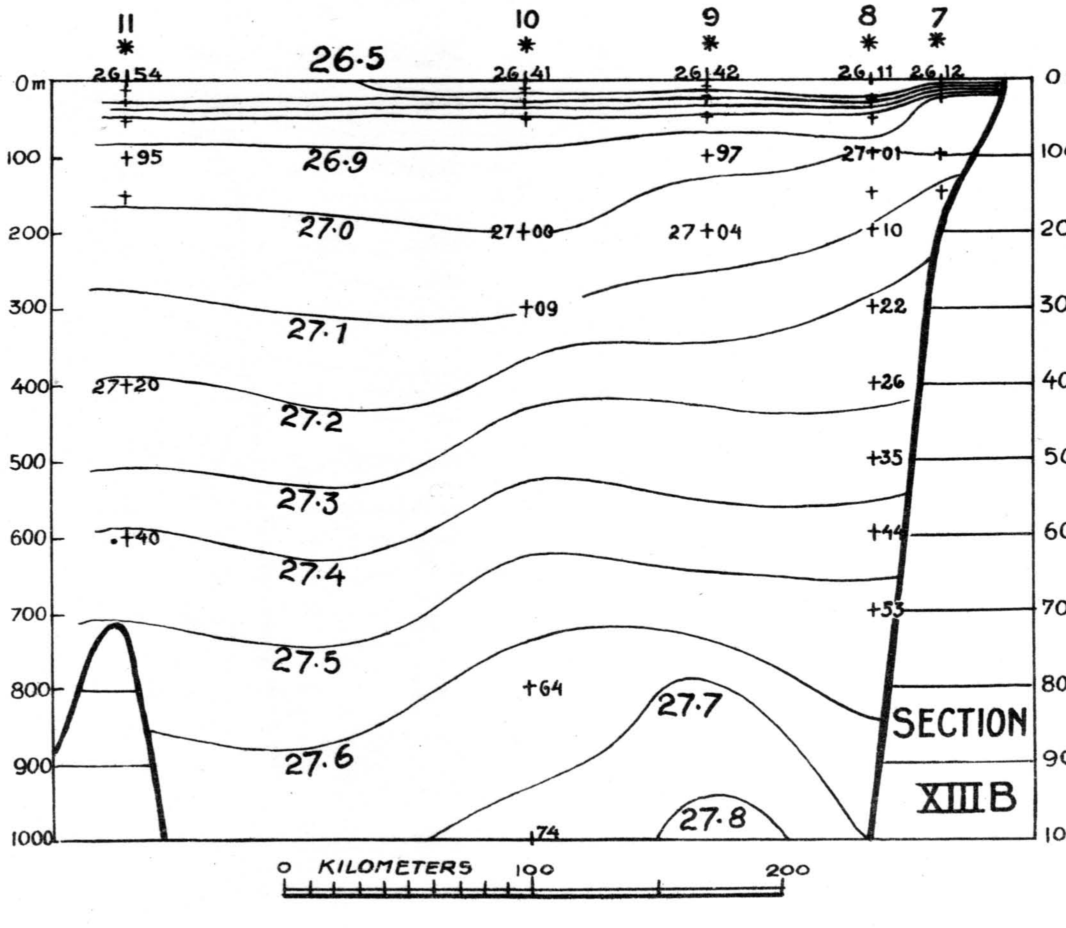
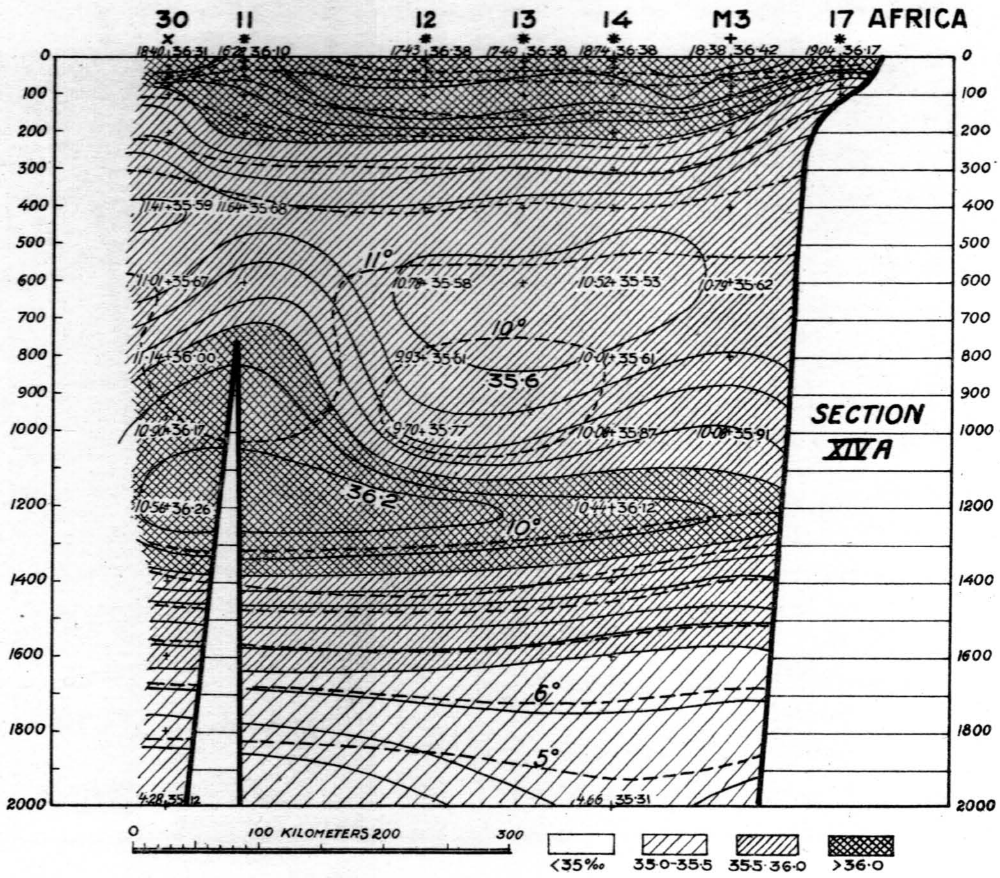
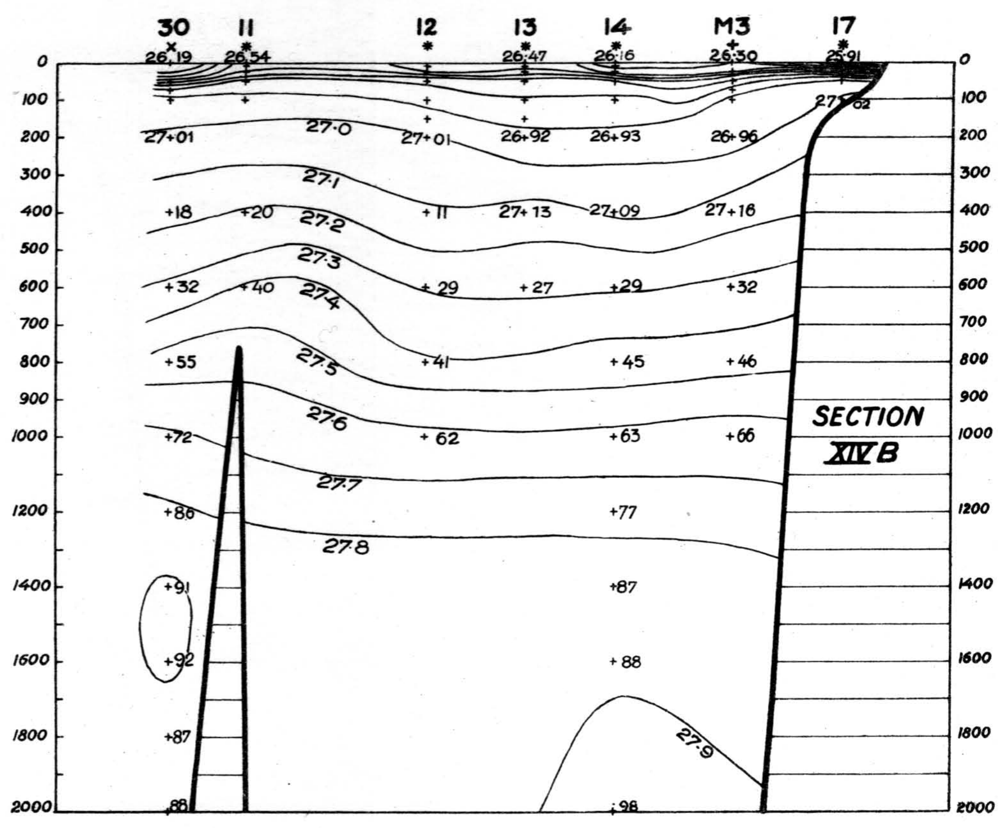
SECT.
XII B


11
10
9
8
7
36·1 36·0
0 m
100
200
300
400
500
600
700
800
900
1000
14°
12°
12°
11°
SECTION
XIII A


11
10
9
8
7
26·5
26·9
27·0
27·1
27·2
27·3
27·4
27·5
27·6
27·7
27·8
0 m
100
200
300
400
500
600
700
800
900
1000
SECTION
XIII B
0 KILOMETERS 100 200


30
11
12
13
14
M3
17 AFRICA
SECTION
XIV A
11°
10°
35·6
36·2
10°
6°
5°
0
100
200
300
400
500
600
700
800
900
1000
1200
1400
1600
1800
2000
0 100 KILOMETERS 200 300
<35‰
35·0-35·5
35·5-36·0
>36·0


30
11
12
13
14
M3
17
SECTION
XIV B
26.19
26.54
26.47
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26.30
25.91
27+01
27·0
27+01
26+92
26+93
26+96
27·1
+18
+20
27·2
+11
27+13
27+09
27+16
27·3
+32
+40
27·4
+29
+27
+29
+32
+55
27·5
+41
+45
+46
27·6
+72
+62
+63
+66
27·7
+86
+77
27·8
+91
+87
+92
+88
+87
27·9
+88
+98
0
100
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900
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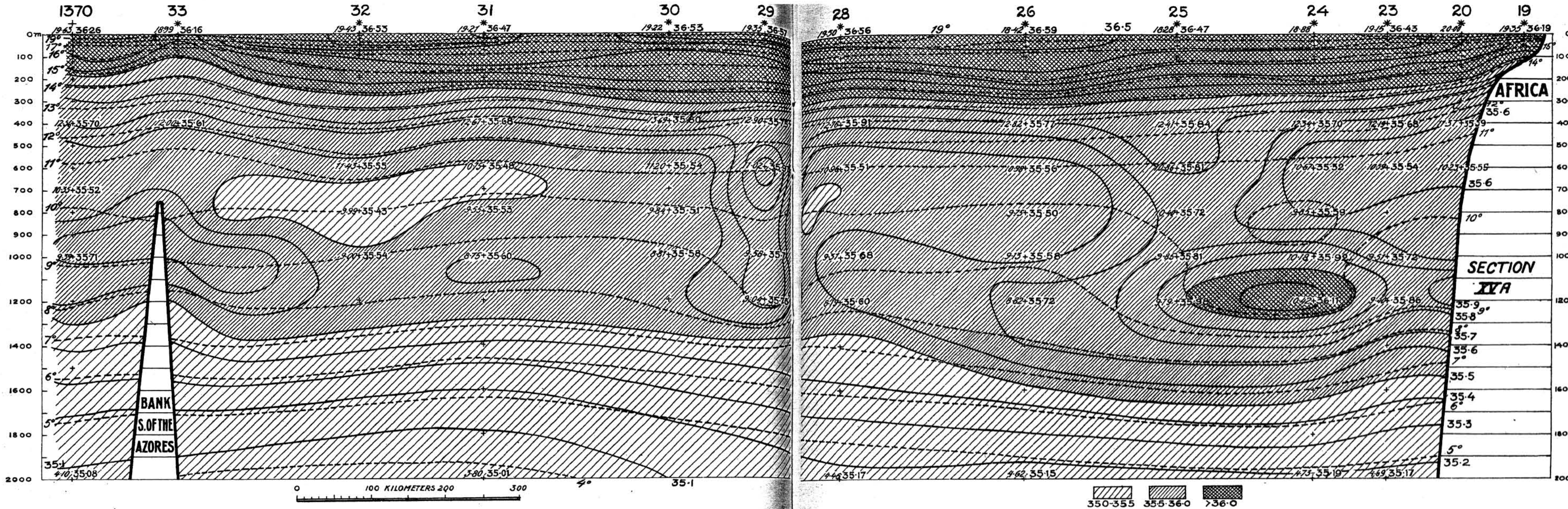
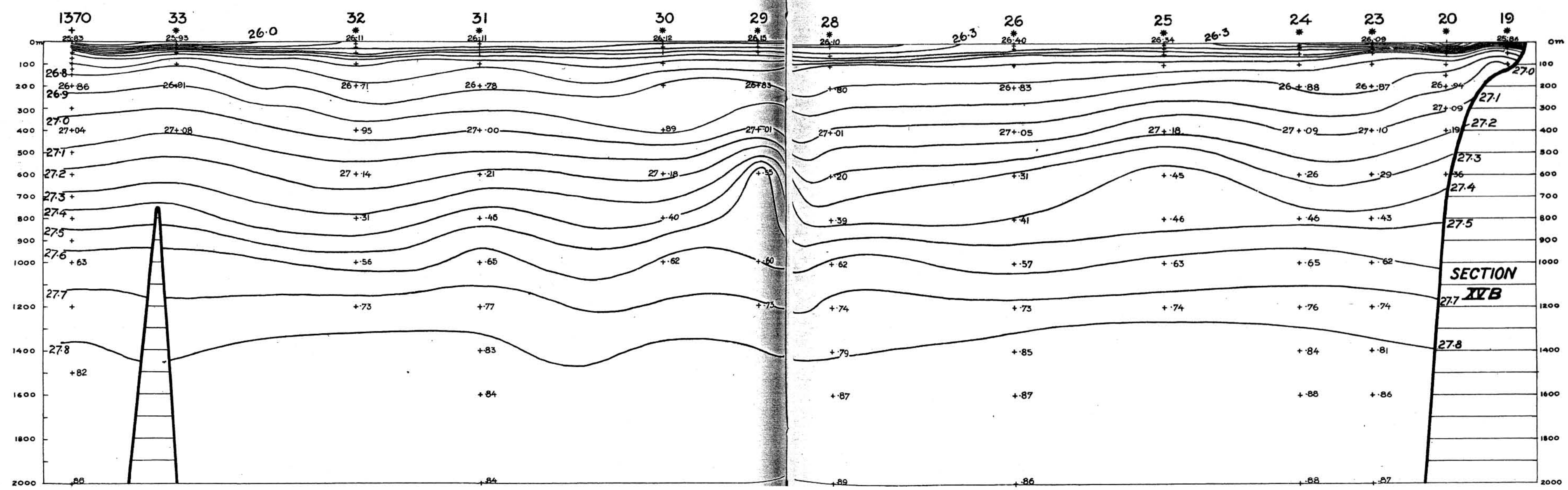
1600
1800
2000


1370
33
32
31
30
29
28
26
25
24
23
20
19
BANK
S. OF THE
AZORES
AFRICA
SECTION
IVA
100 KILOMETERS 200
300
35.0-35.5
35.5-36.0
>36.0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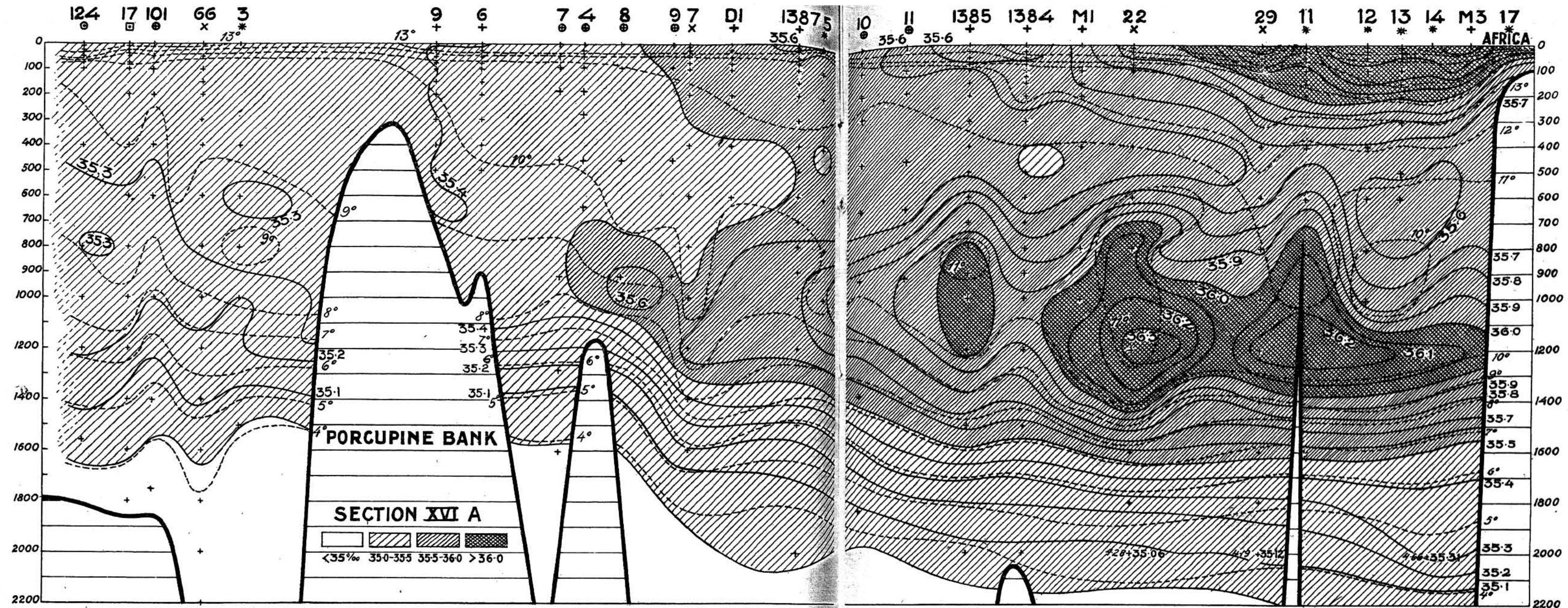
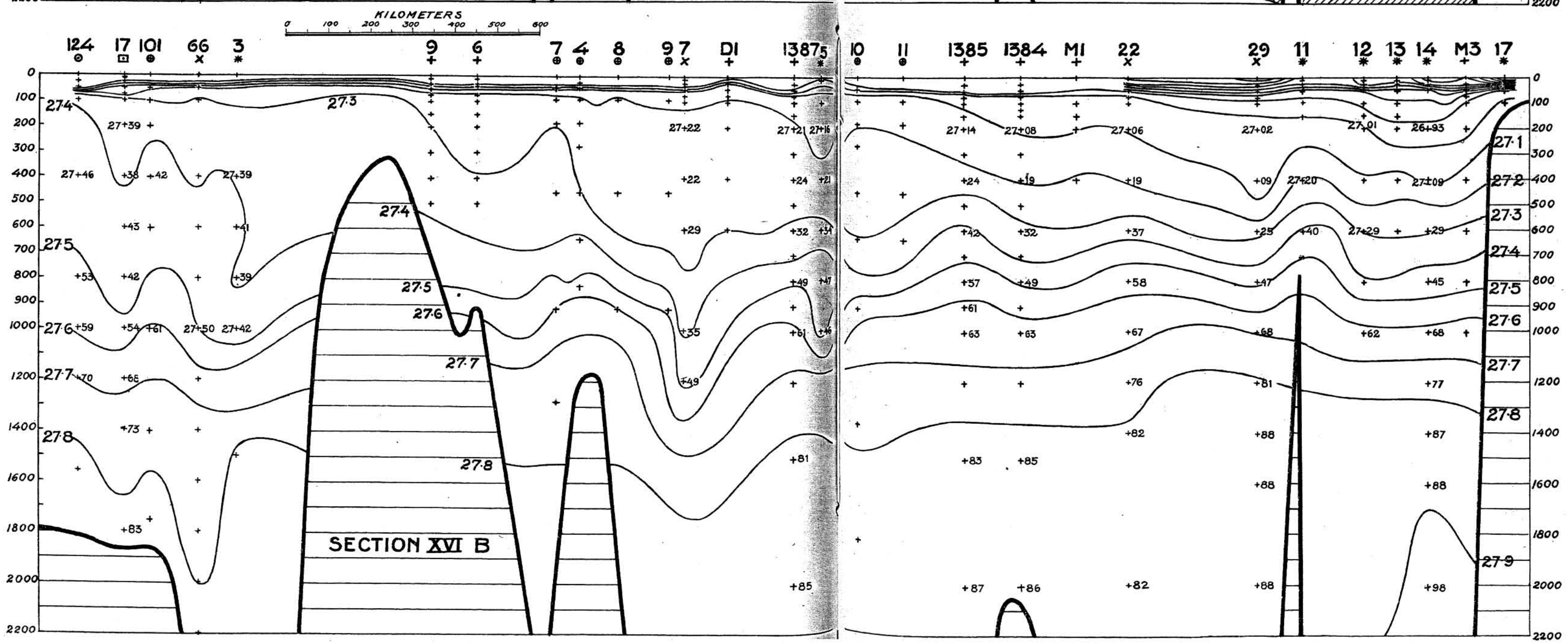
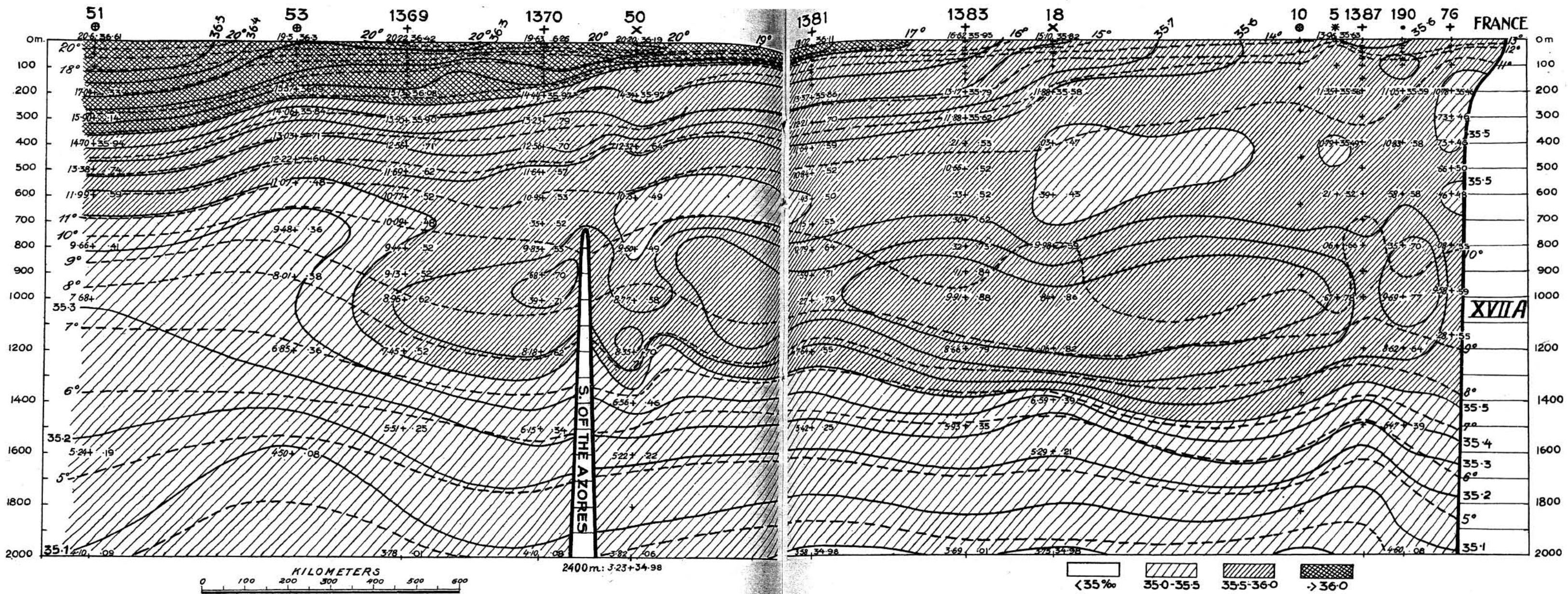
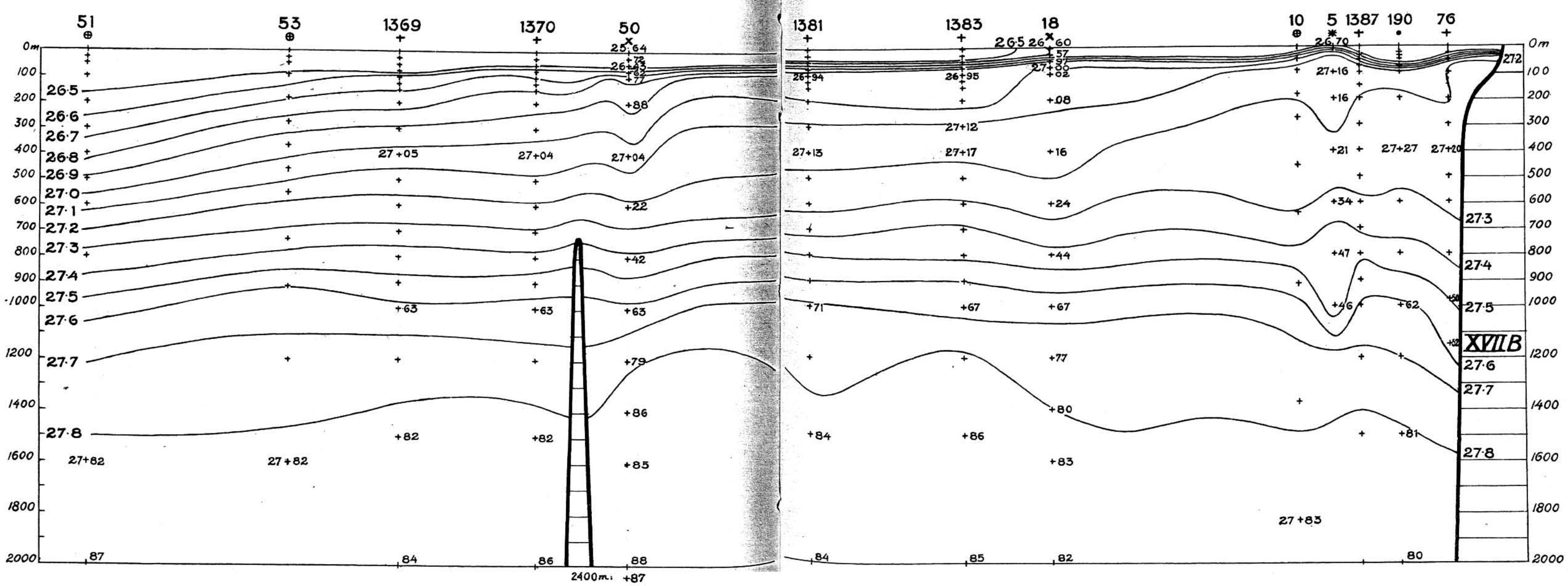
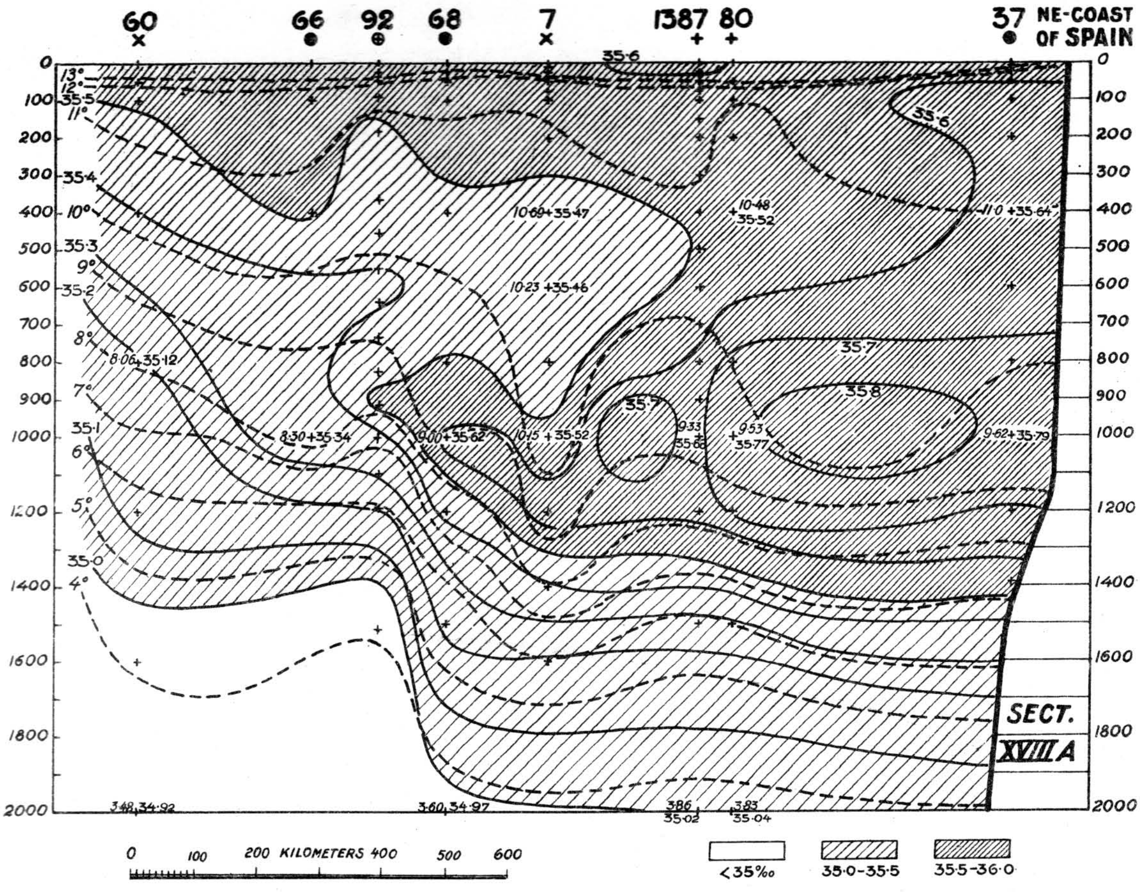
19
SECTION
IVB

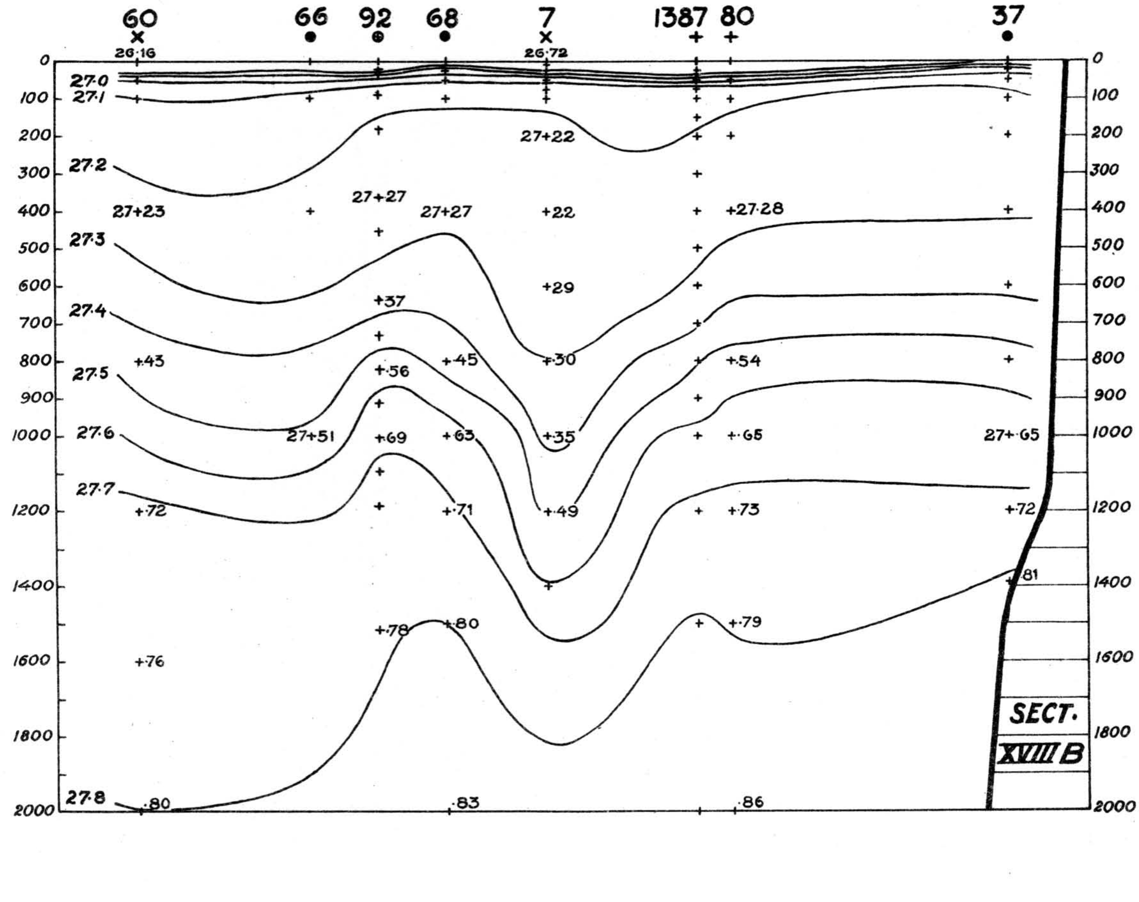

PORCUPINE BANK
SECTION XVI A
<35‰ 35·0-35·5 35·5-36·0 >36·0
AFRICA

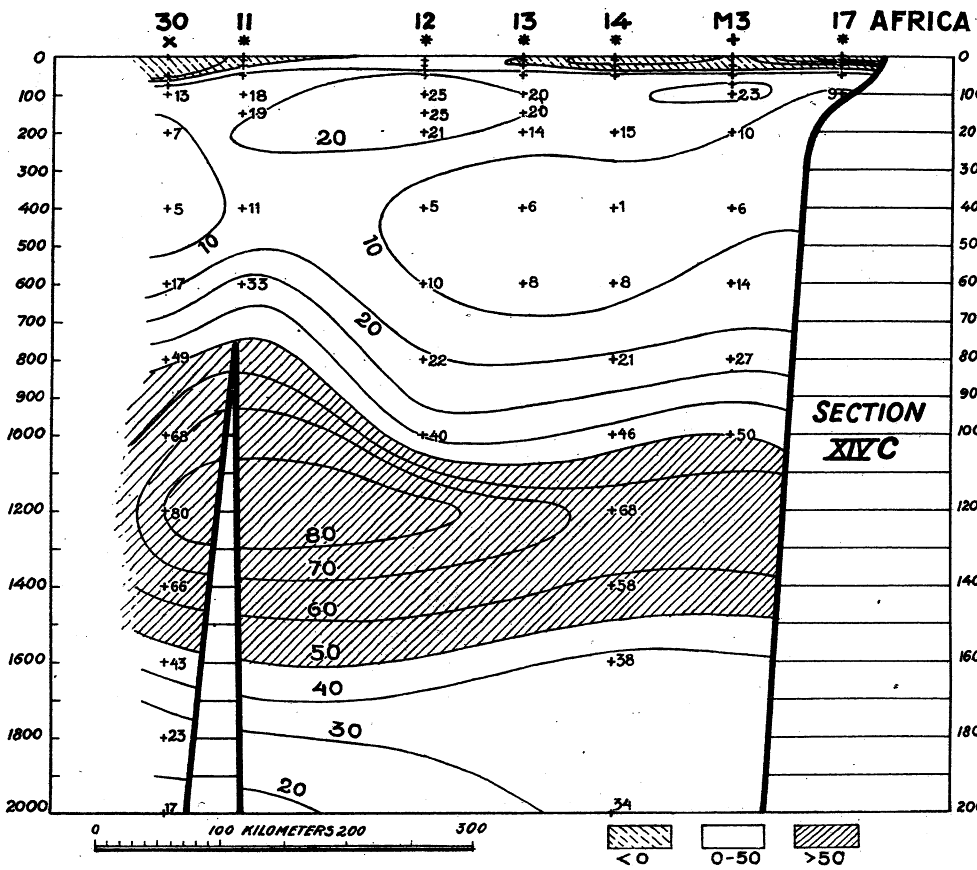

KILOMETERS
0 100 200 300 400 500 600
SECTION XVI B

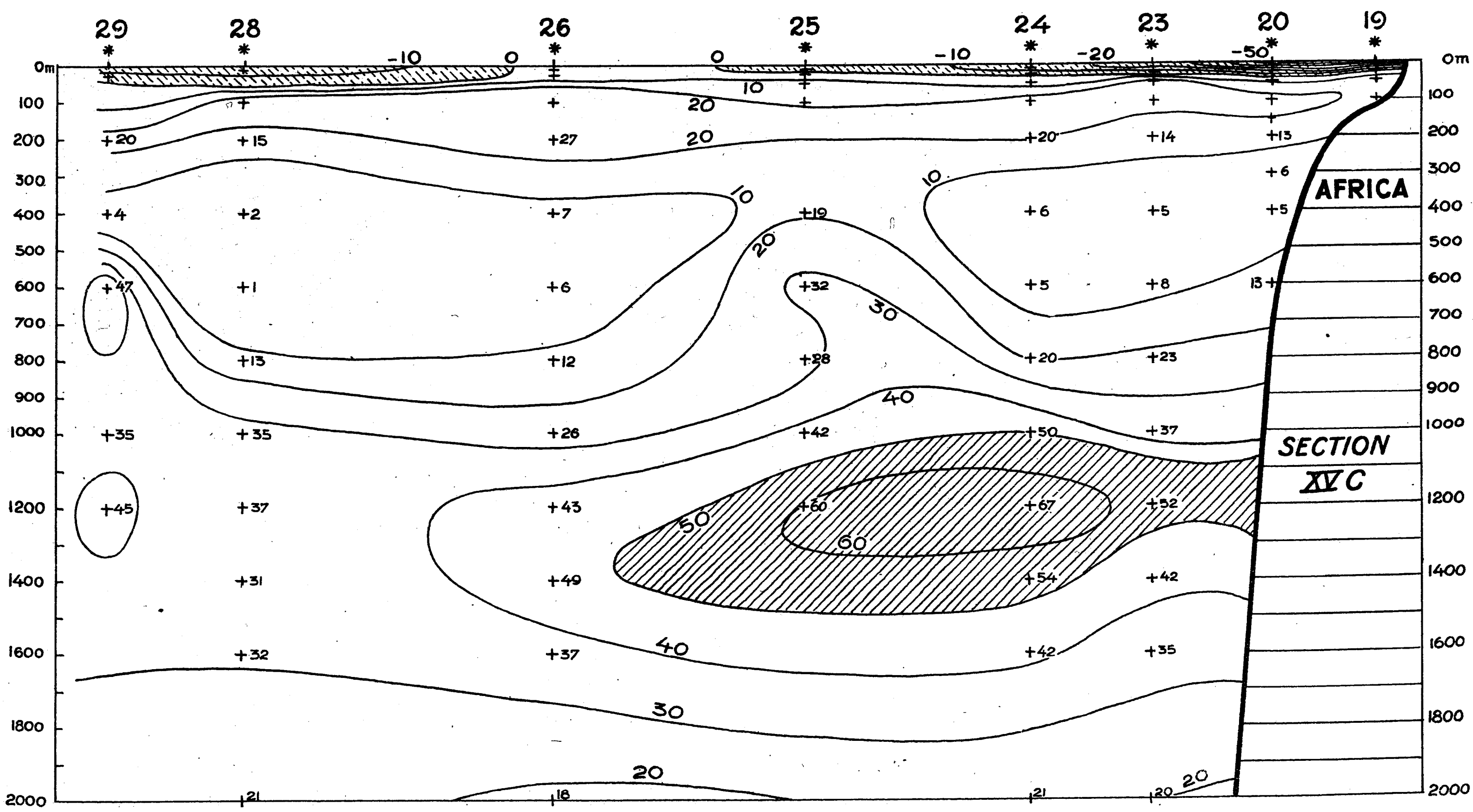

51
53
1369
1370
50
1381
1383
18
10
5
1387
190
76
FRANCE
S. OF THE AZORES
XVII A
2400m: 3·23+34·98
KILOMETERS
0 100 200 300 400 500 600
<35‰
35·0-35·5
35·5-36·0
>36·0


51
53
1369
1370
50
1381
1383
18
10
5
1387
190
76
26·5
26·6
26·7
26·8
26·9
27·0
27·1
27·2
27·3
27·4
27·5
27·6
27·7
27·8
XVII B
2400m: +87


60
66
92
68
7
1387
80
37
NE-COAST OF SPAIN
SECT. XVIII A
0 100 200 KILOMETERS 400 500 600
<35‰
35·0-35·5
35·5-36·0


60
66
92
68
7
1387
80
37
27·0
27·1
27·2
27·3
27·4
27·5
27·6
27·7
27·8
SECT. XVIII B


30 11 12 13 14 M3 17 AFRICA
SECTION XIV C
100 KILOMETERS 200 300
<0 0-50 >50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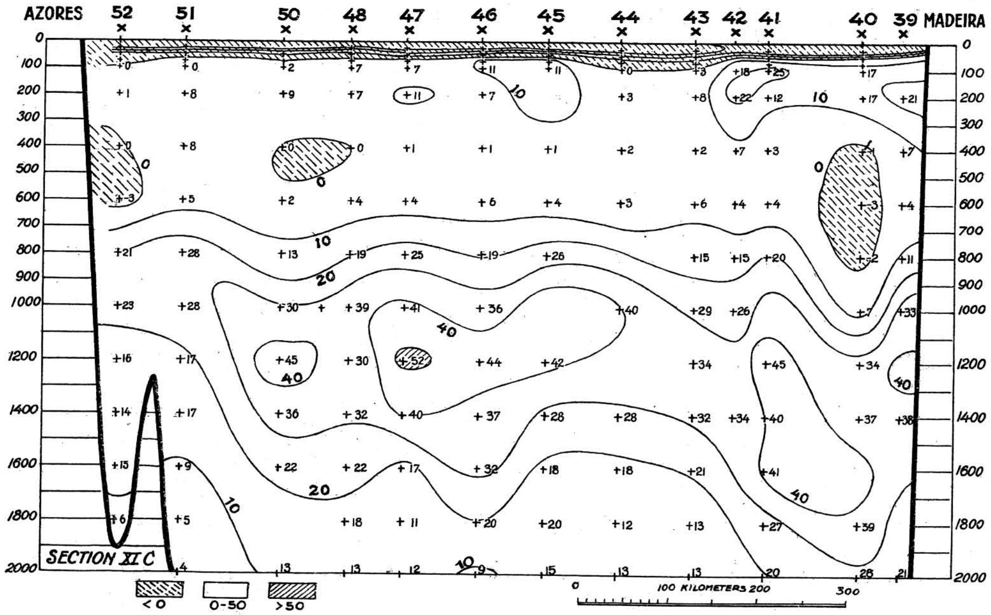
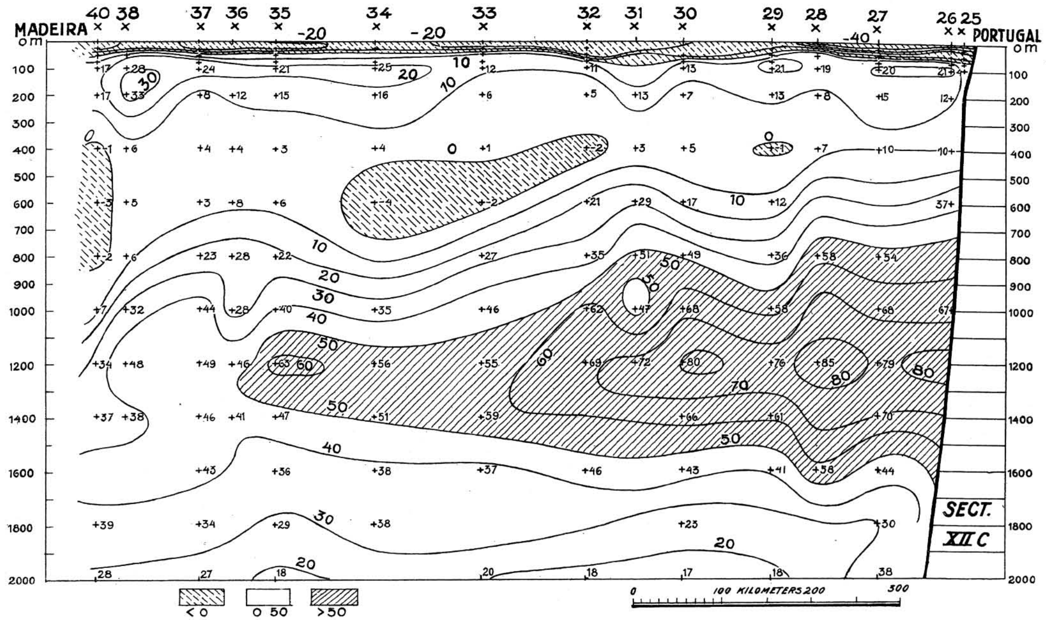
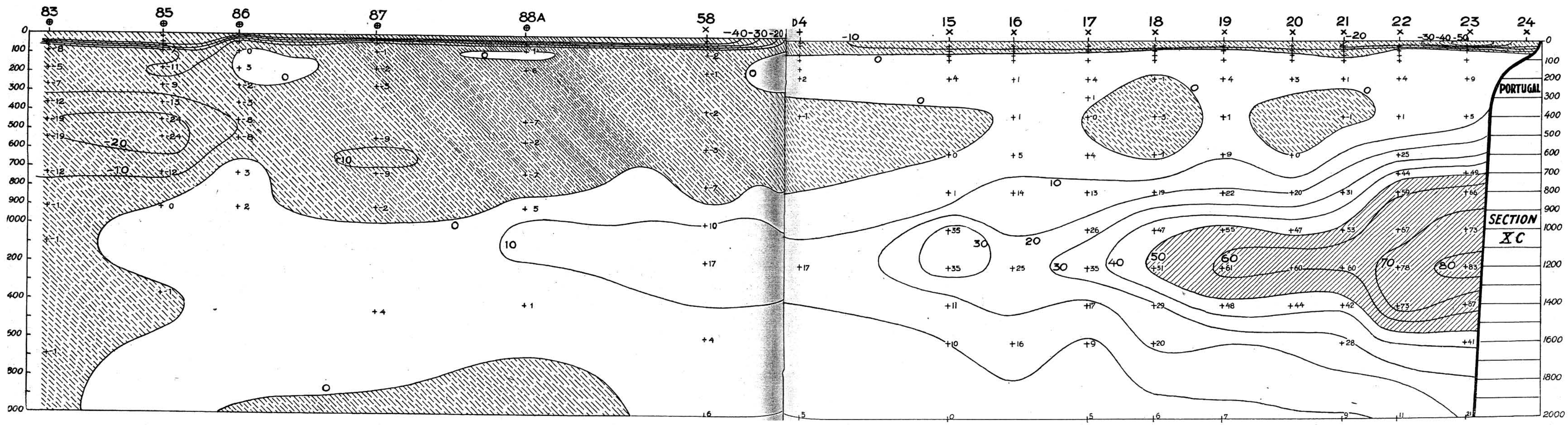
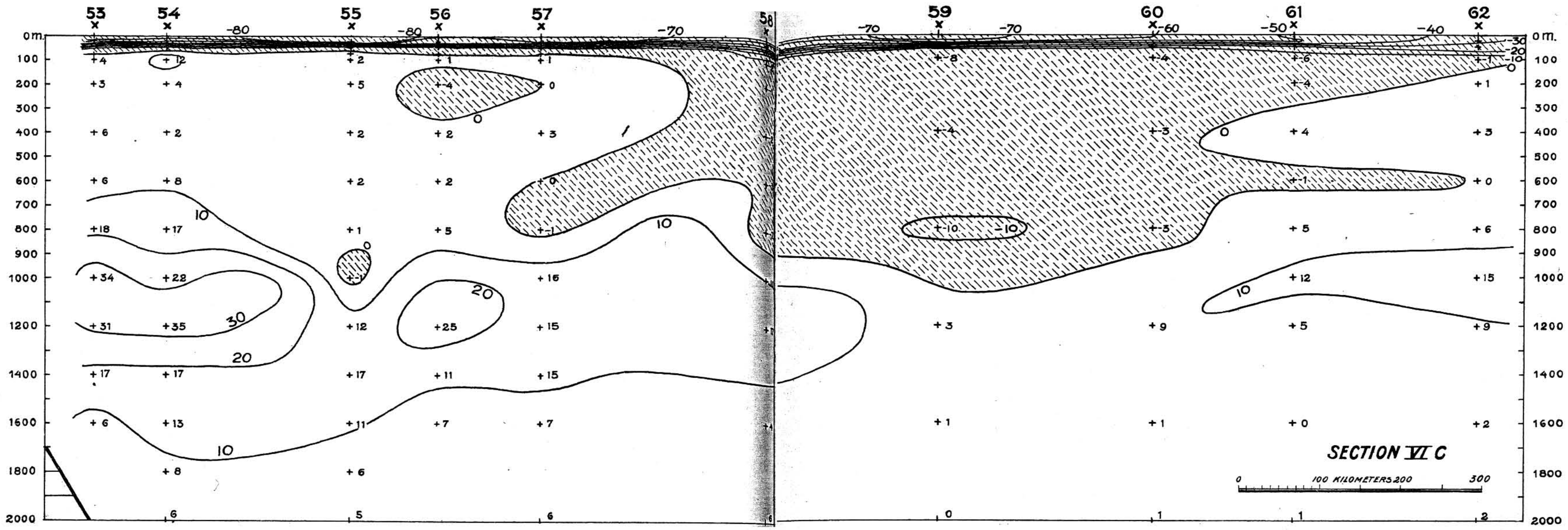
AFRICA
SECTION XV C

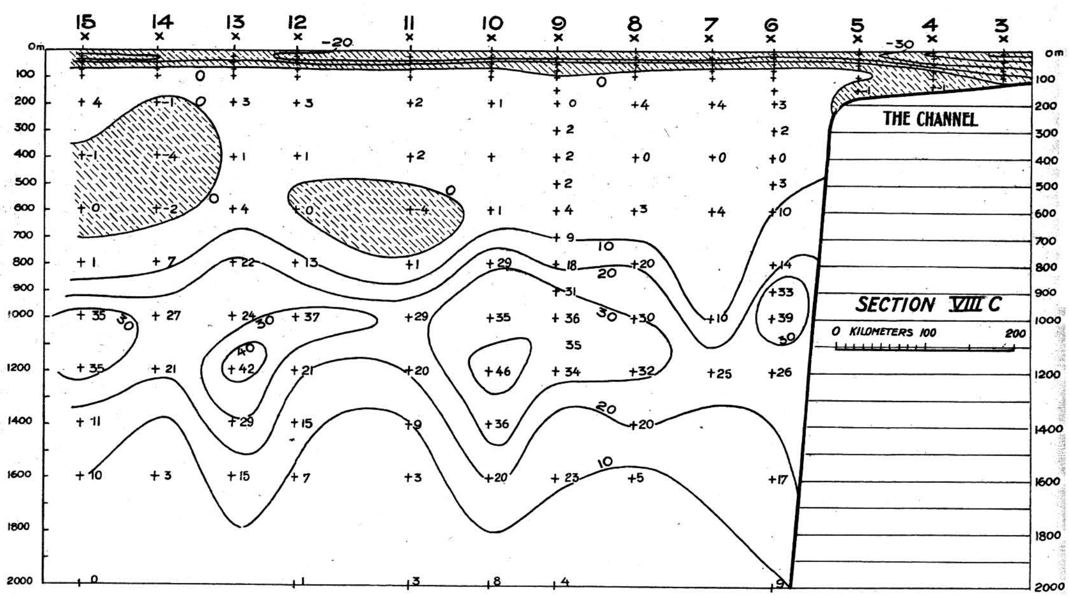

AZORES
52
51
50
48
47
46
45
44
43
42
41
40
39
MADEIRA
SECTION XI C
< 0
0-50
> 50
100 KILOMETERS 200 300

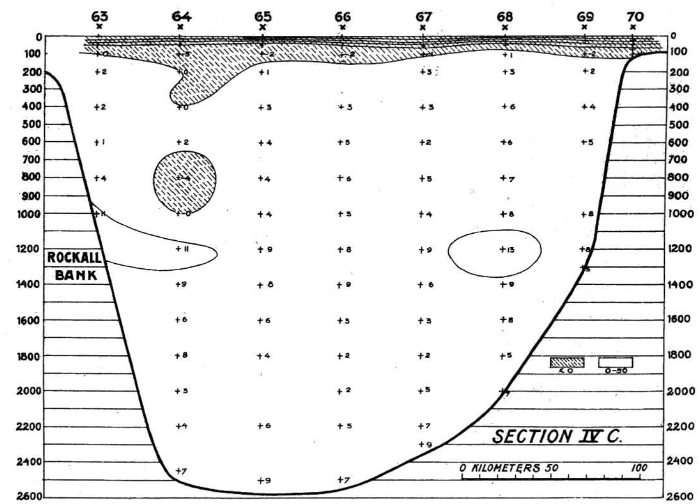

MADEIRA
40 38 37 36 35 34 33 32 31 30 29 28 27 26 25
PORTUGAL
SECT.
XII C
< 0
0 50
> 50
100 KILOMETERS 200 300

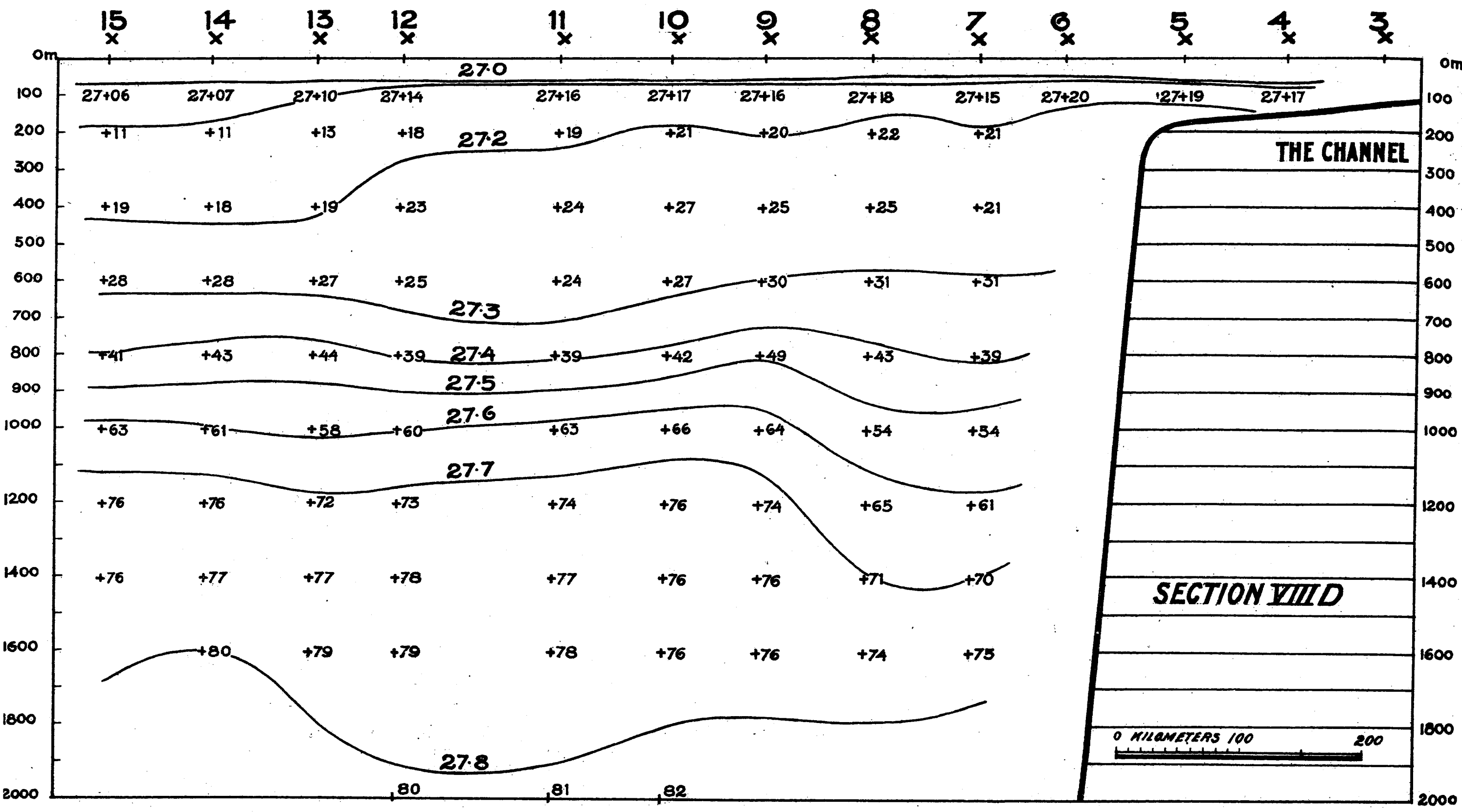

83
85
86
87
88A
58
D4
15
16
17
18
19
20
21
22
23
24
PORTUGAL
SECTION
X C

Geof. Publ. Vol. IV. No. 2.





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0m 100 200 300 400 500 600 700 800 900 1000 1200 1400 1600 1800 2000
27·0
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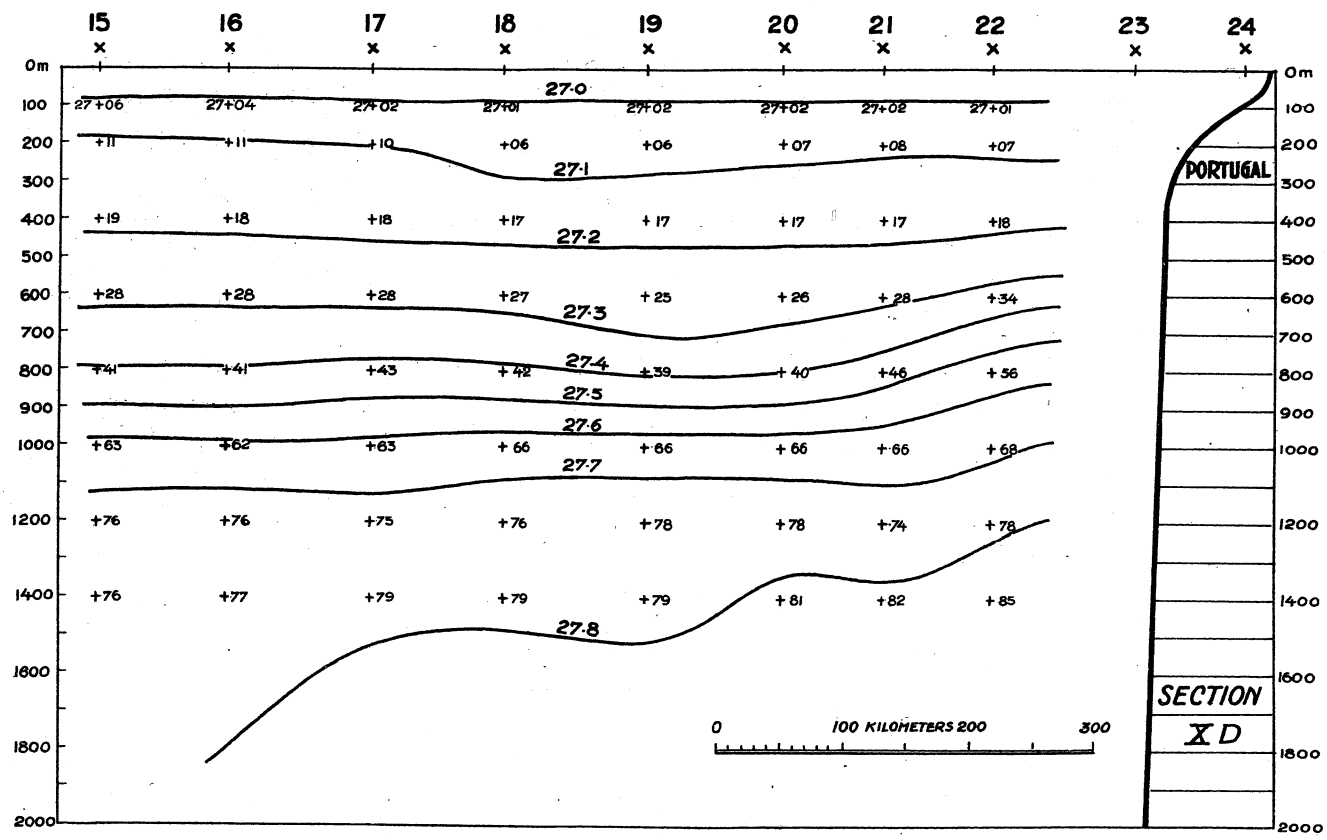
+11 +11 +13 +18 +19 +21 +20 +22 +21
27·2
+19 +18 +19 +23 +24 +27 +25 +25 +21
+28 +28 +27 +25 +24 +27 +30 +31 +31
27·3
+41 +43 +44 +39 +39 +42 +49 +43 +39
27·4
27·5
27·6
+63 +61 +58 +60 +63 +66 +64 +54 +54
27·7
+76 +76 +72 +73 +74 +76 +74 +65 +61
+76 +77 +77 +78 +77 +76 +76 +71 +70
+80 +79 +79 +78 +76 +76 +74 +75
27·8
80 81 82
THE CHANNEL
SECTION VIII D
0 KILOMETERS 100 200


15 16 17 18 19 20 21 22 23 24
0m 100 200 300 400 500 600 700 800 900 1000 1200 1400 1600 1800 2000
27·0
27+06 27+04 27+02 27+01 27+02 27+02 27+02 27+01
+11 +11 +10 +06 +06 +07 +08 +07
27·1
+19 +18 +18 +17 +17 +17 +17 +18
27·2
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27·3
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27·4
27·5
27·6
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27·7
+76 +76 +75 +76 +78 +78 +74 +78
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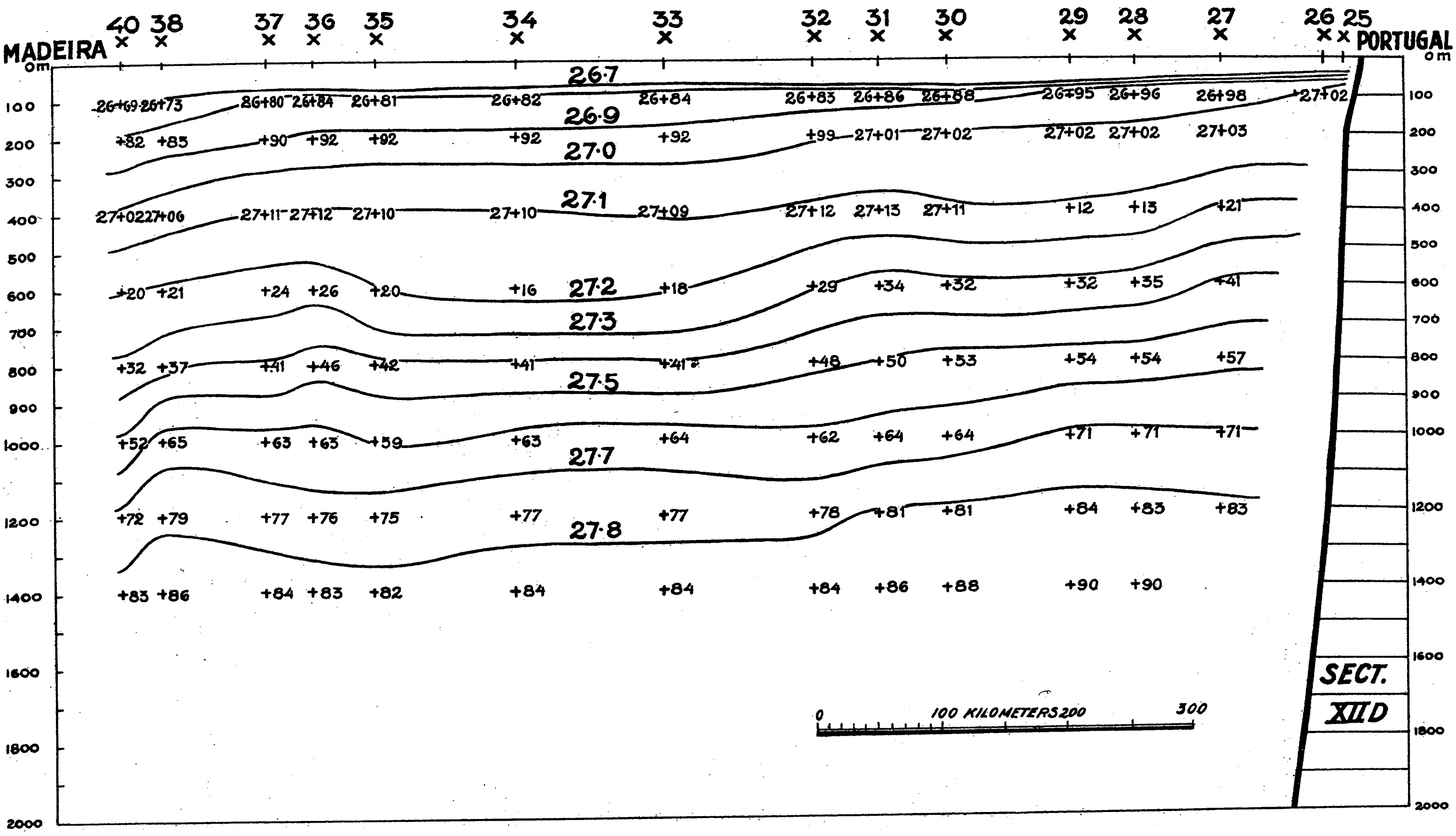
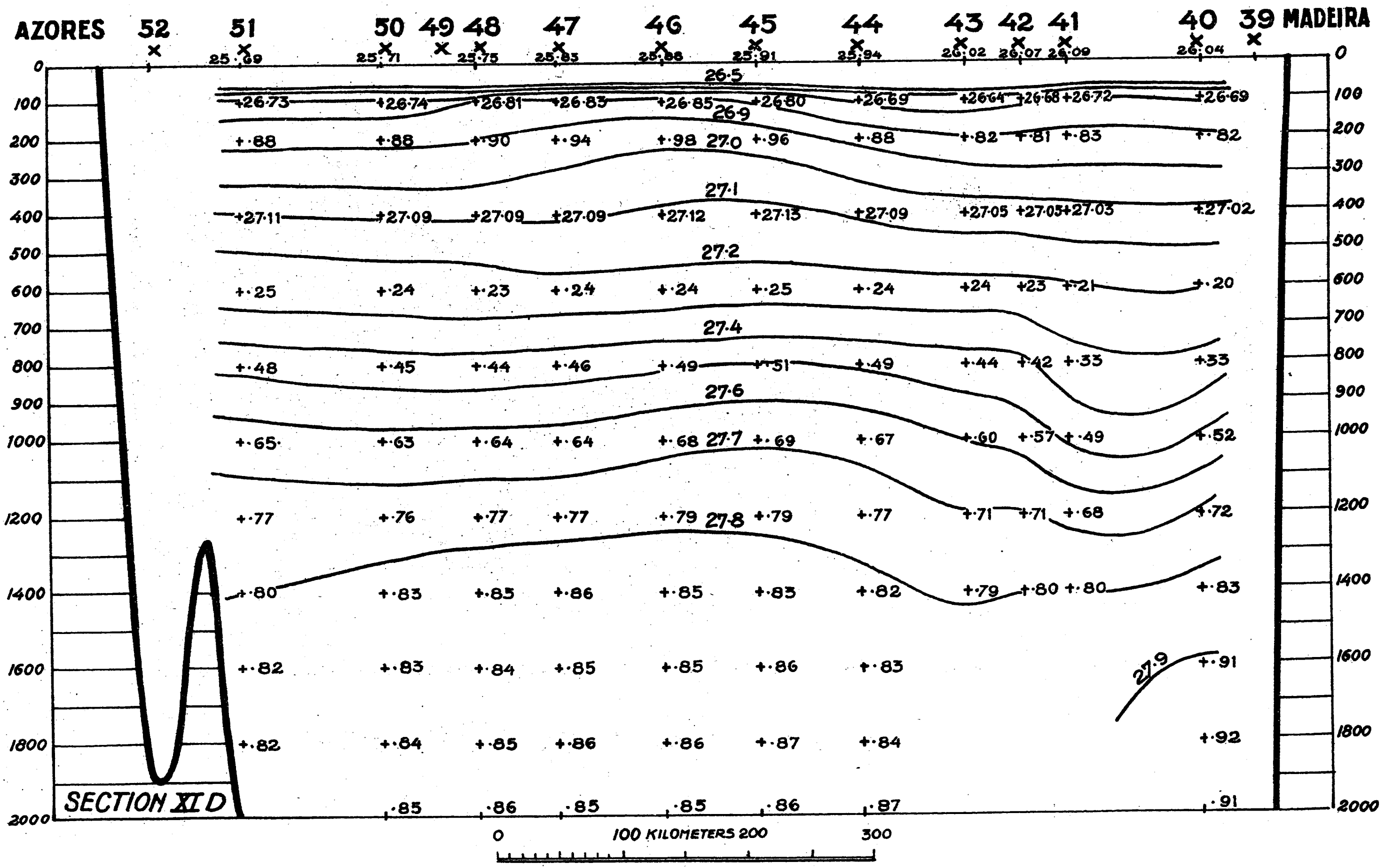
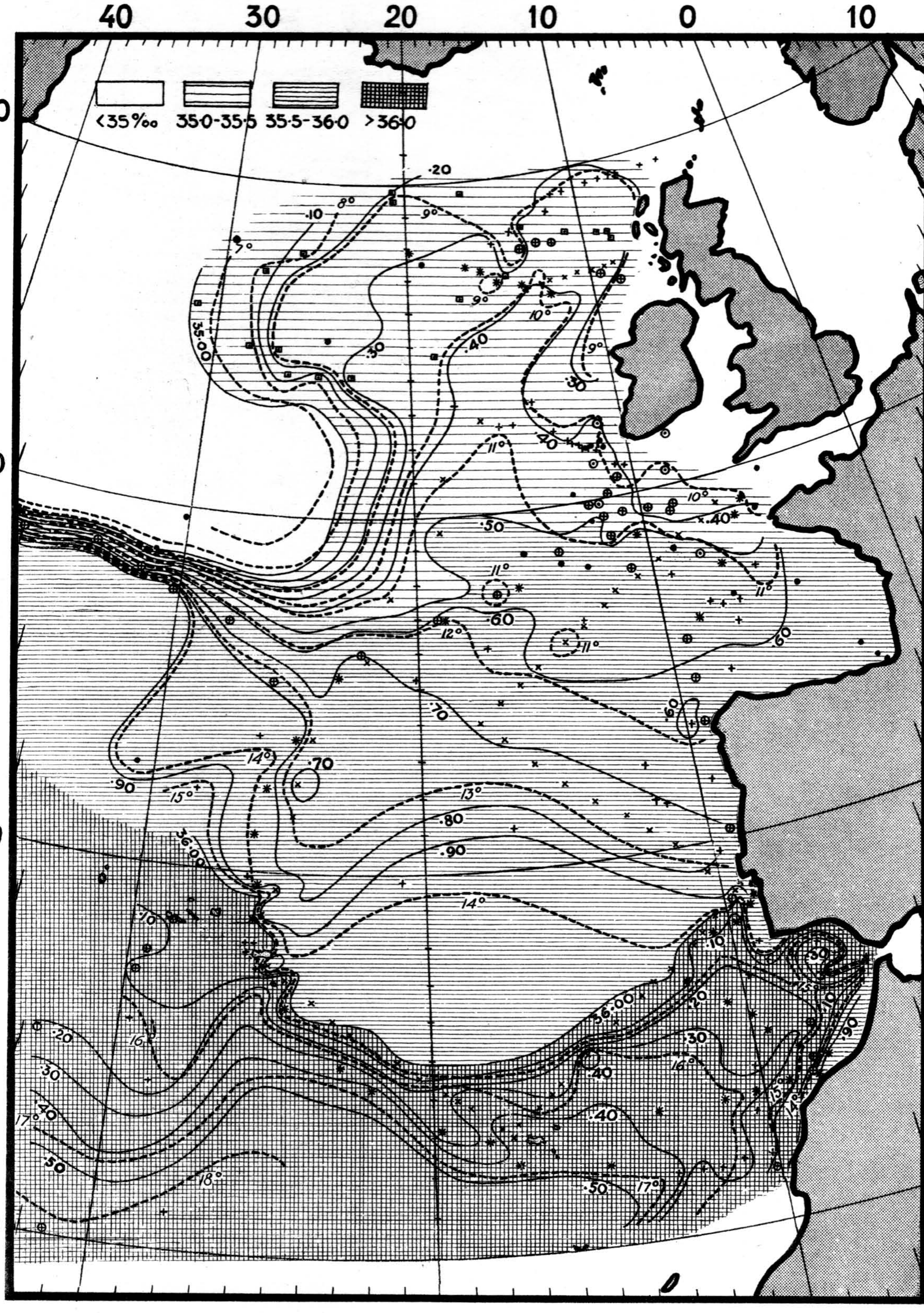
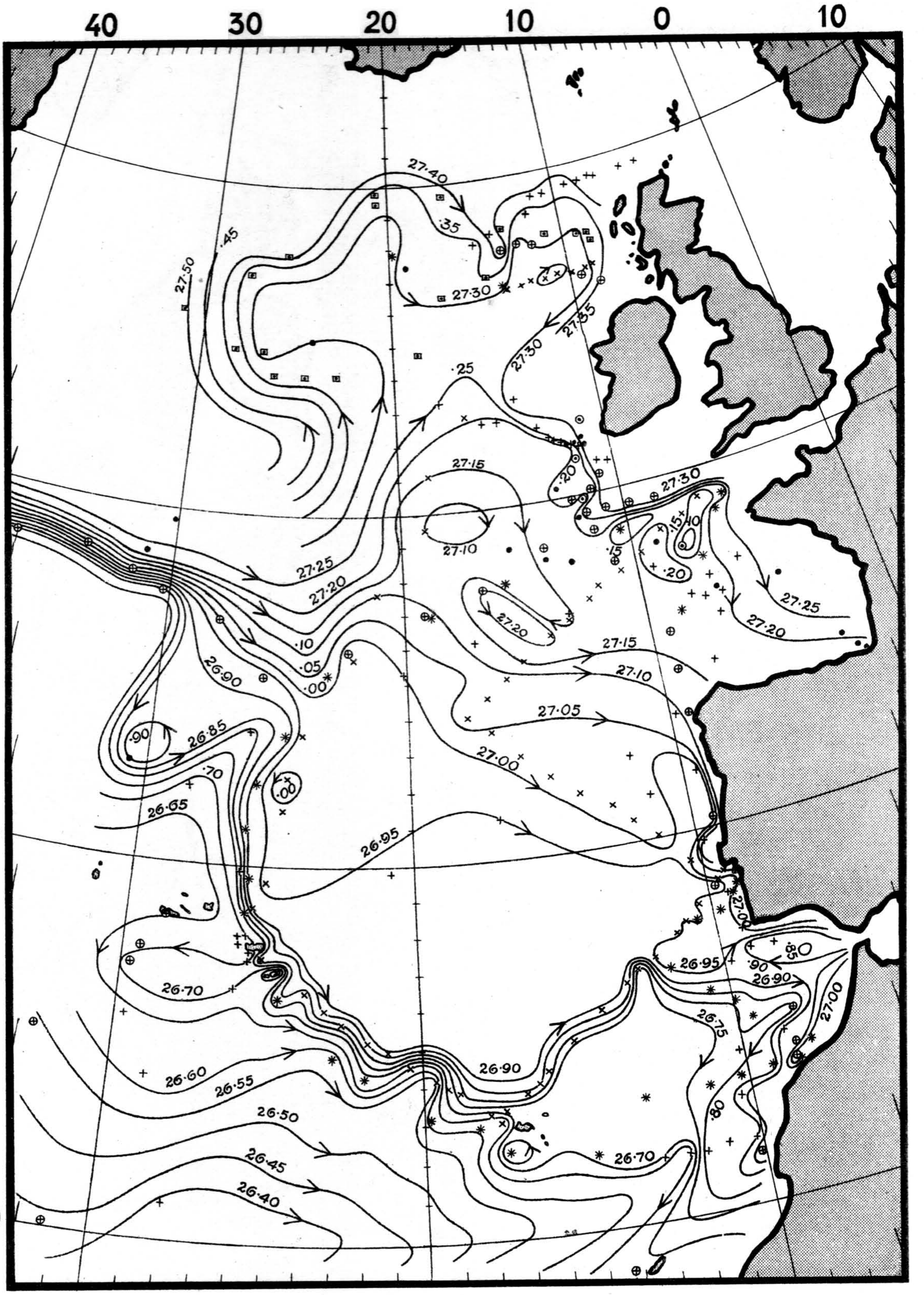
PORTUGAL
SECTION
X D
0 100 KILOMETERS 200 300


MADEIRA
PORTUGAL
40 38 37 36 35 34 33 32 31 30 29 28 27 26 25
26·7
26·9
27·0
27·1
27·2
27·3
27·5
27·7
27·8
0 100 KILOMETERS 200 300
SECT. XII D

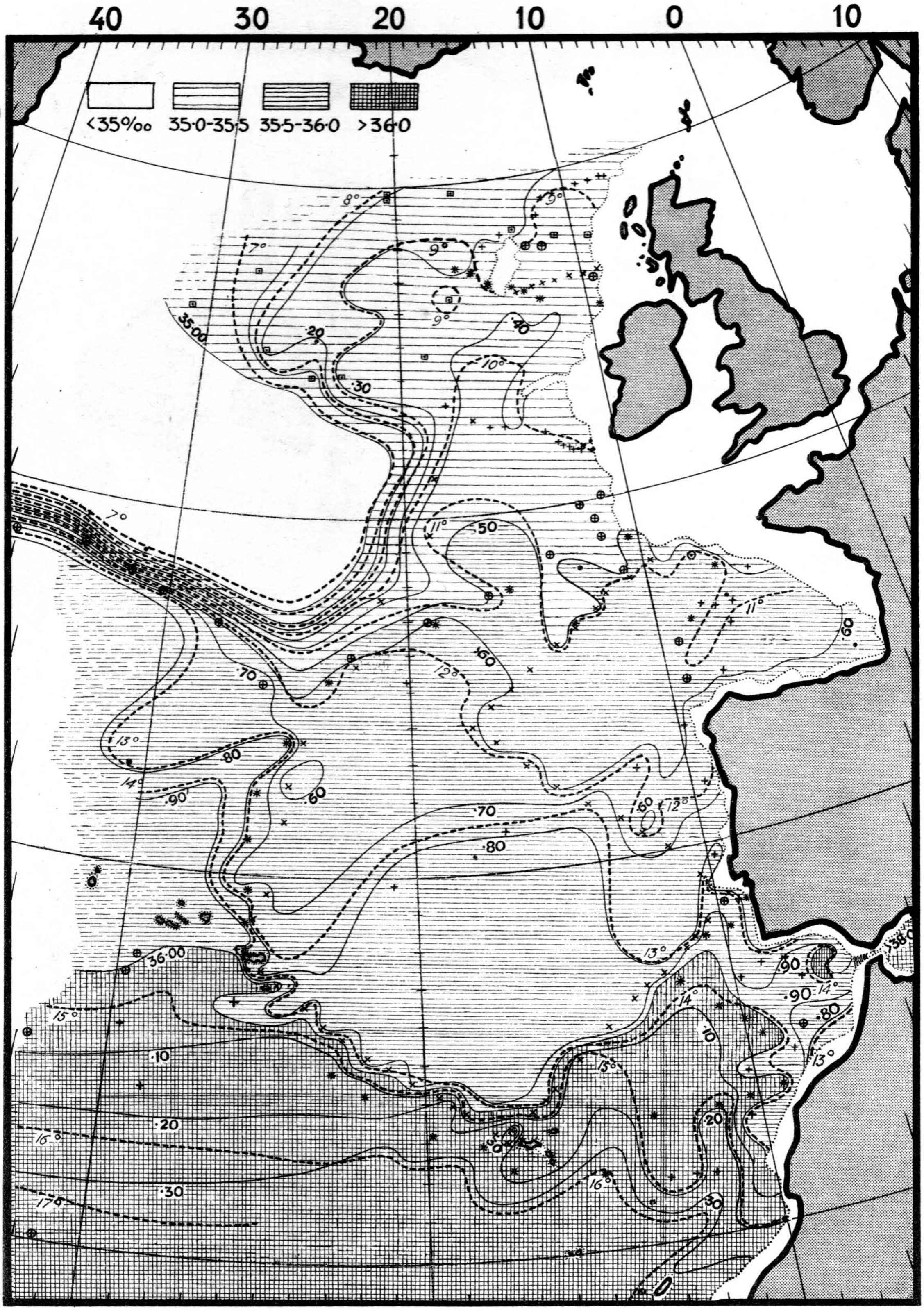

AZORES
MADEIRA
52 51 50 49 48 47 46 45 44 43 42 41 40 39
26·5
26·9
27·0
27·1
27·2
27·4
27·6
27·7
27·8
27·9
SECTION XI D
0 100 KILOMETERS 200 300



Temperature and Salinity. 100 Meters.



Density. 100 Meters.



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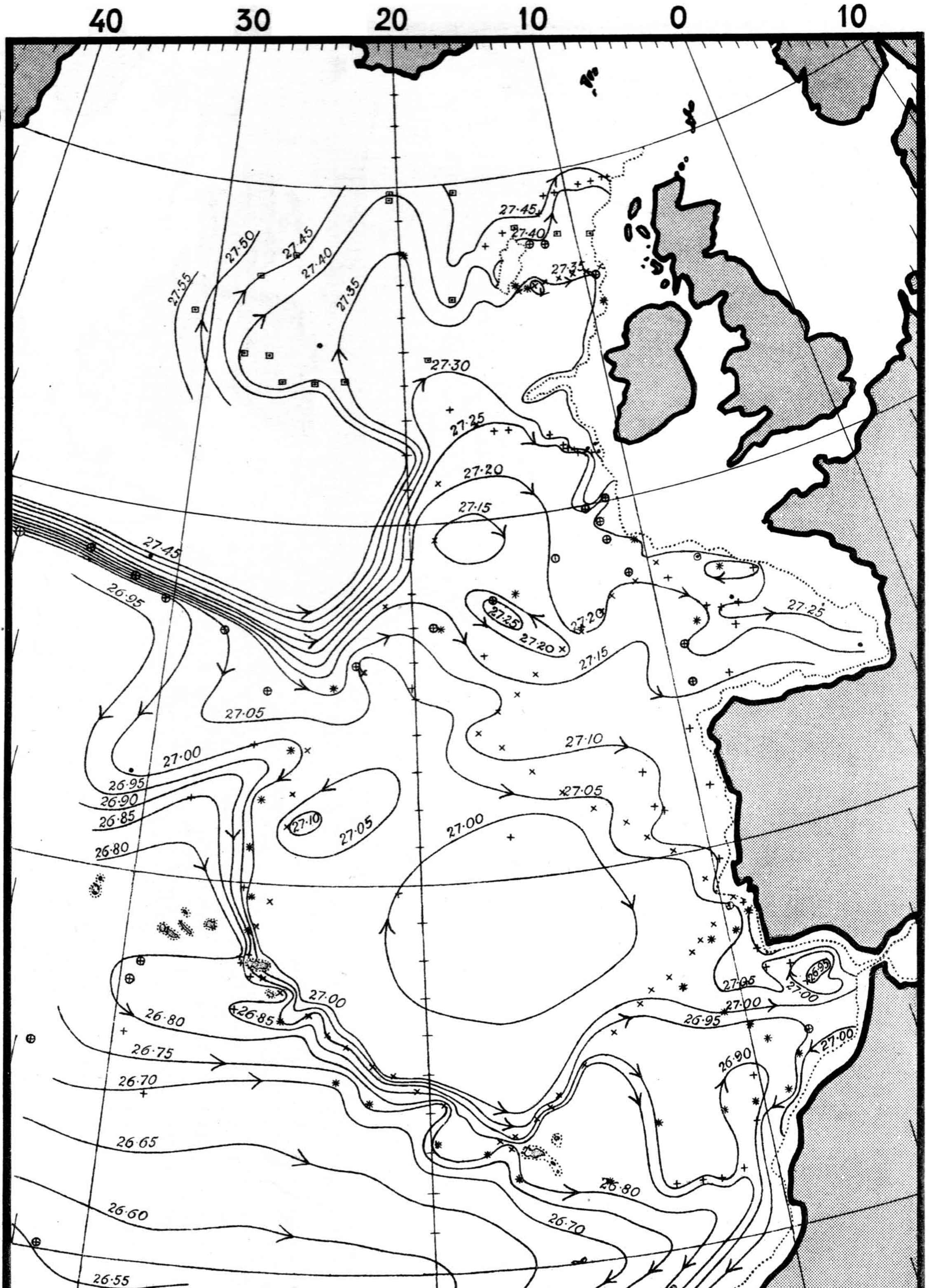
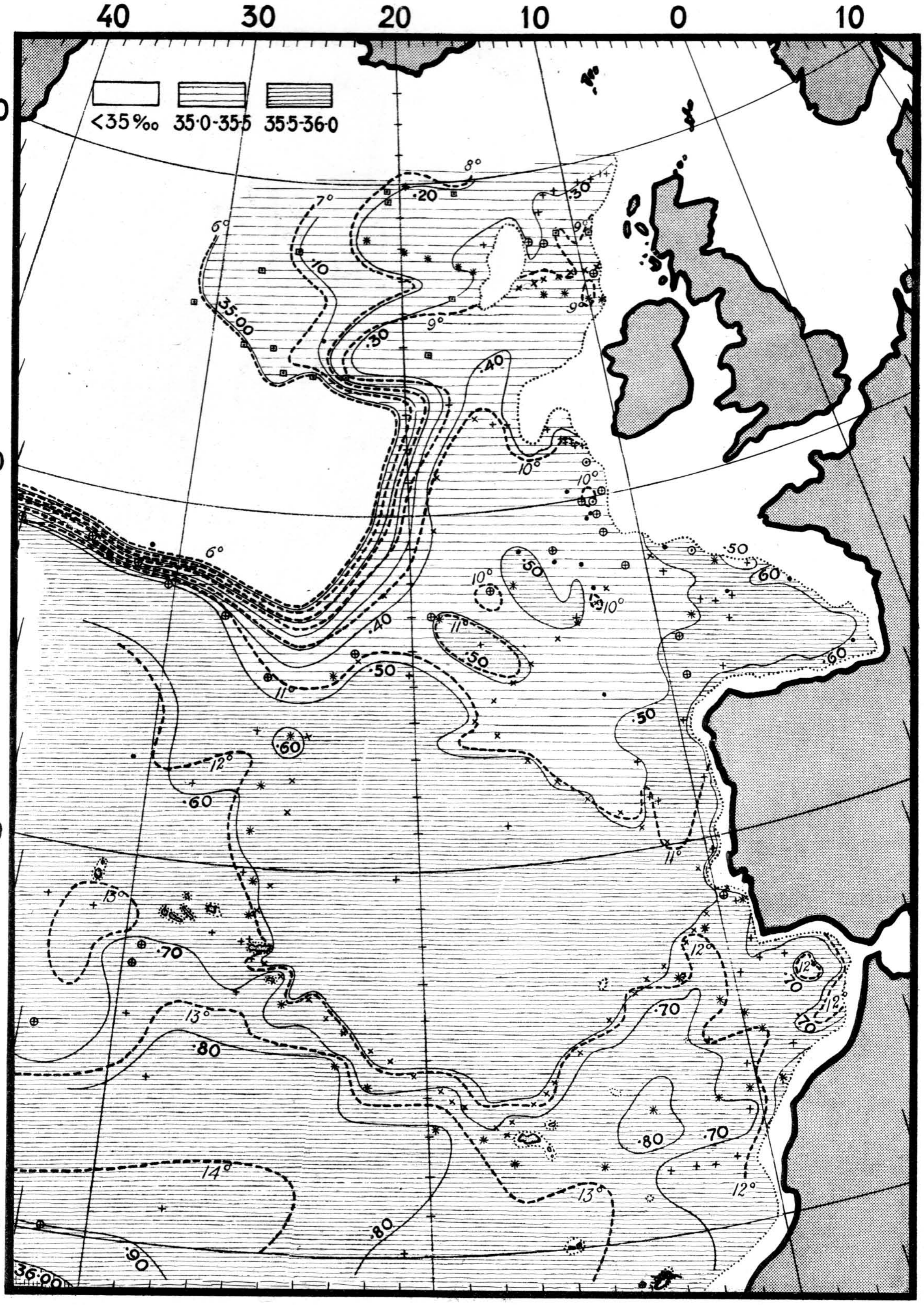
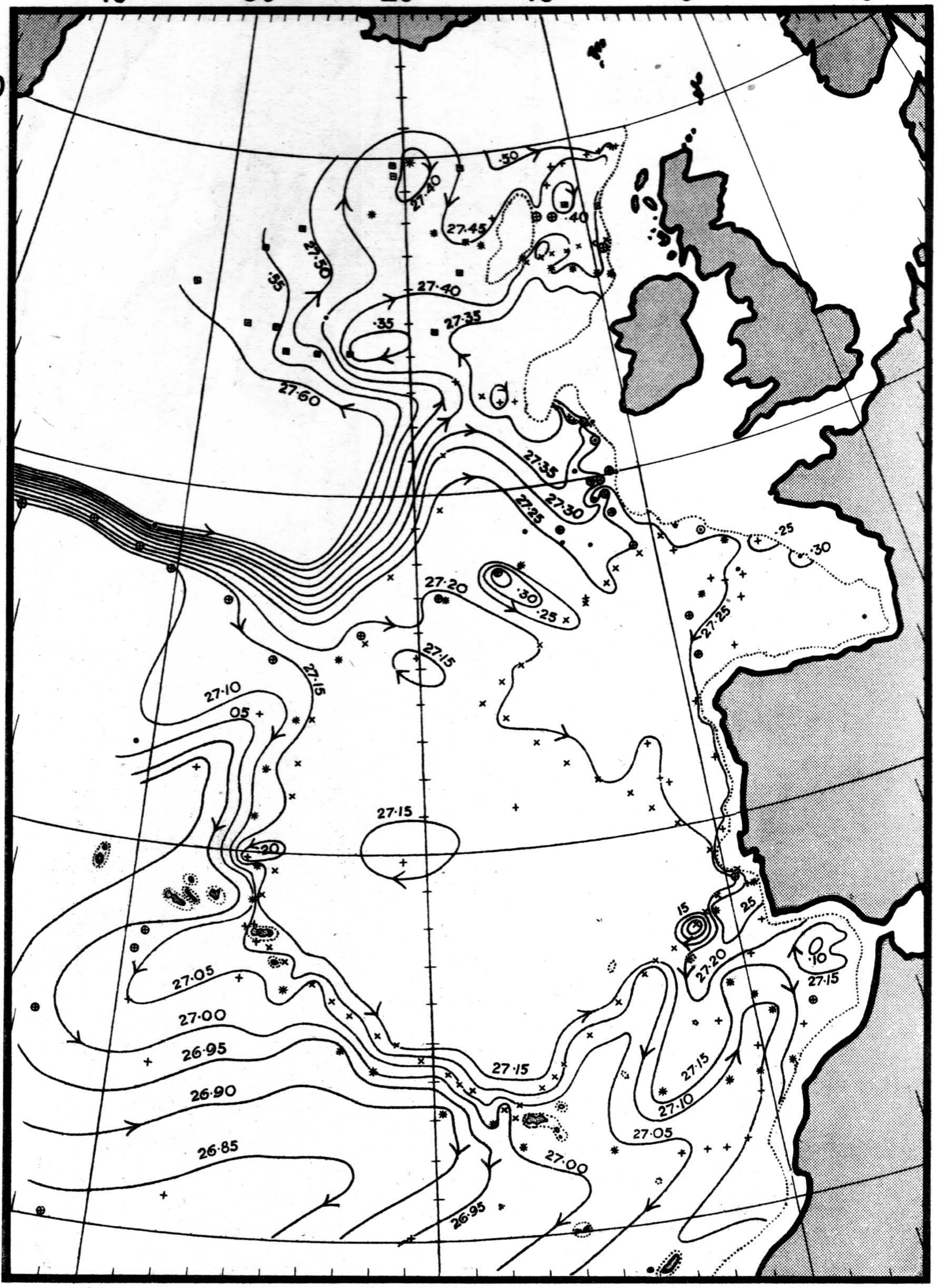


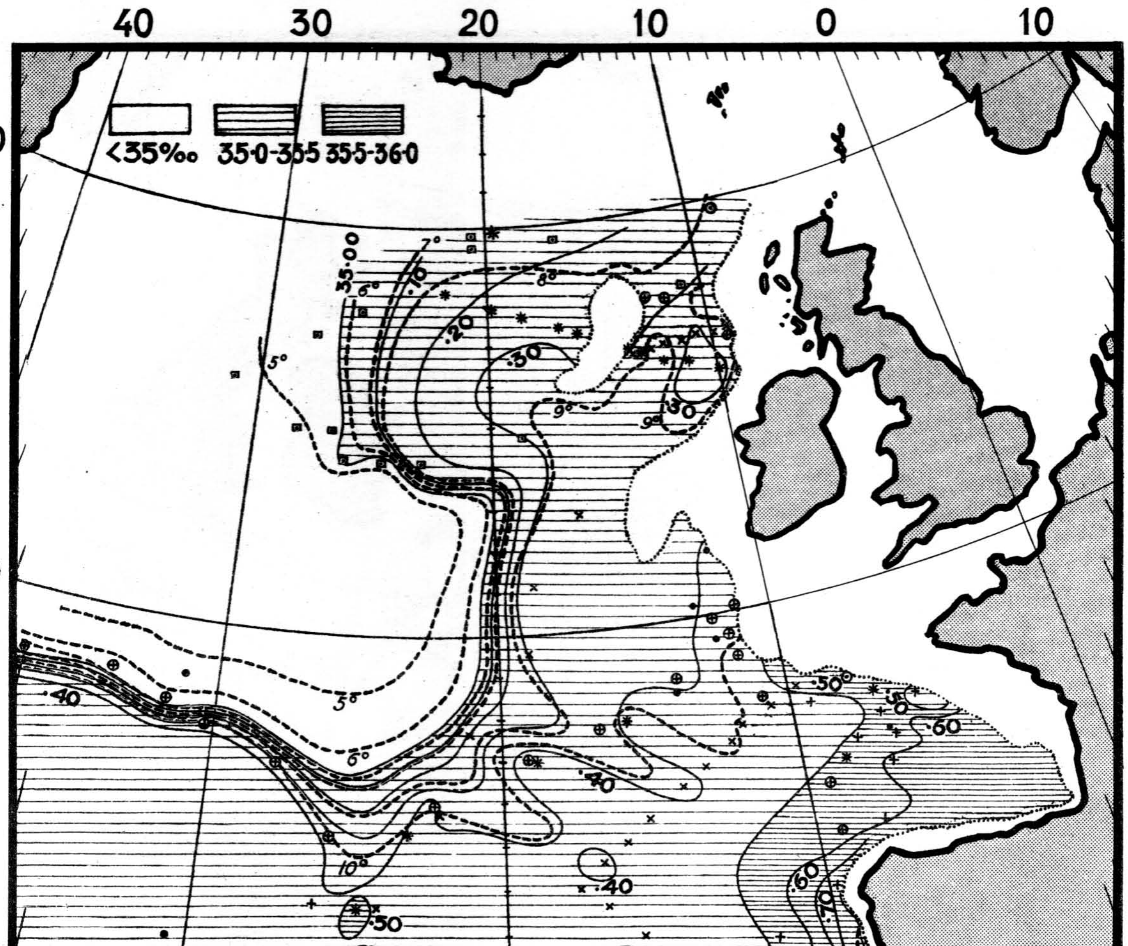
Density. 200 Meters.



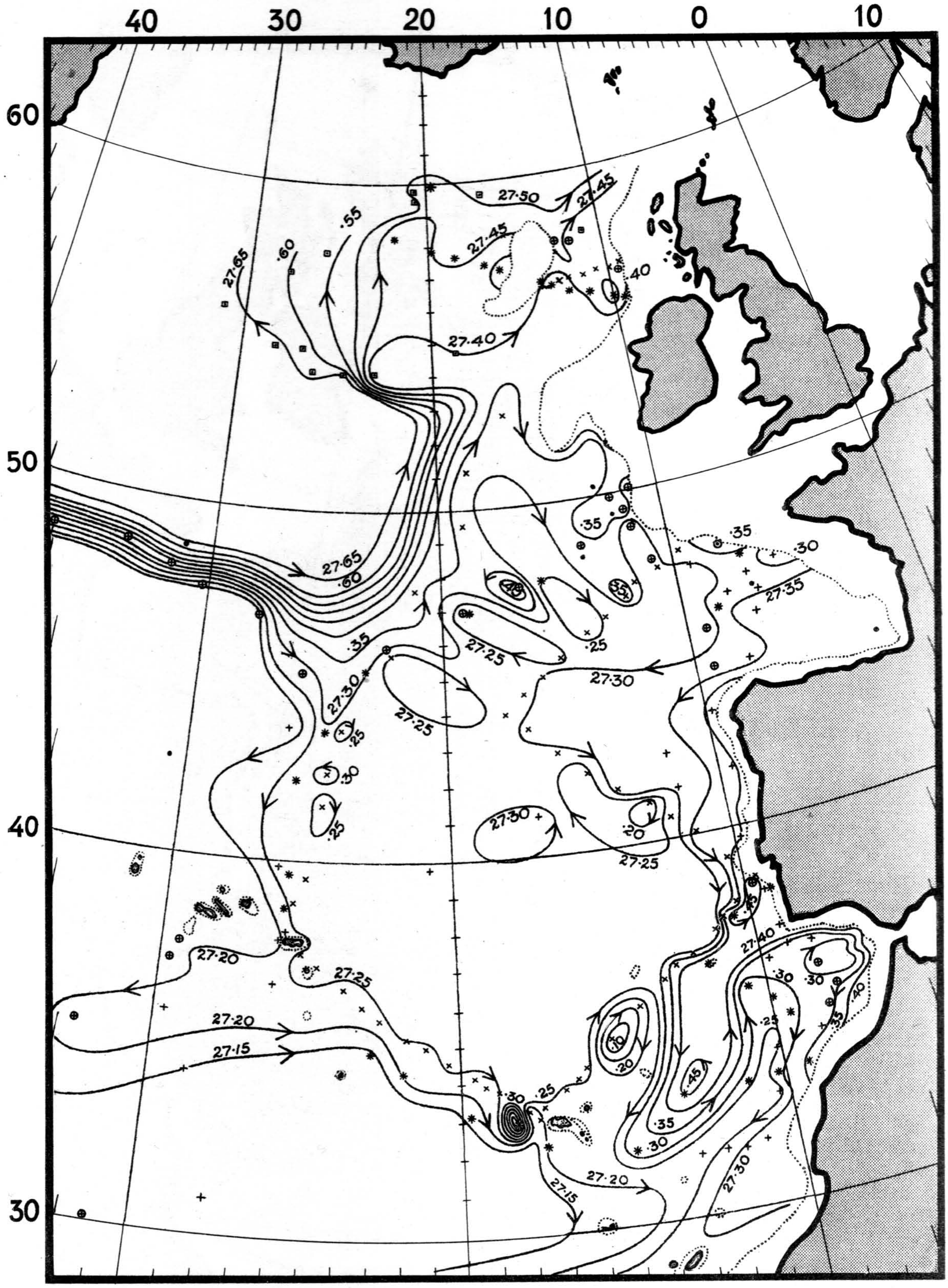
Temperature and Salinity. 400 Meters.



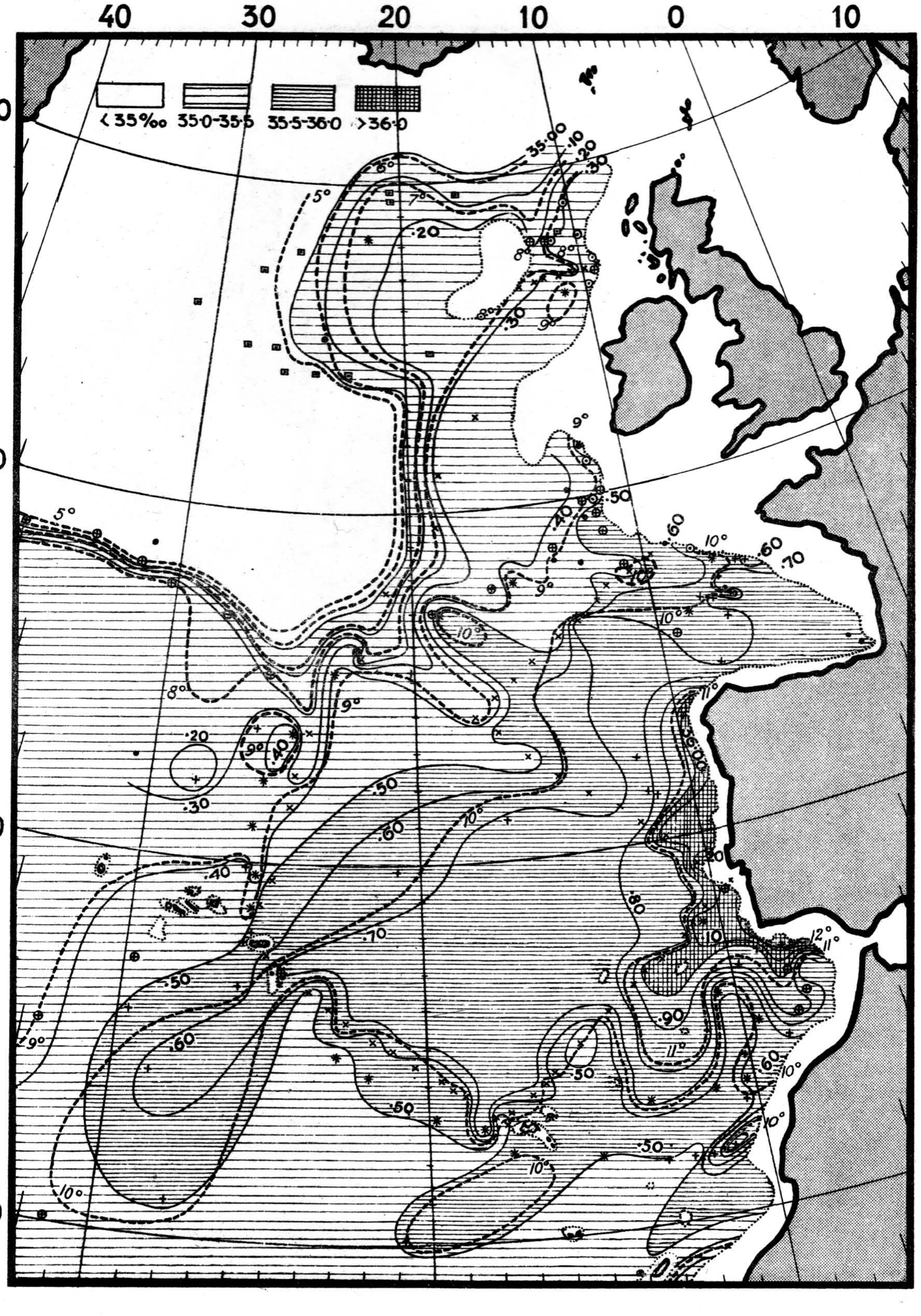
Density. 400 Meters.



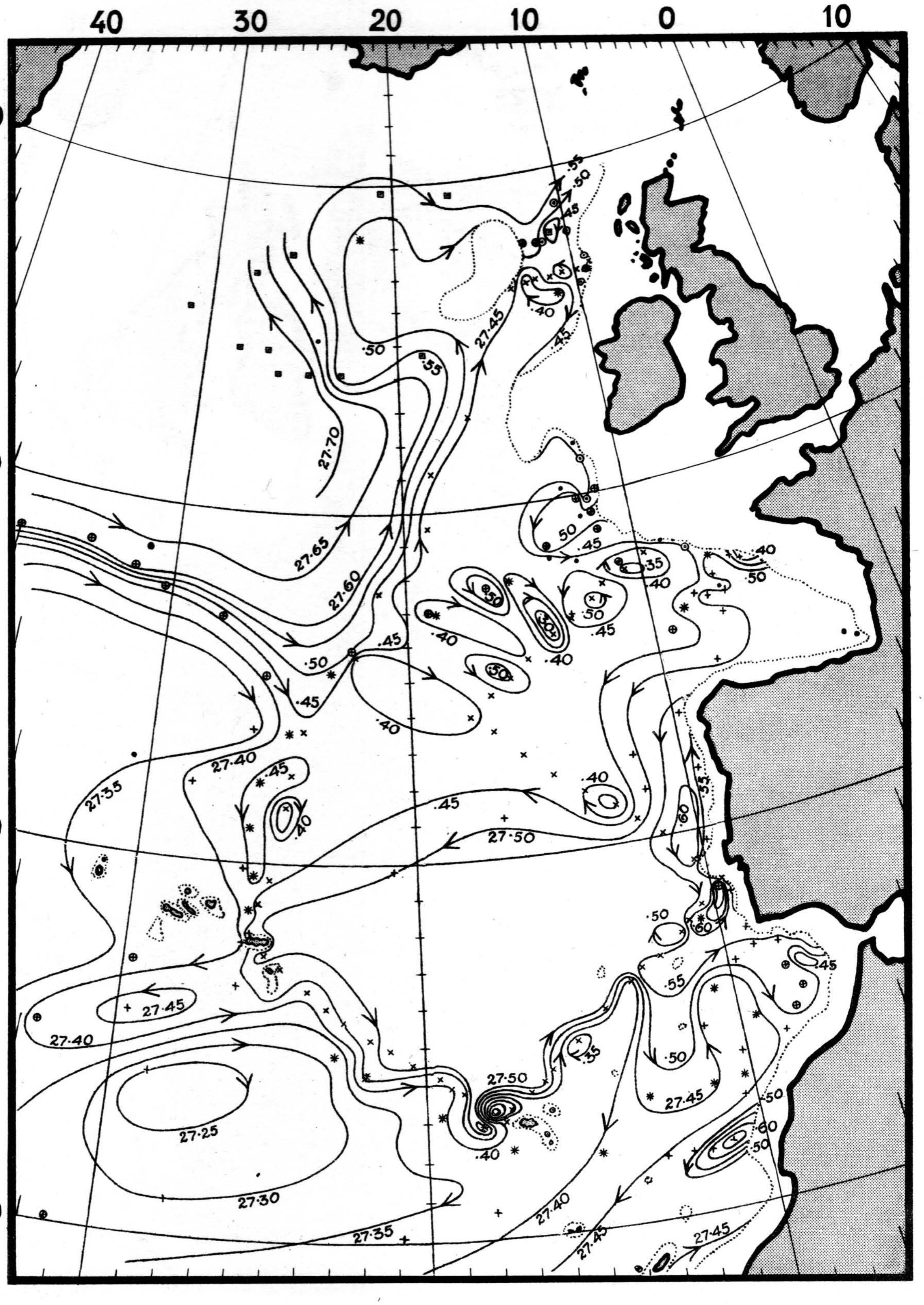
Temperature and Salinity. 600 Meters.



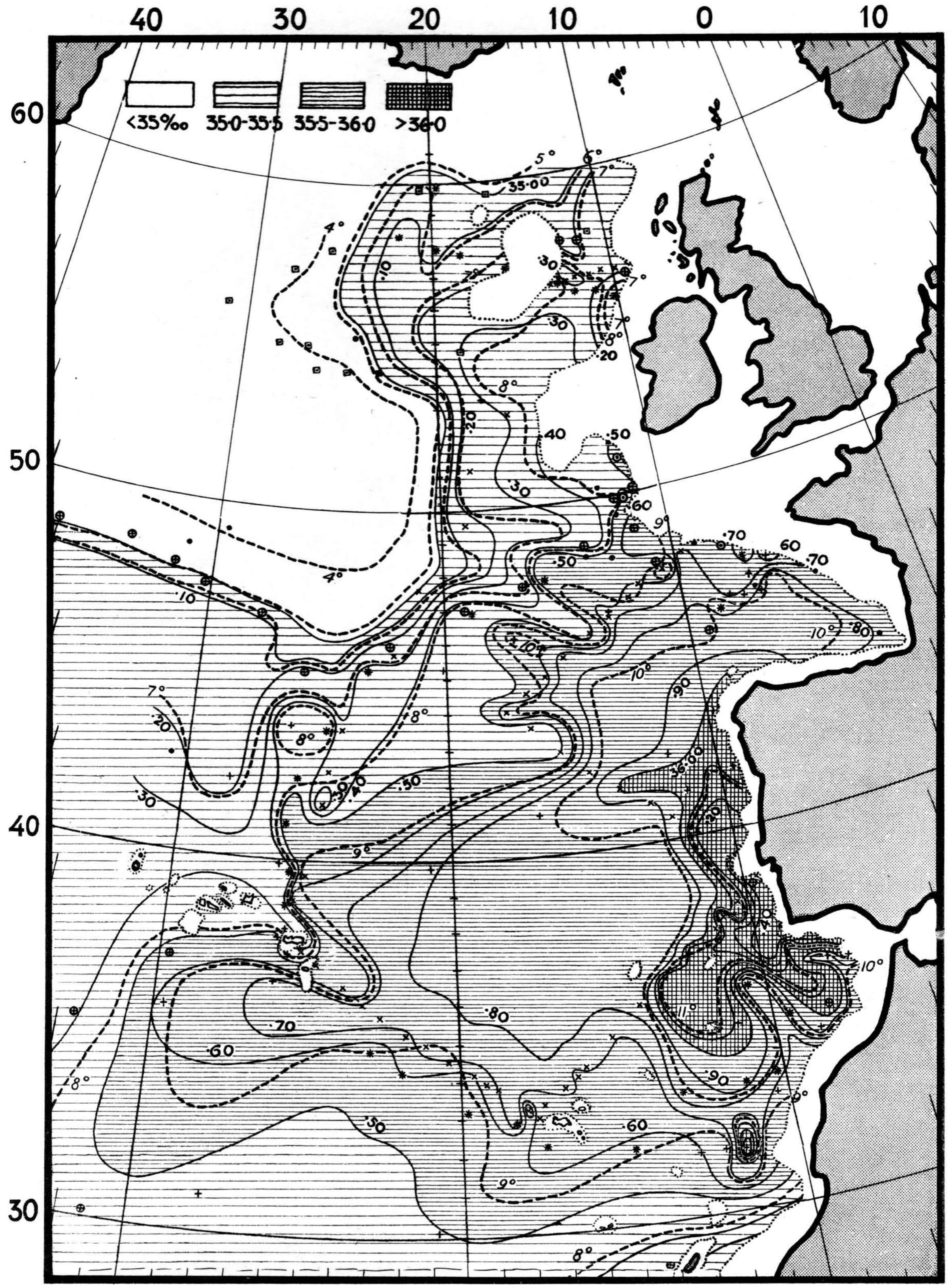
Density. 600 Meters.



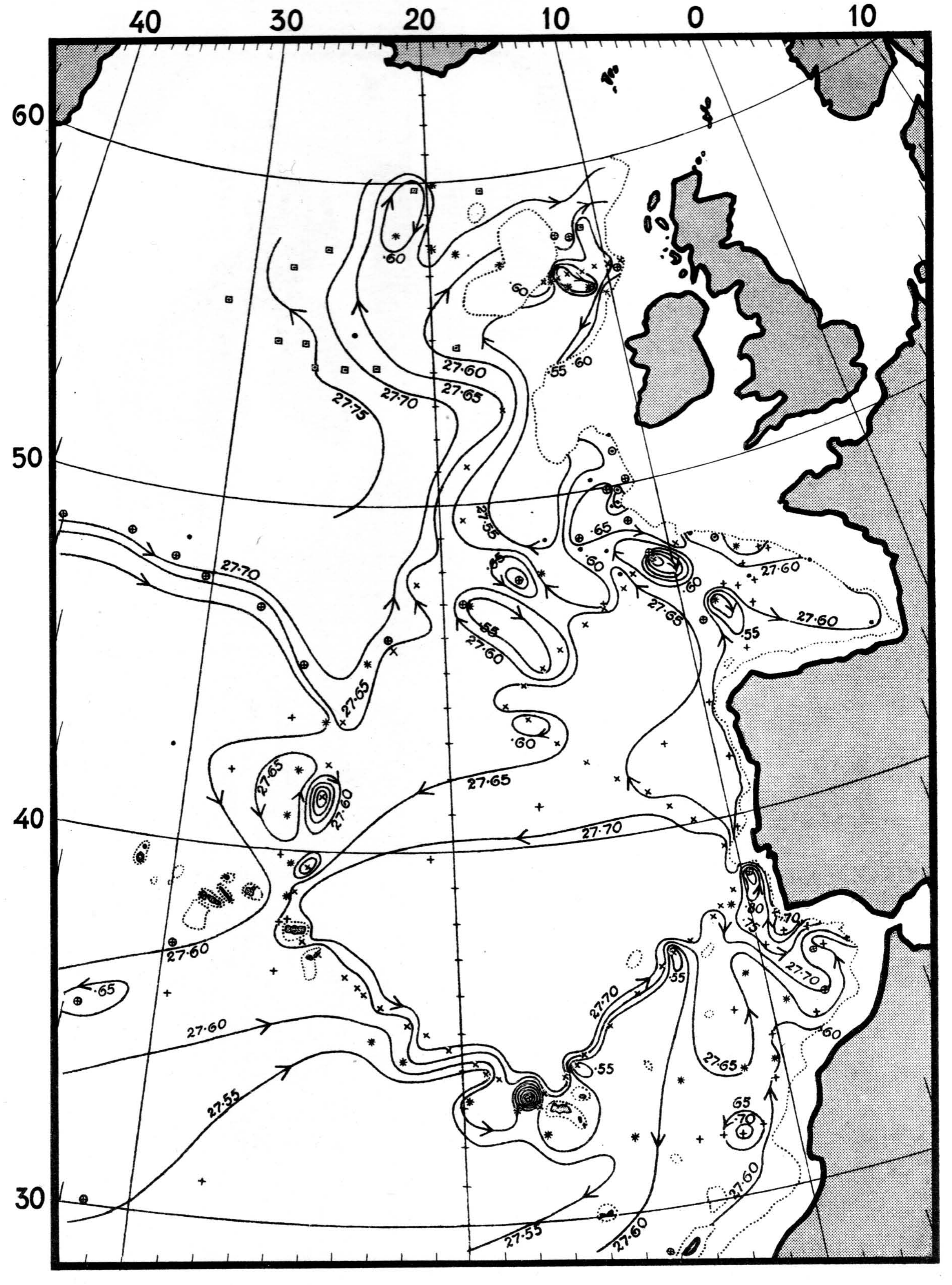
Temperature and Salinity. 800 Meters.



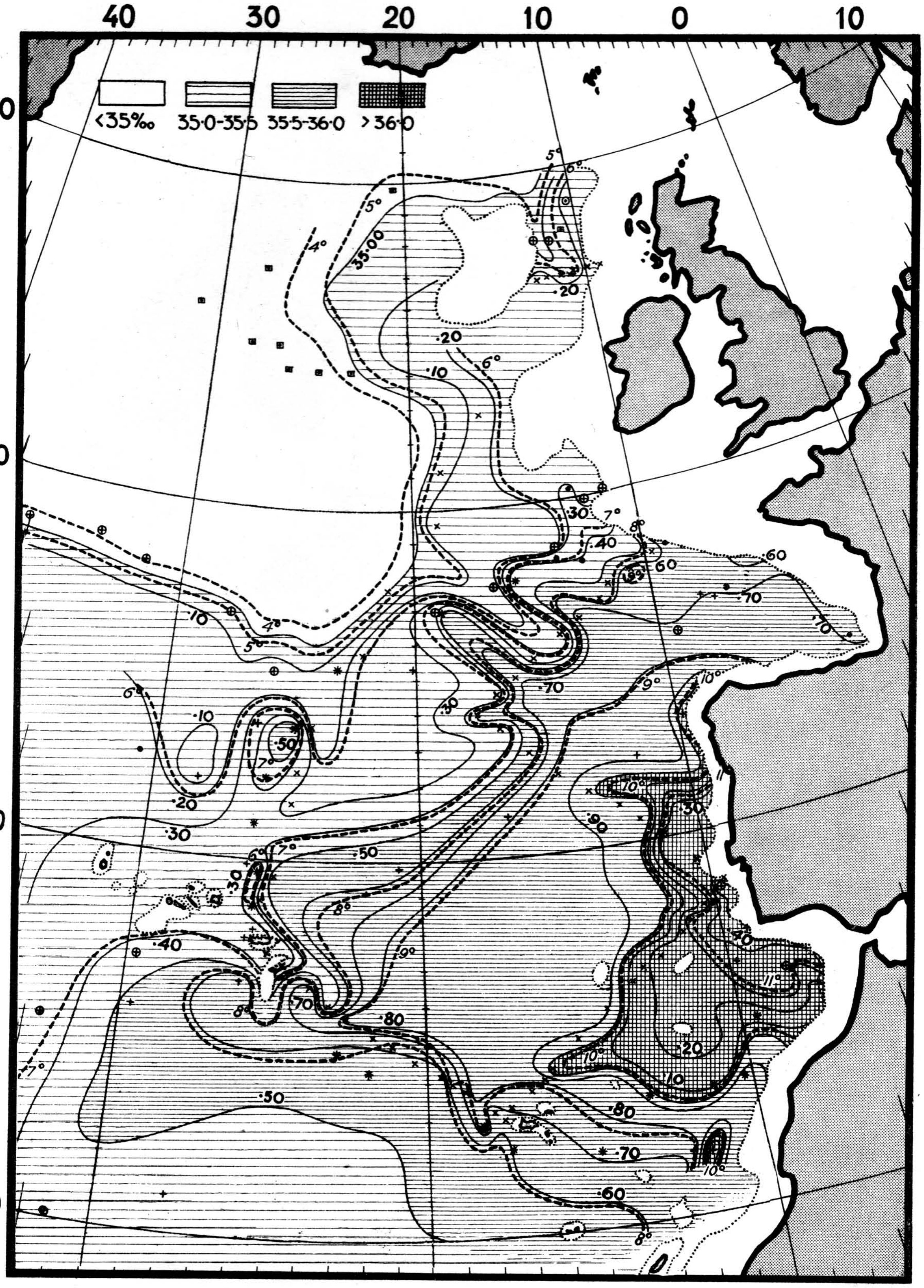
Density. 800 Meters.



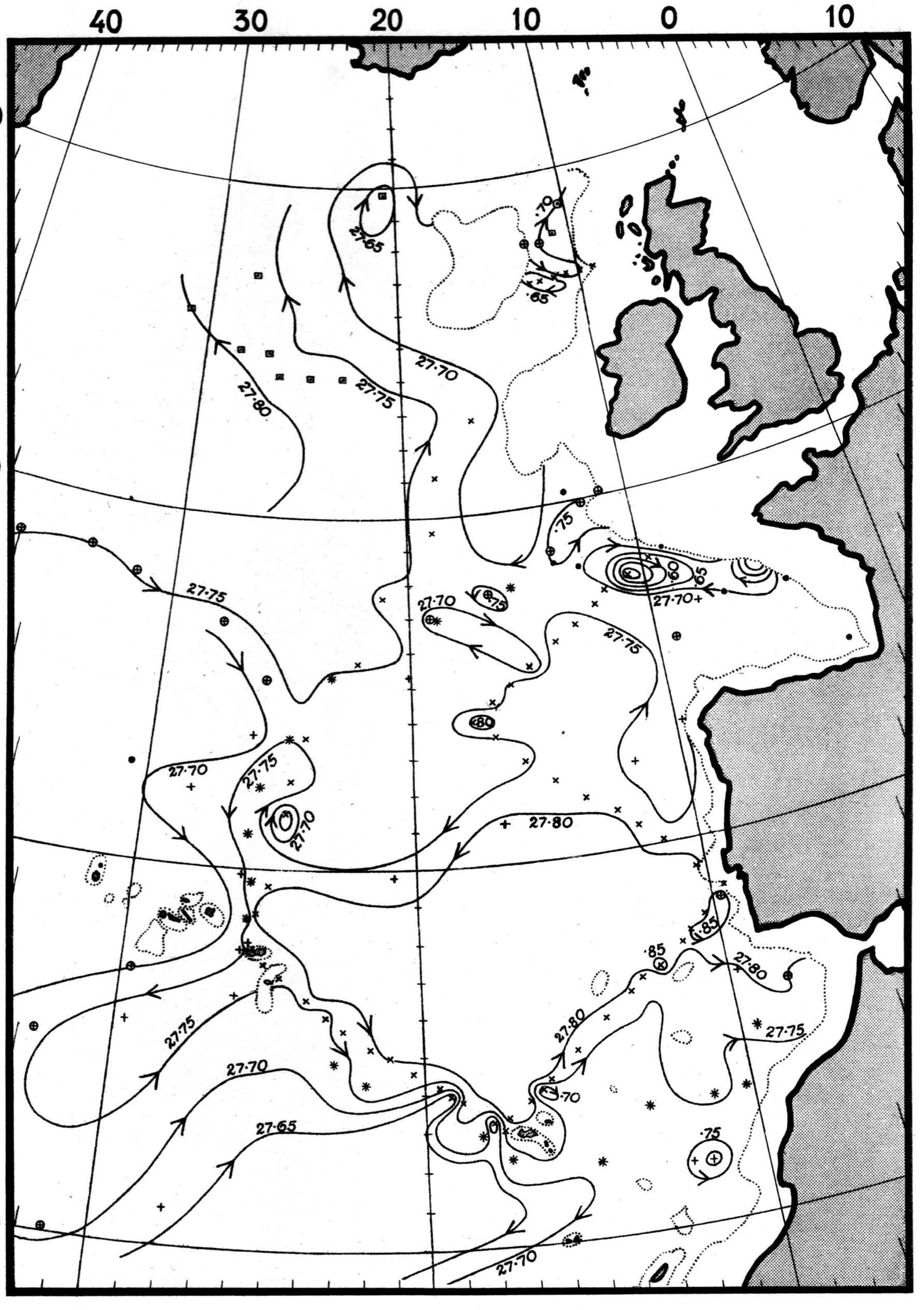
Temperature and Salinity. 1000 Meters.



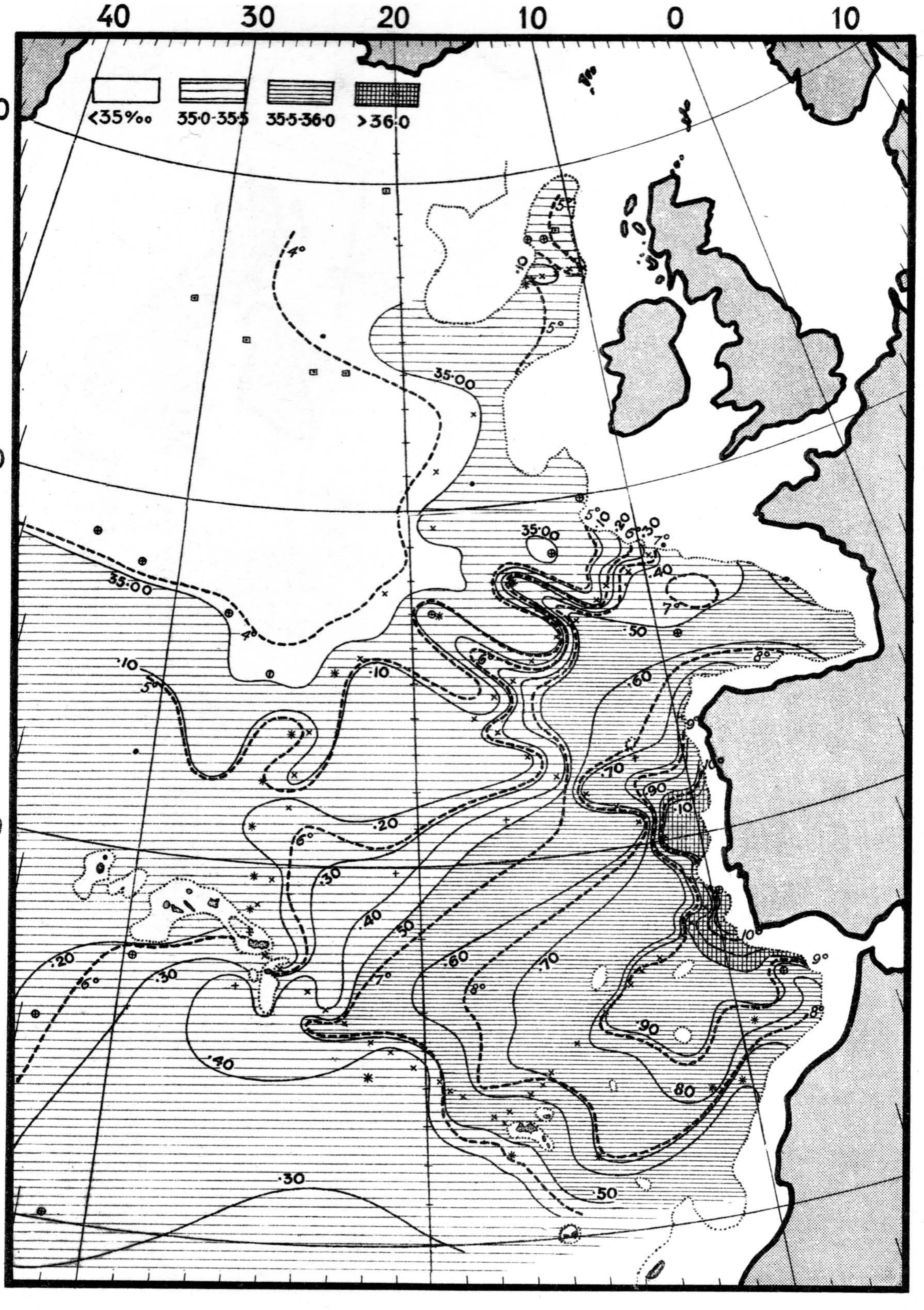
Density. 1000 Meters.



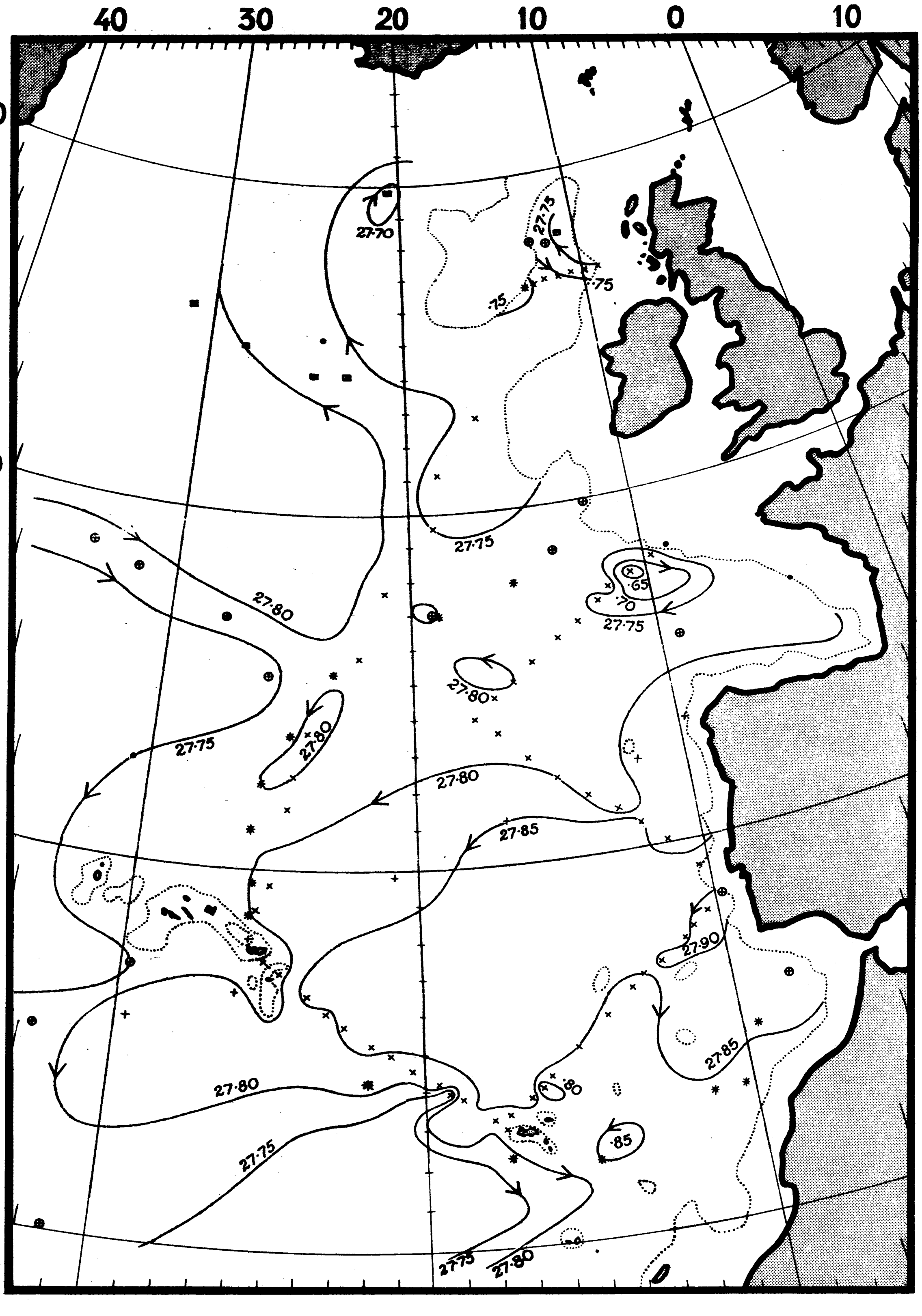
Temperature and Salinity. 1200 Meters.



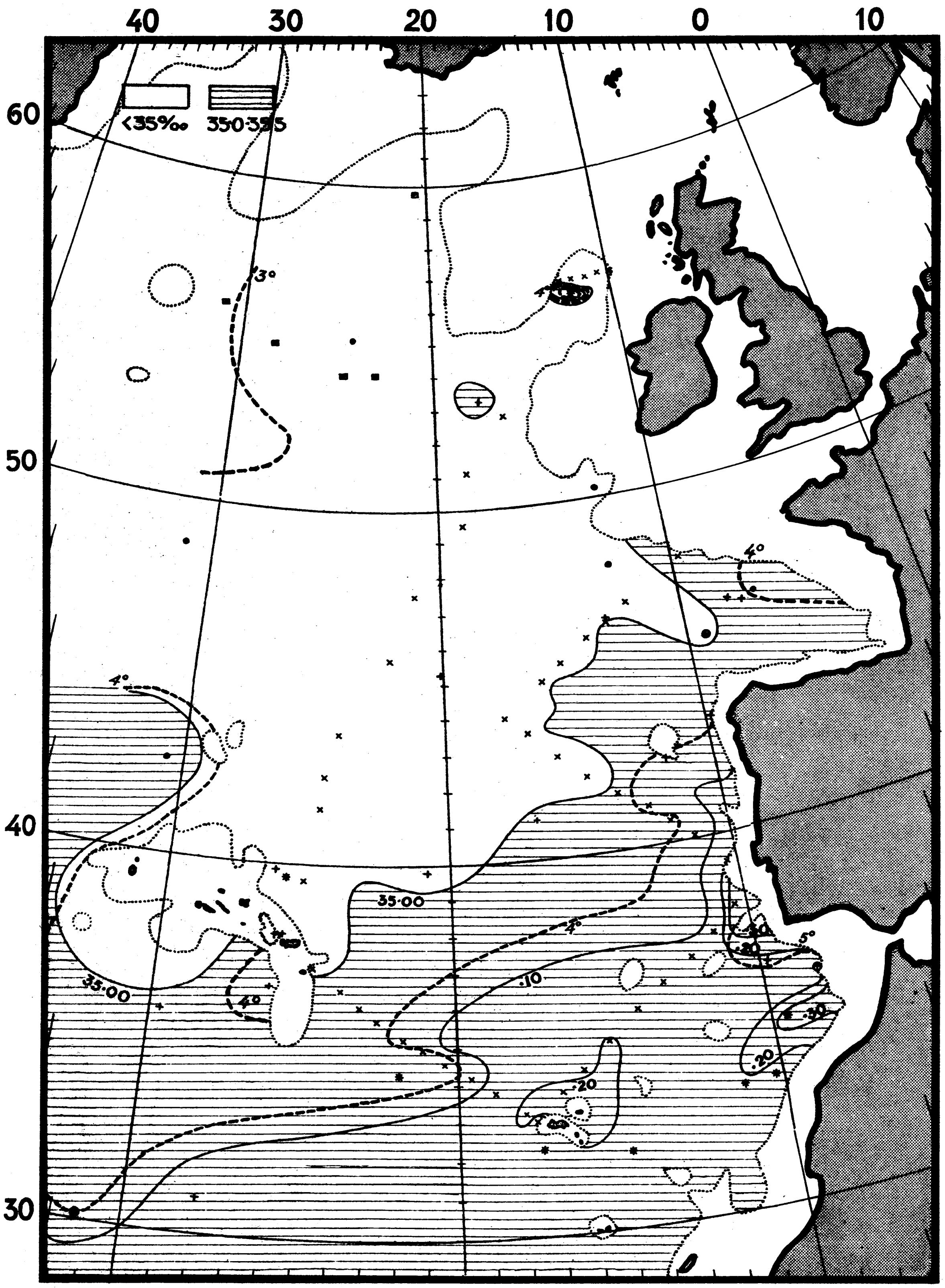
Density. 1200 Meters.



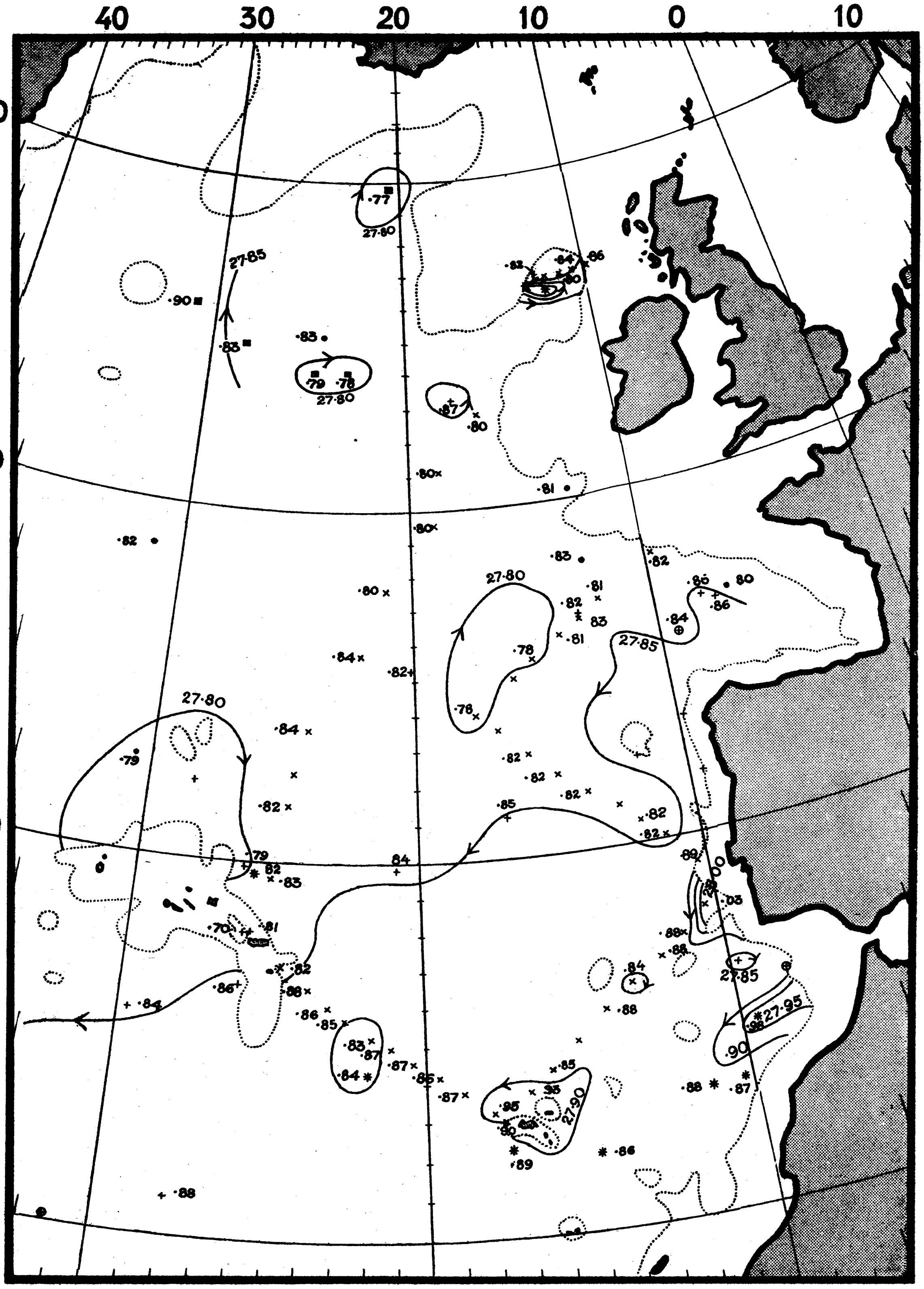
Temperature and Salinity. 1400 Meters.



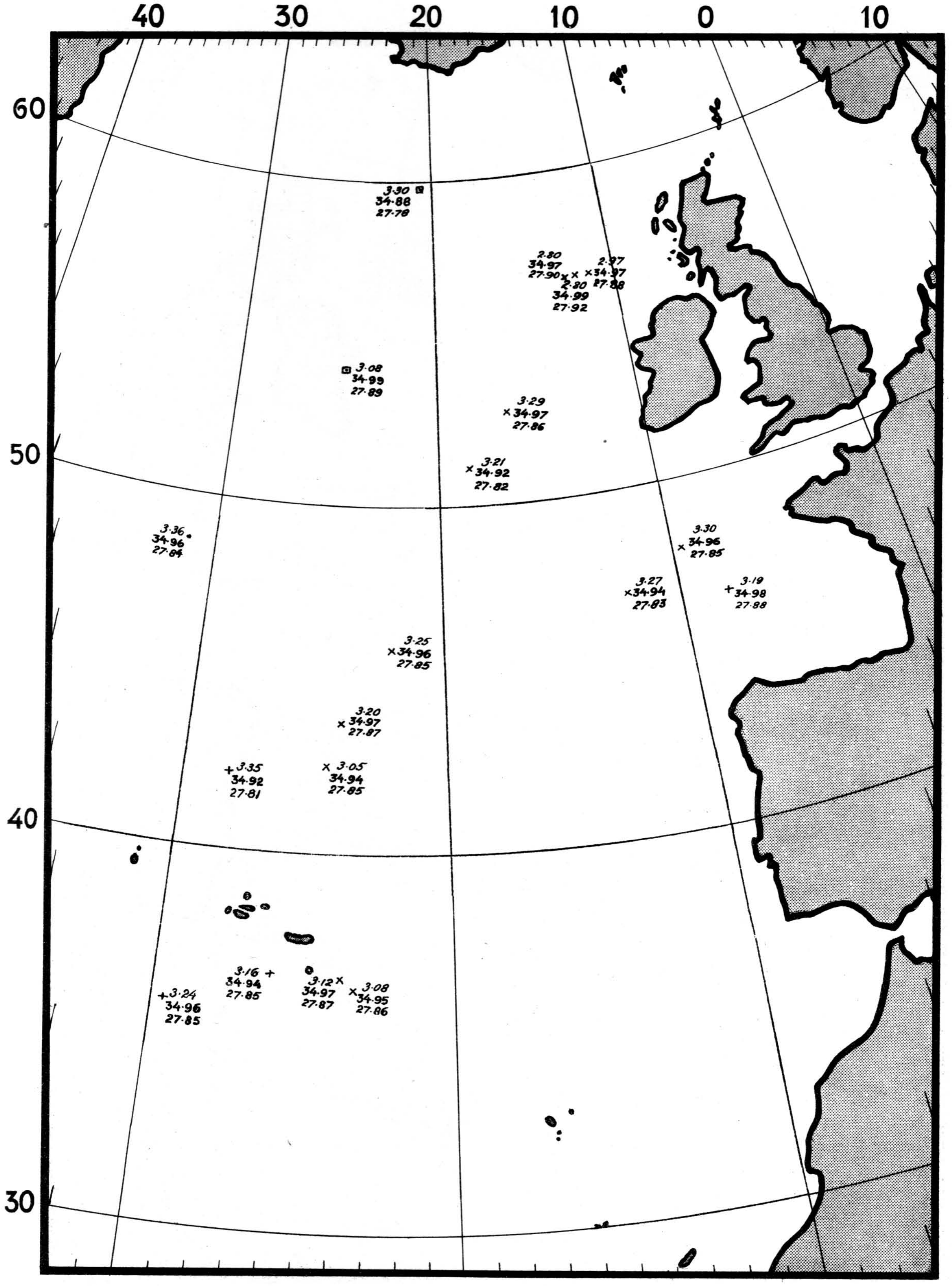
Density. 1400 Meters.



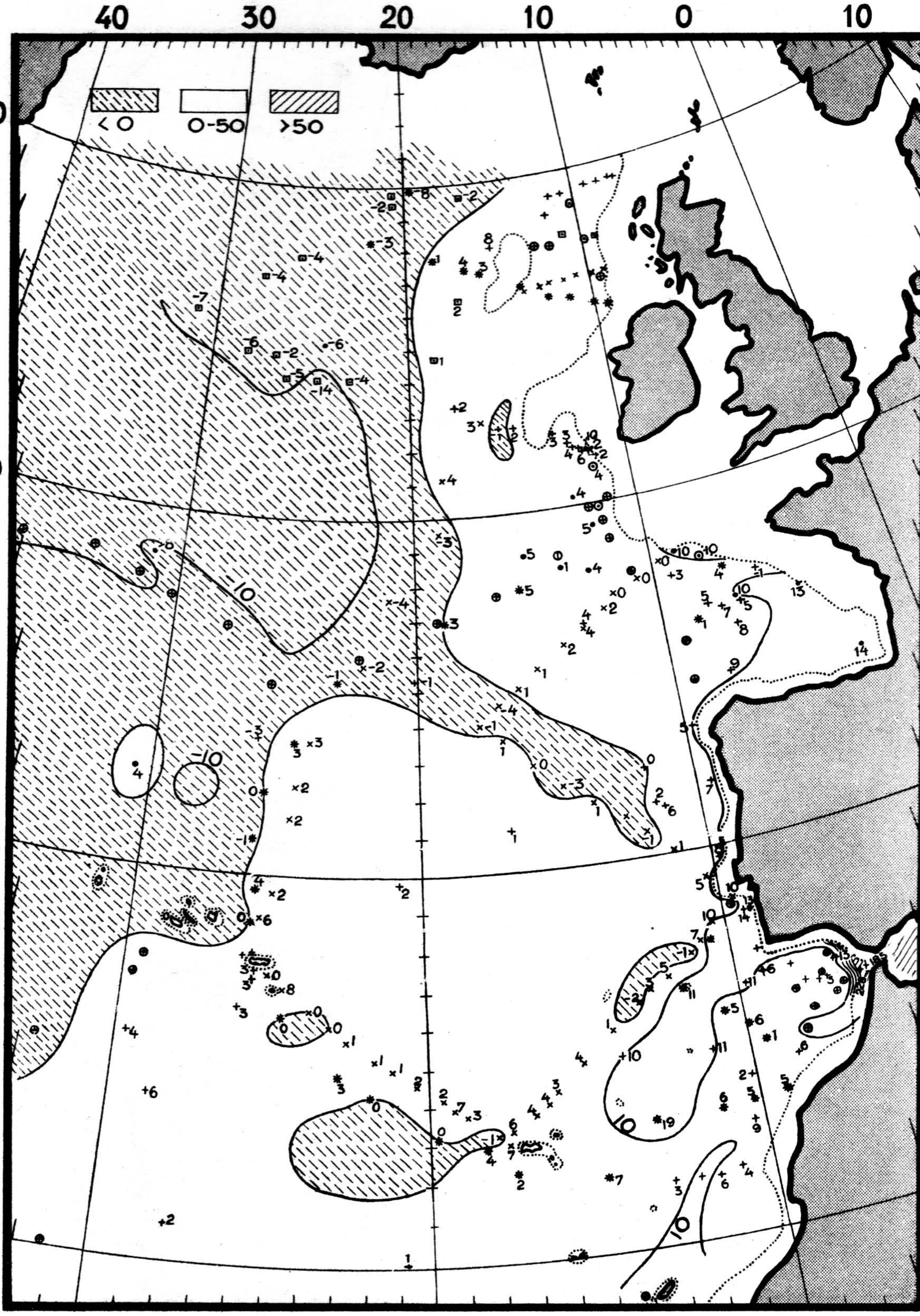
Temperature and Salinity. 2000 Meters.



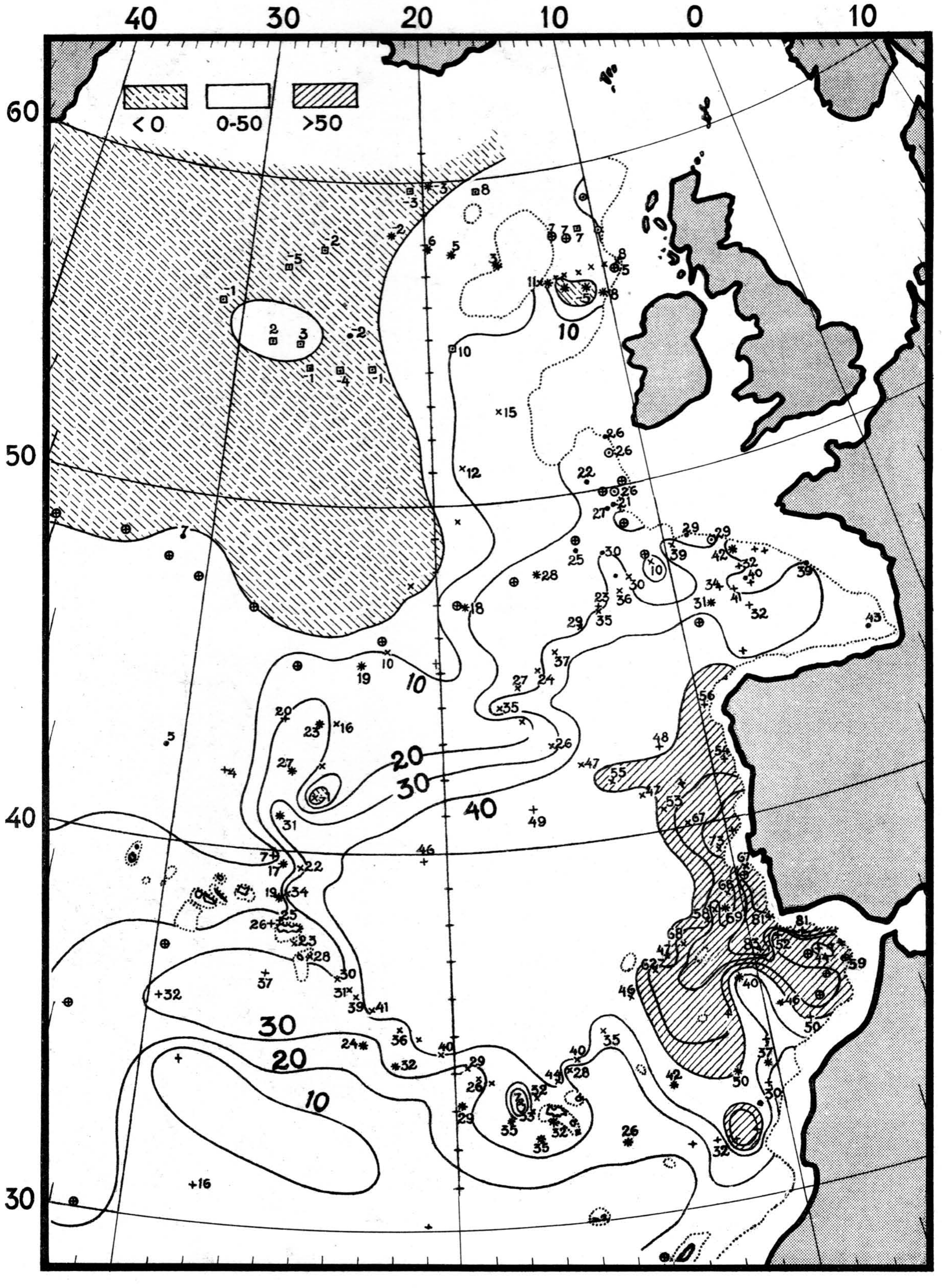
Density. 2000 Meters.



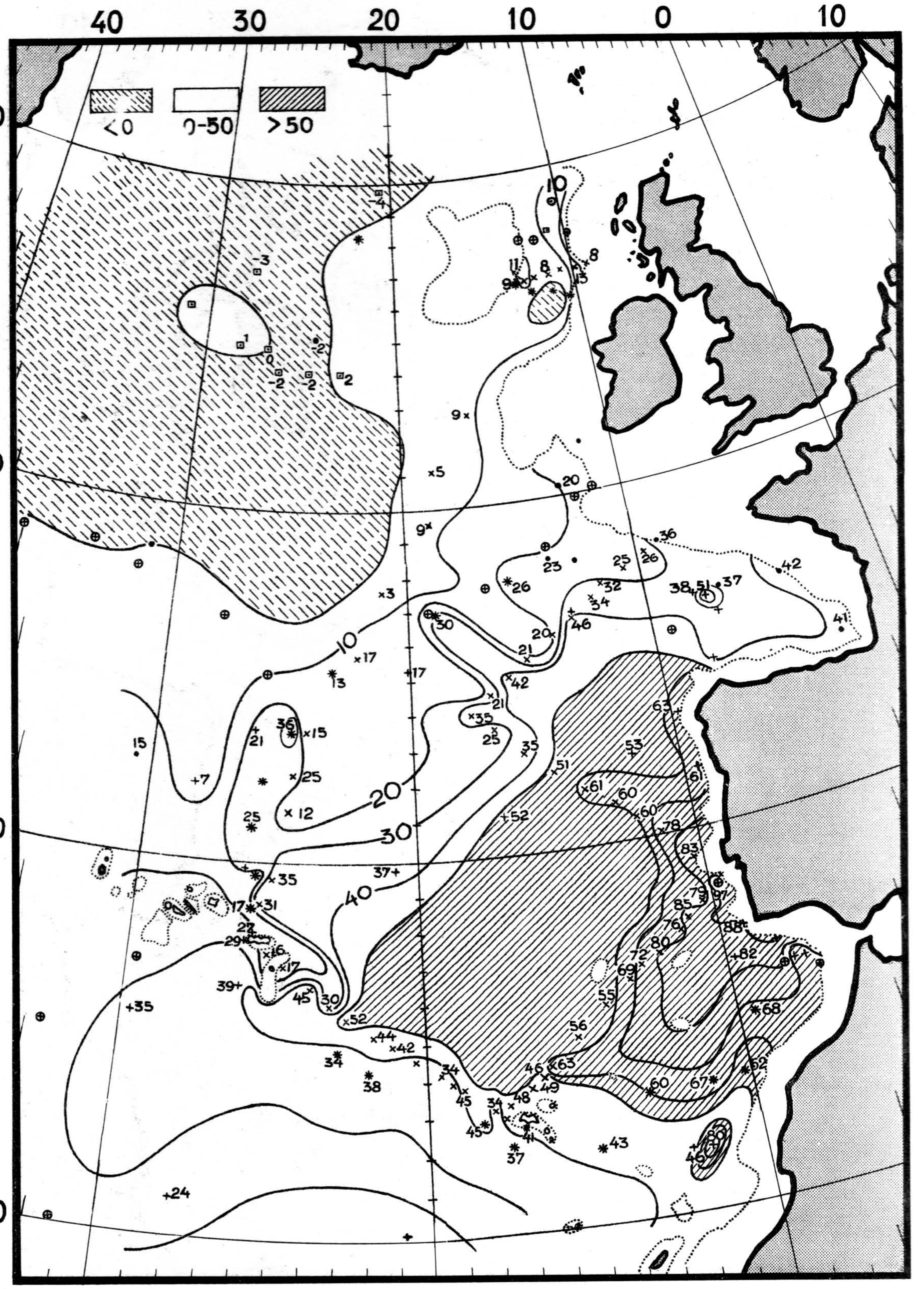
Temperature, Salinity, Density. 2500 Meters.



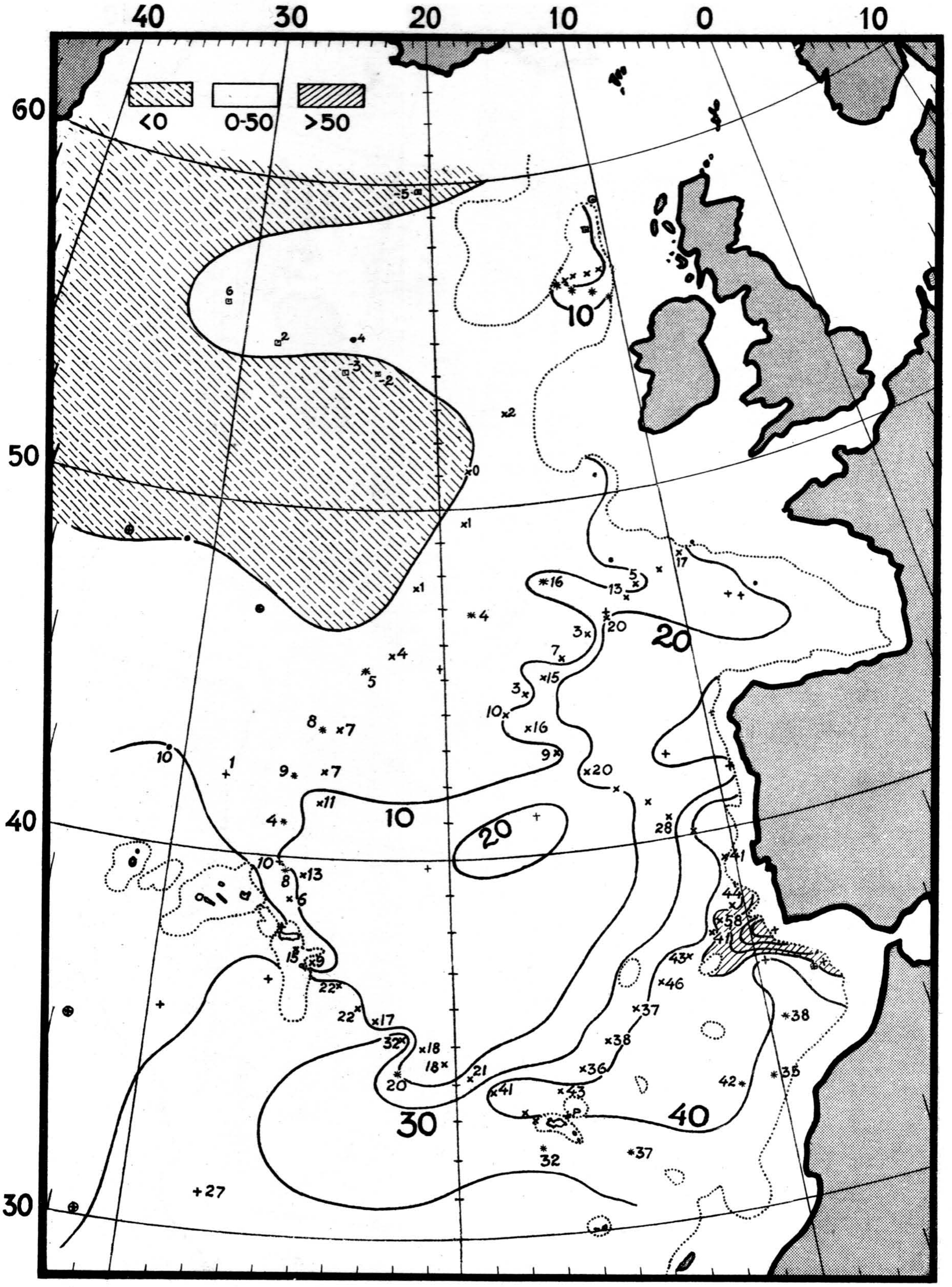
Anomaly of Salinity. 400 Meters.



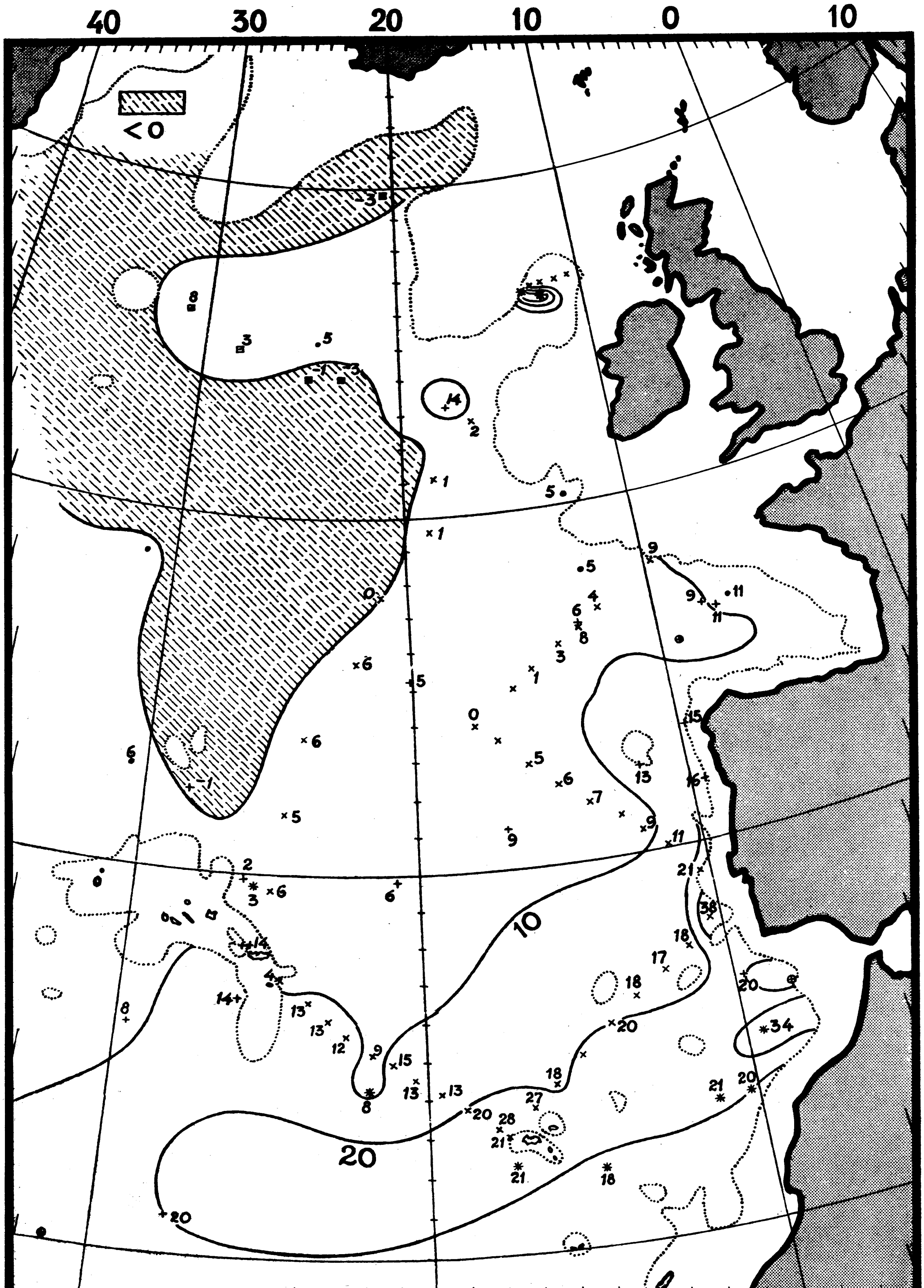
Anomaly of Salinity. 1000 Meters.



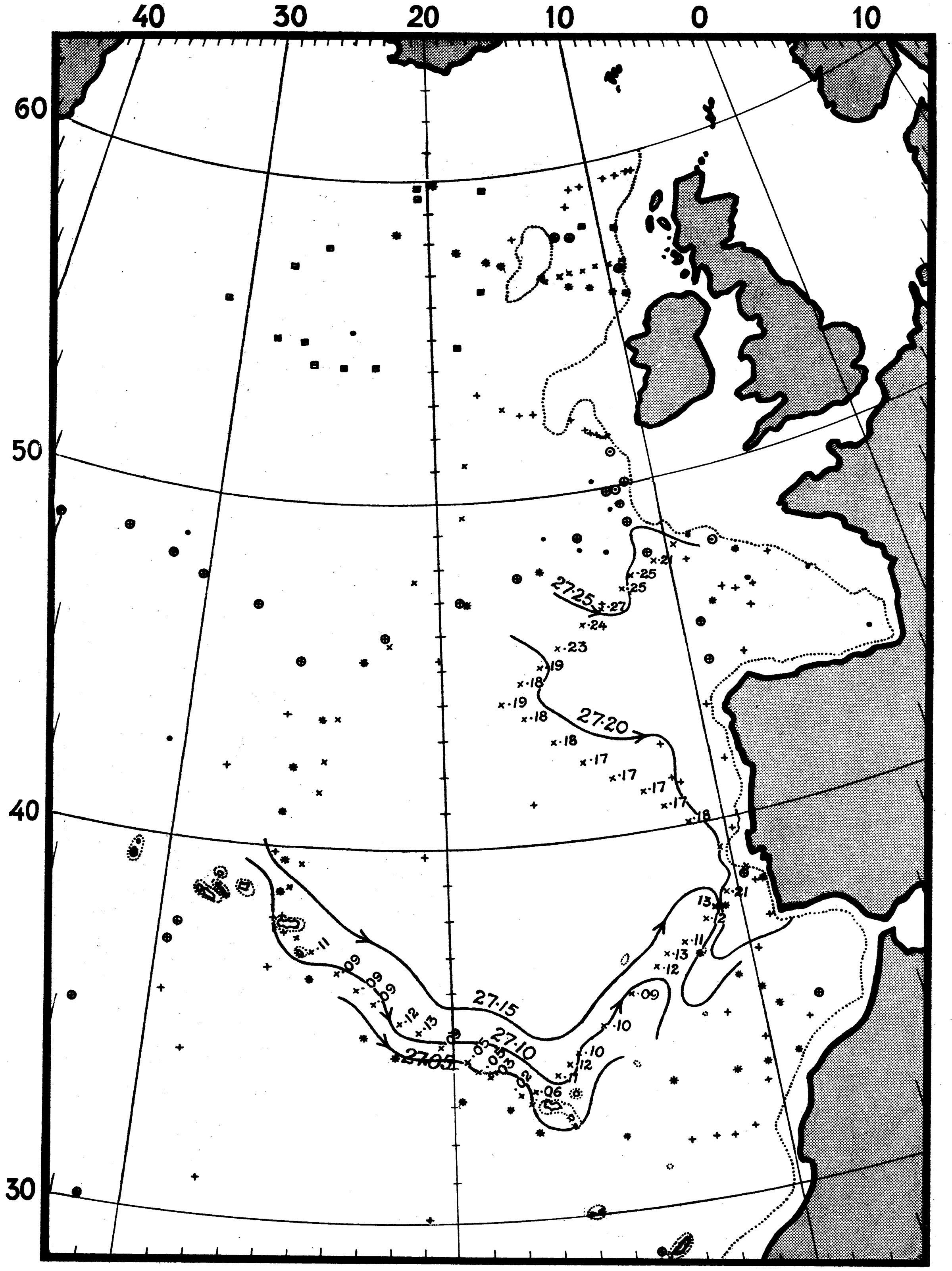
Anomaly of Salinity. 1200 Meters.



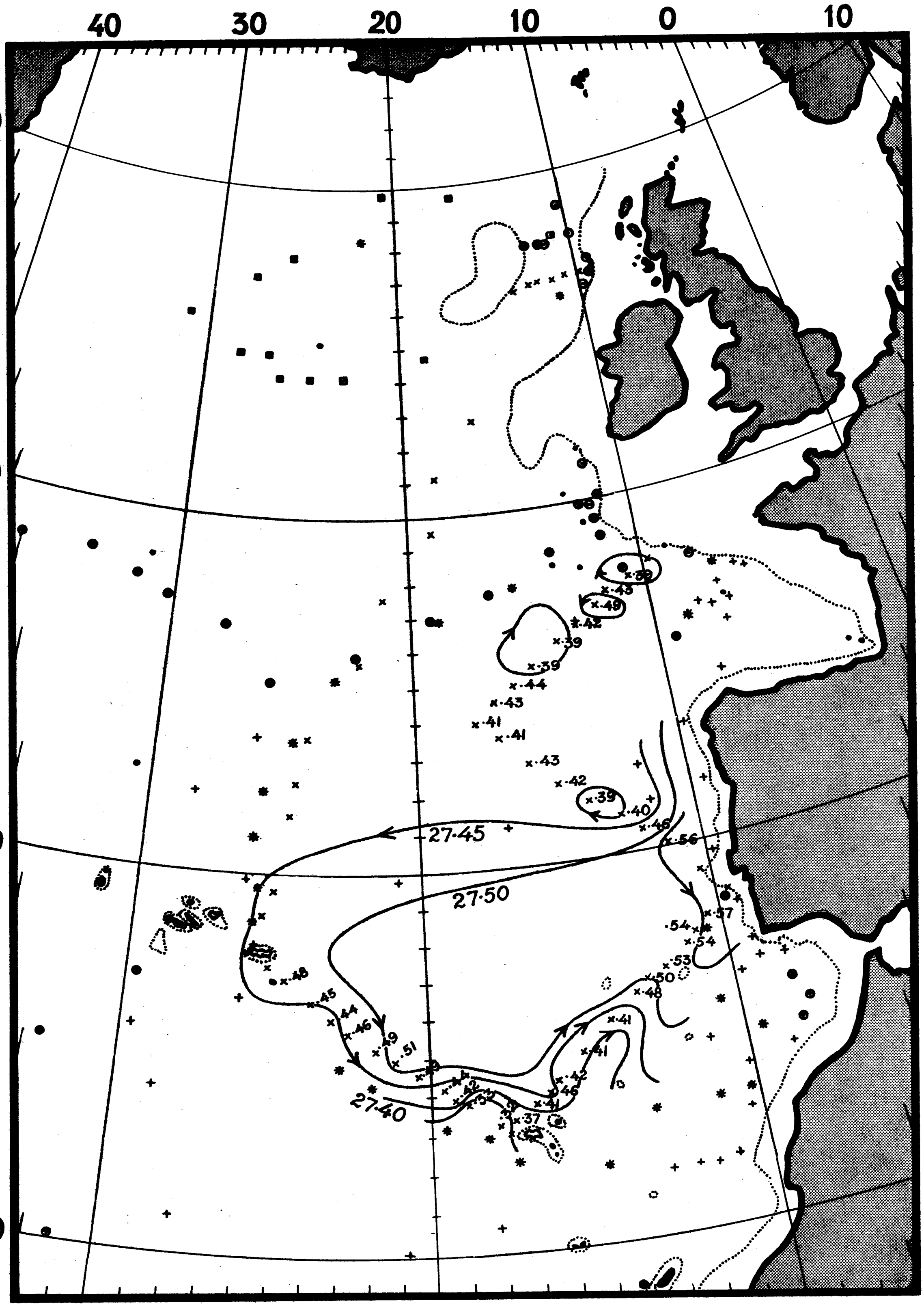
Anomaly of Salinity. 1600 Meters.



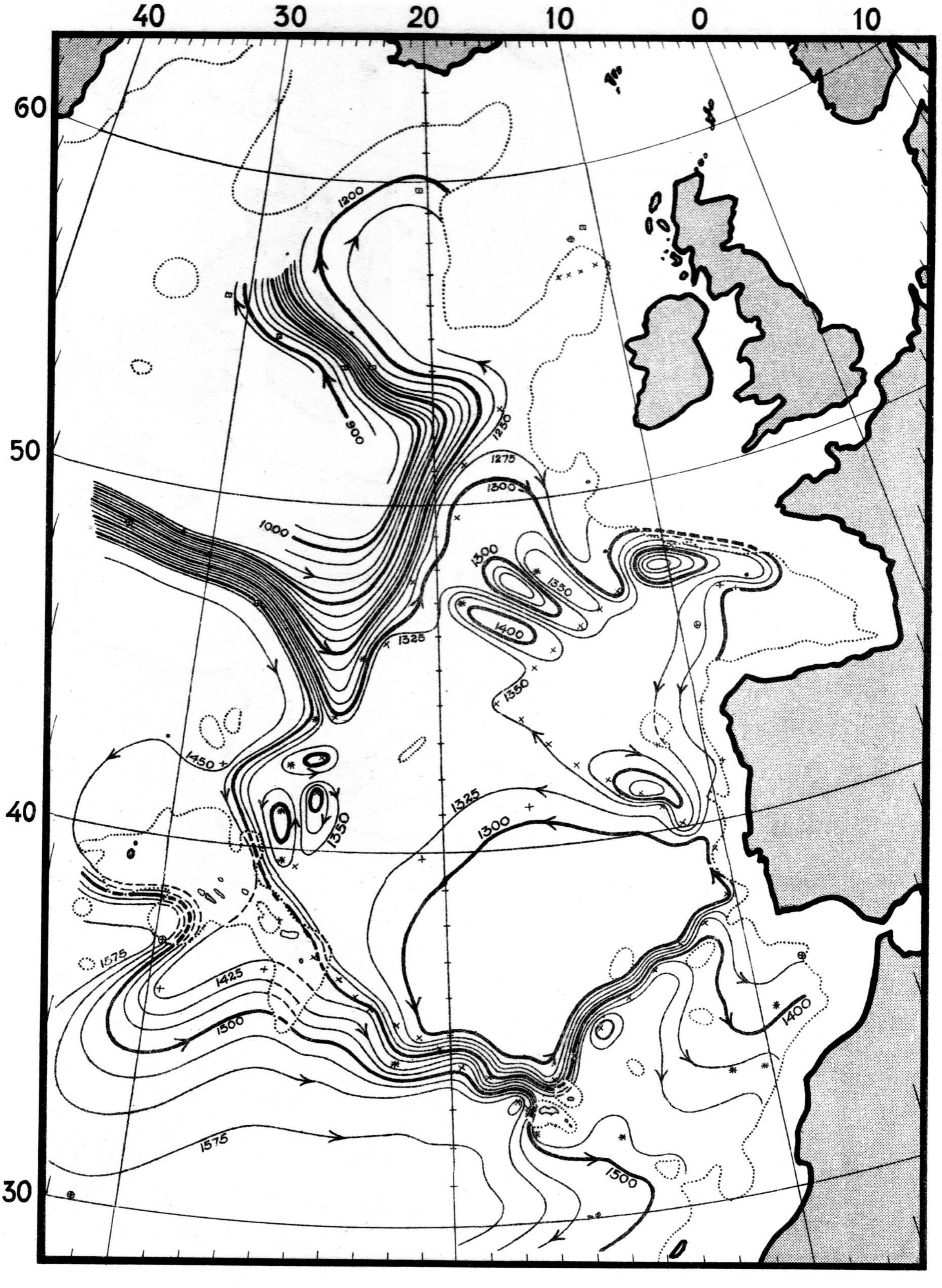
Anomaly of Salinity. 2000 Meters.



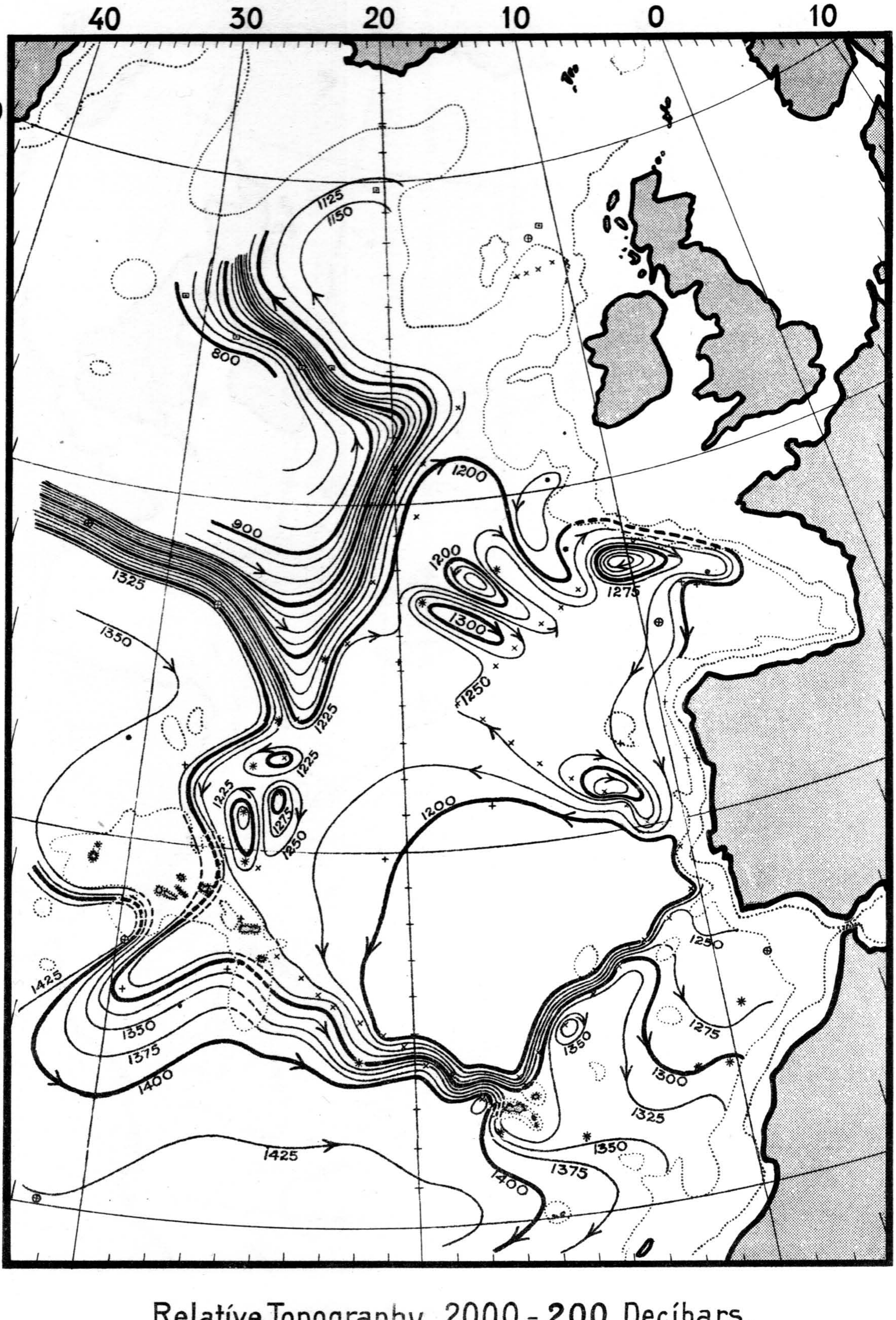
Smoothed Values of σ_t. 400 Meters.



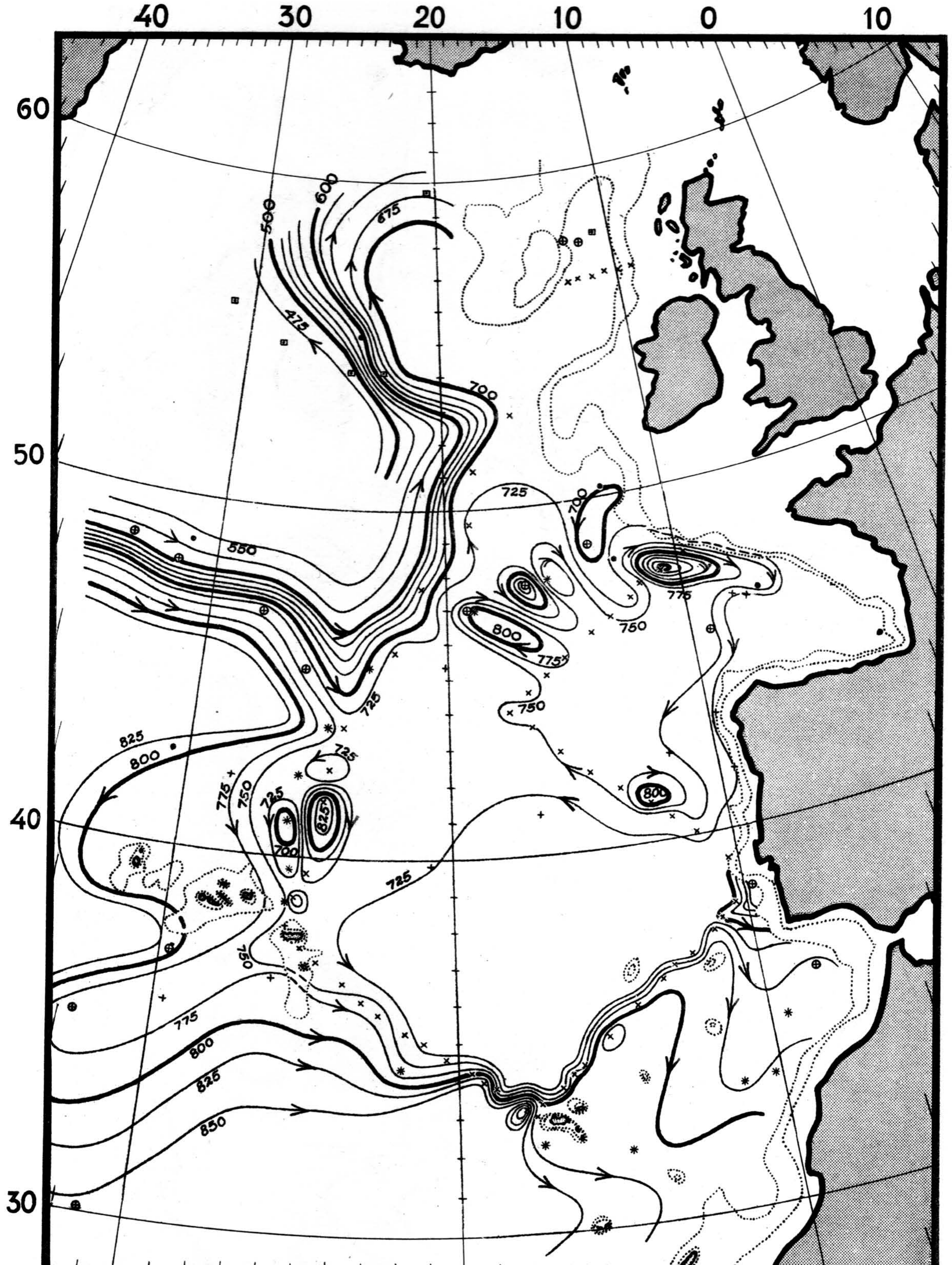
Smoothed Values of σ_t. 800 Meters.



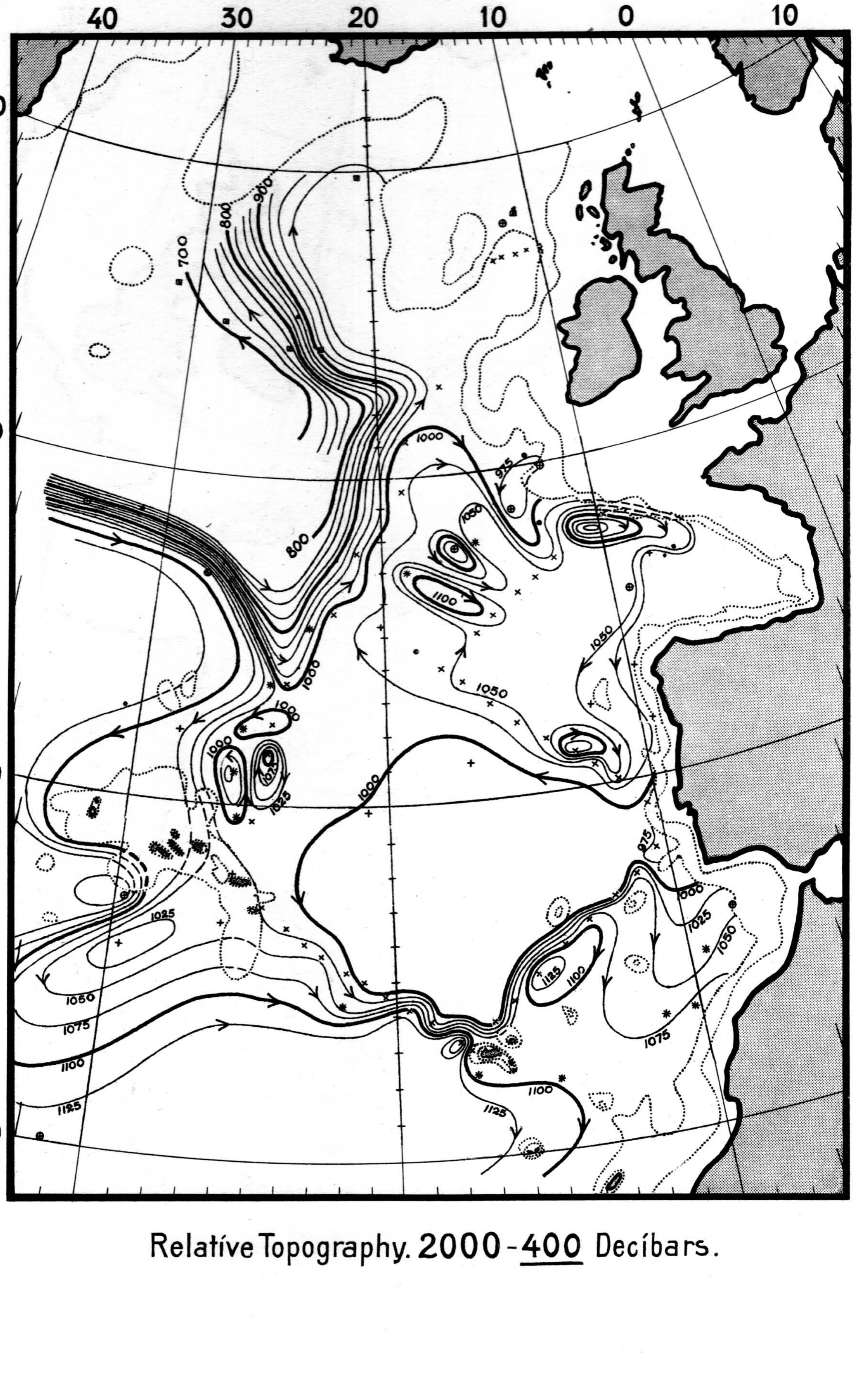
Relative Topography. 2000 - 100 Decibars.



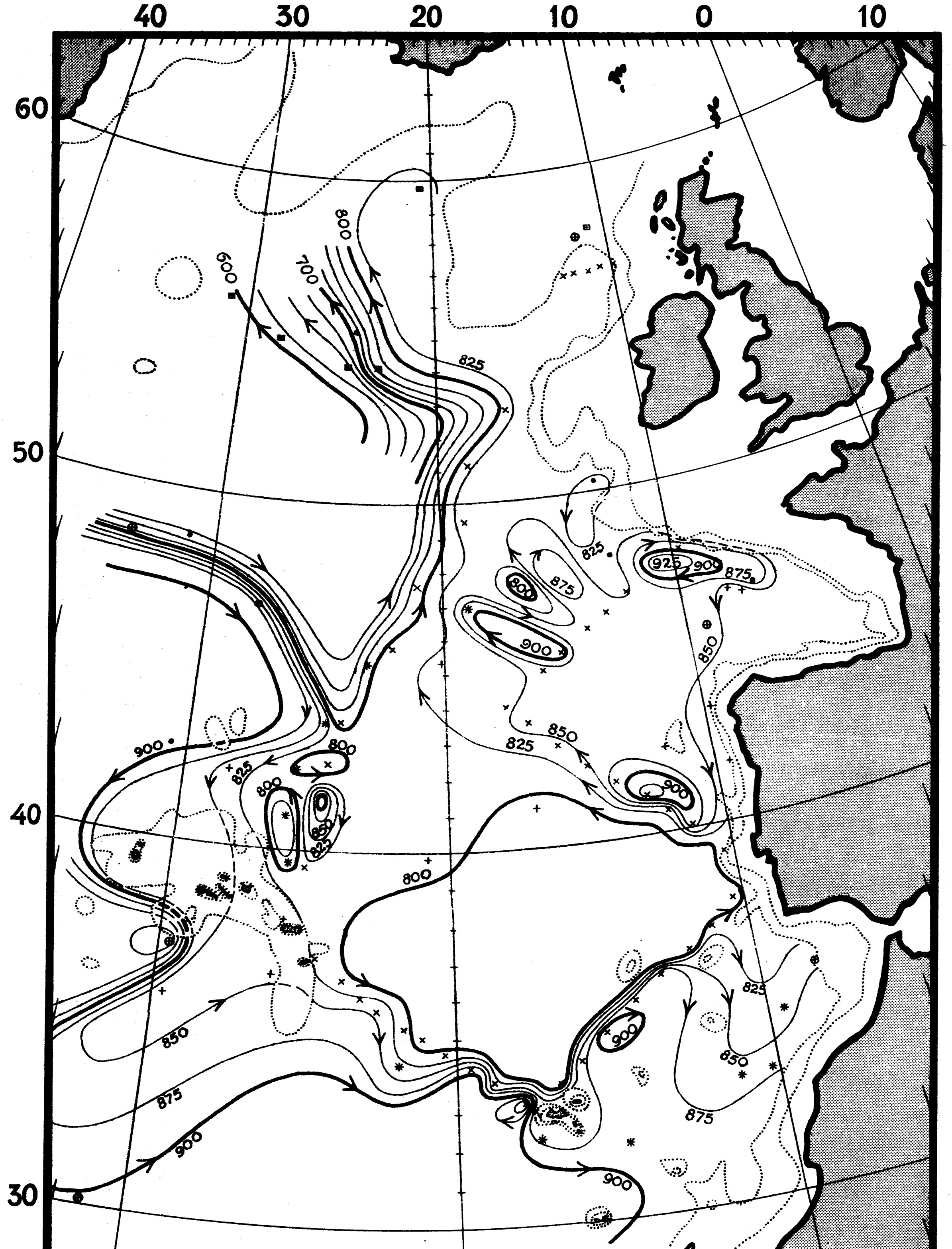
Relative Topography. 2000 - 200 Decibars.



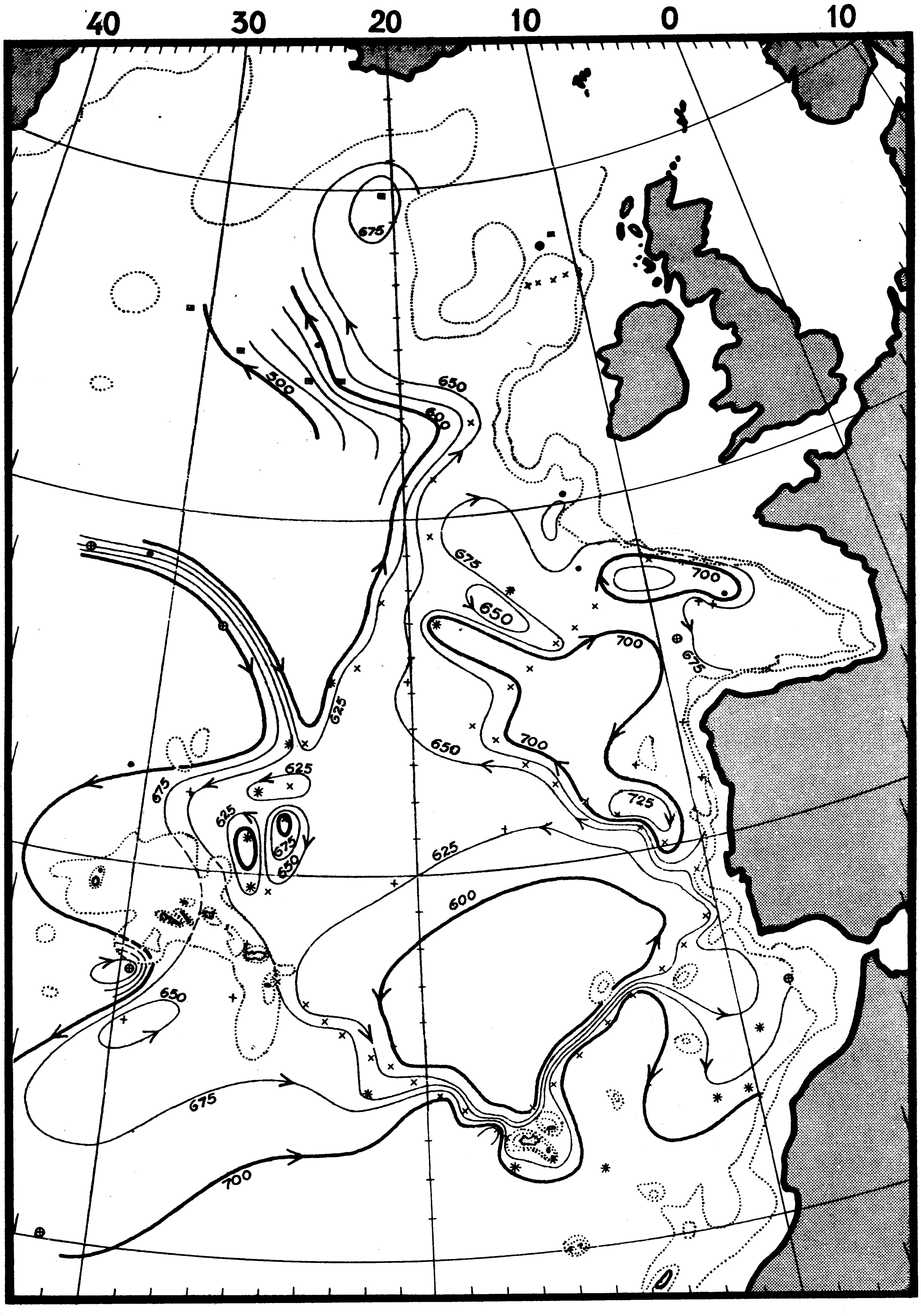
Relative Topography. 1400-400 Decibars.



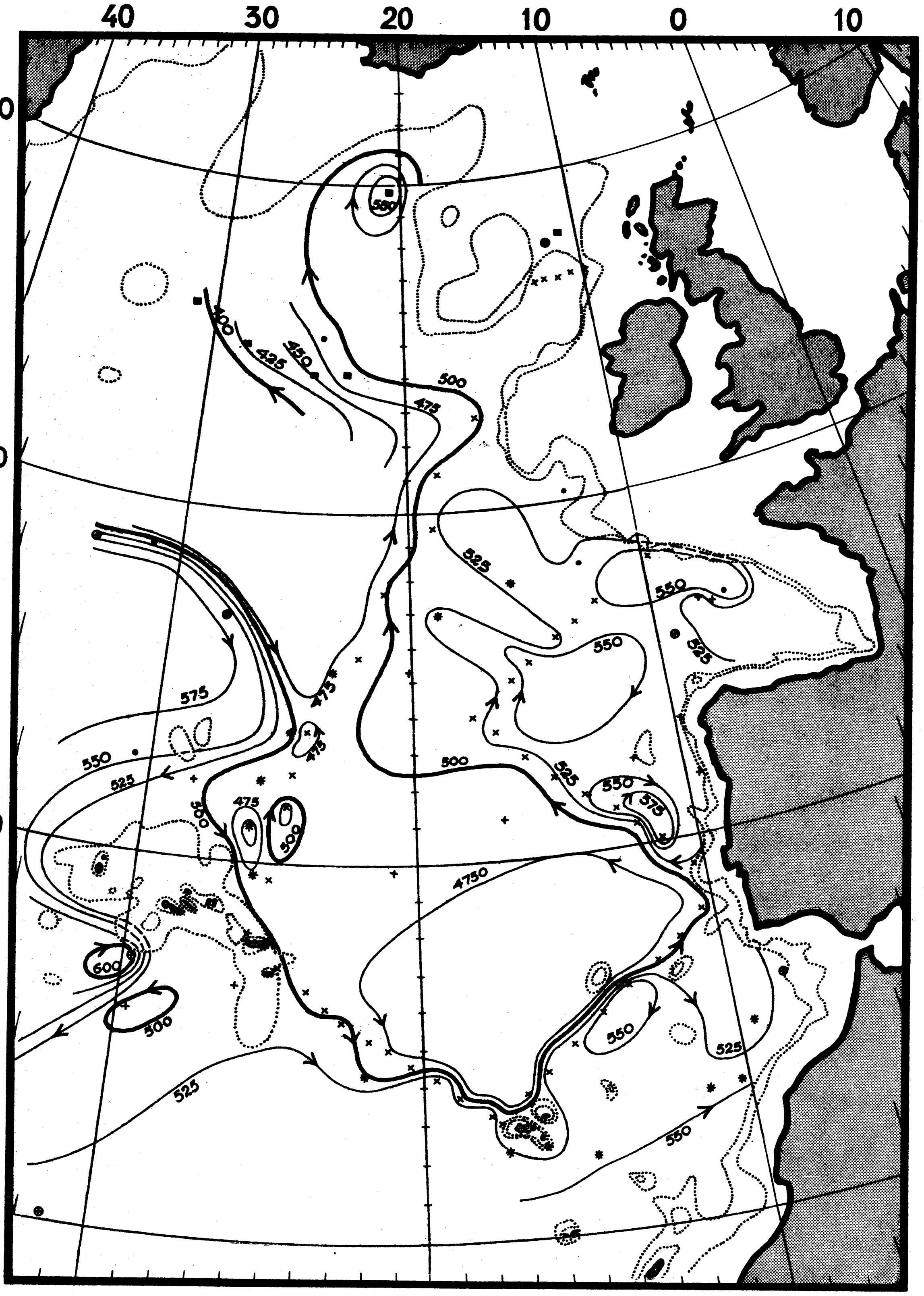
Relatíve Topography. 2000-400 Decíbars.



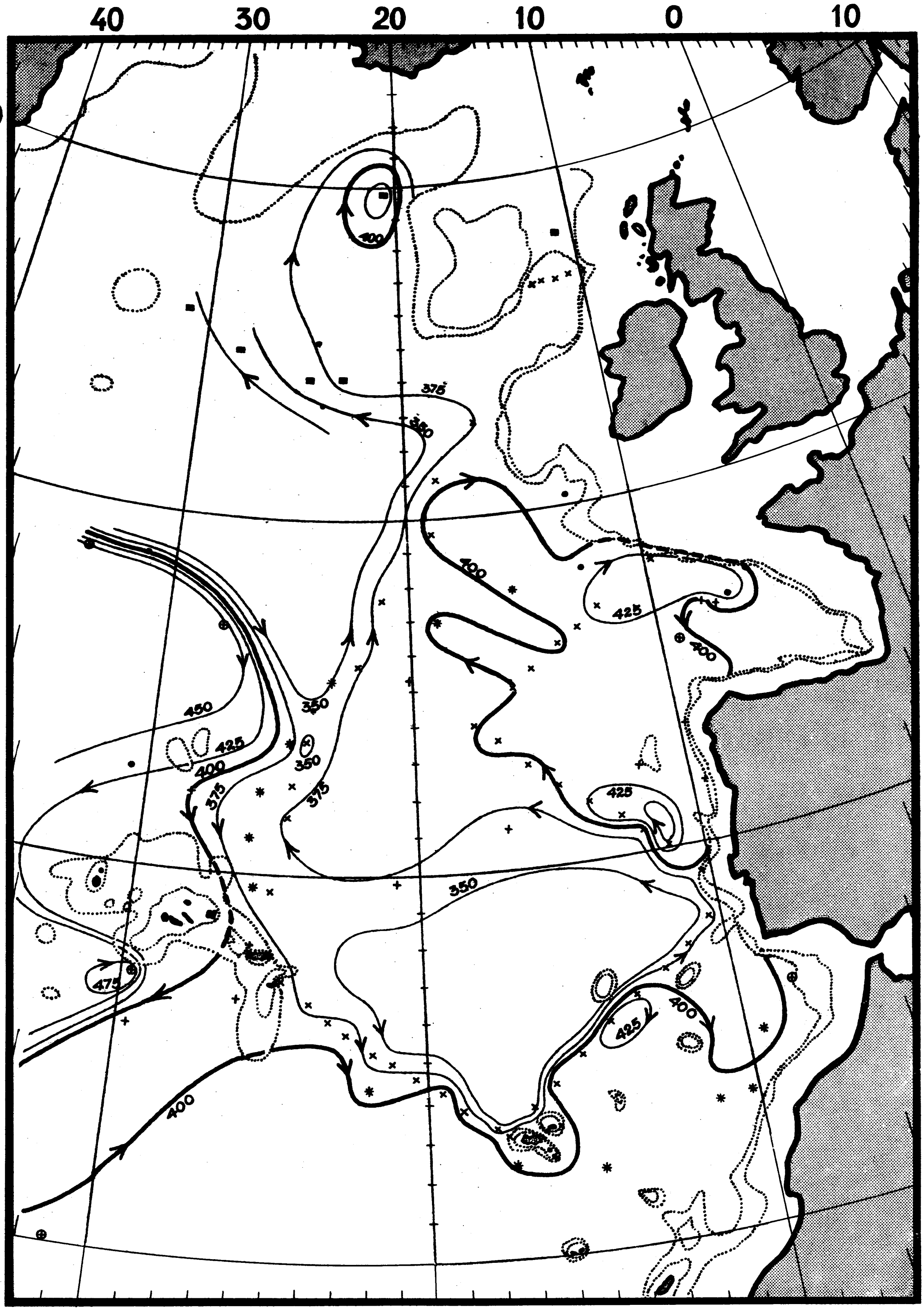
Relative Topography. 2000 - 600 Decibars.



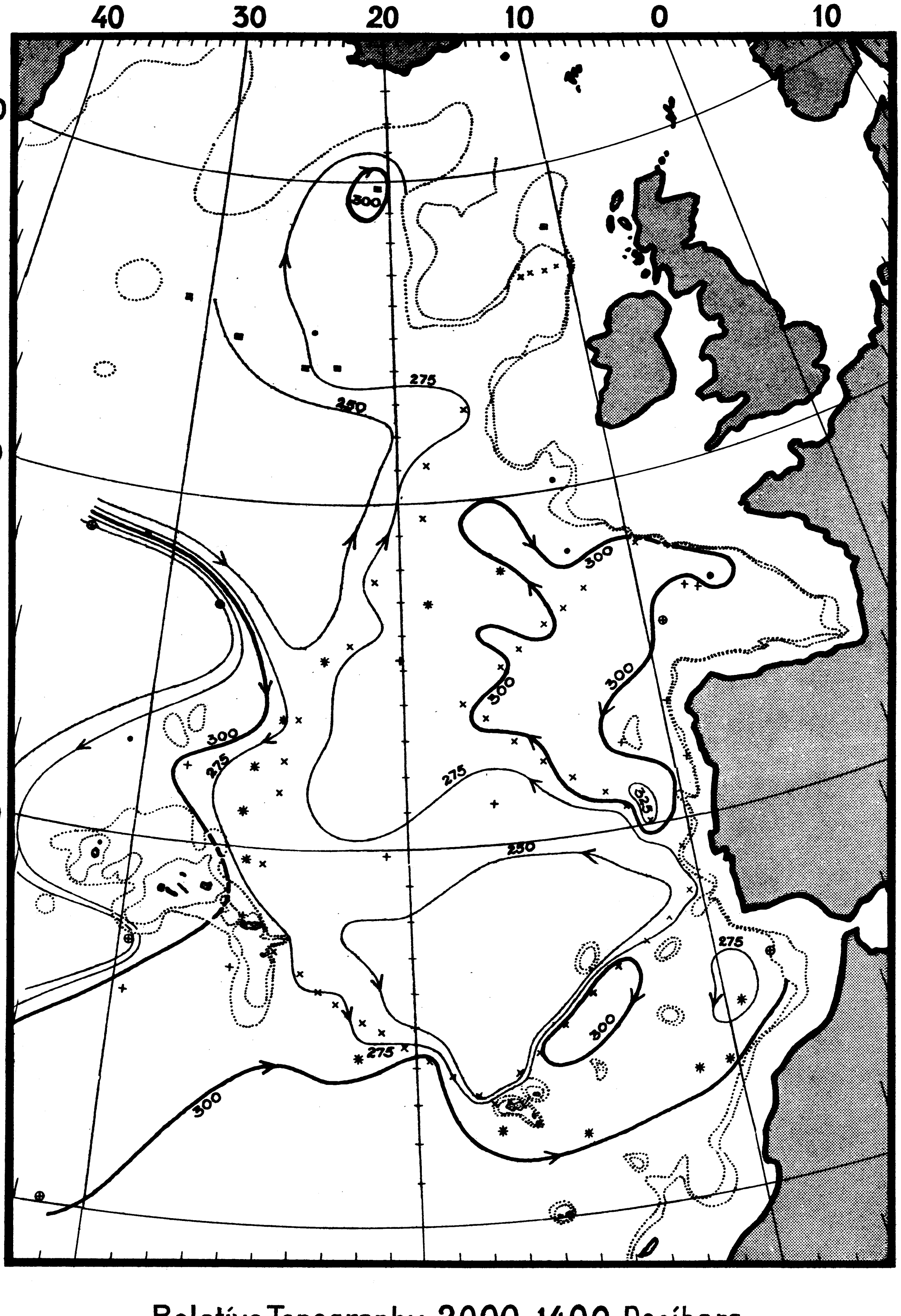
Relative Topography. 2000-<u>800</u> Decibars.



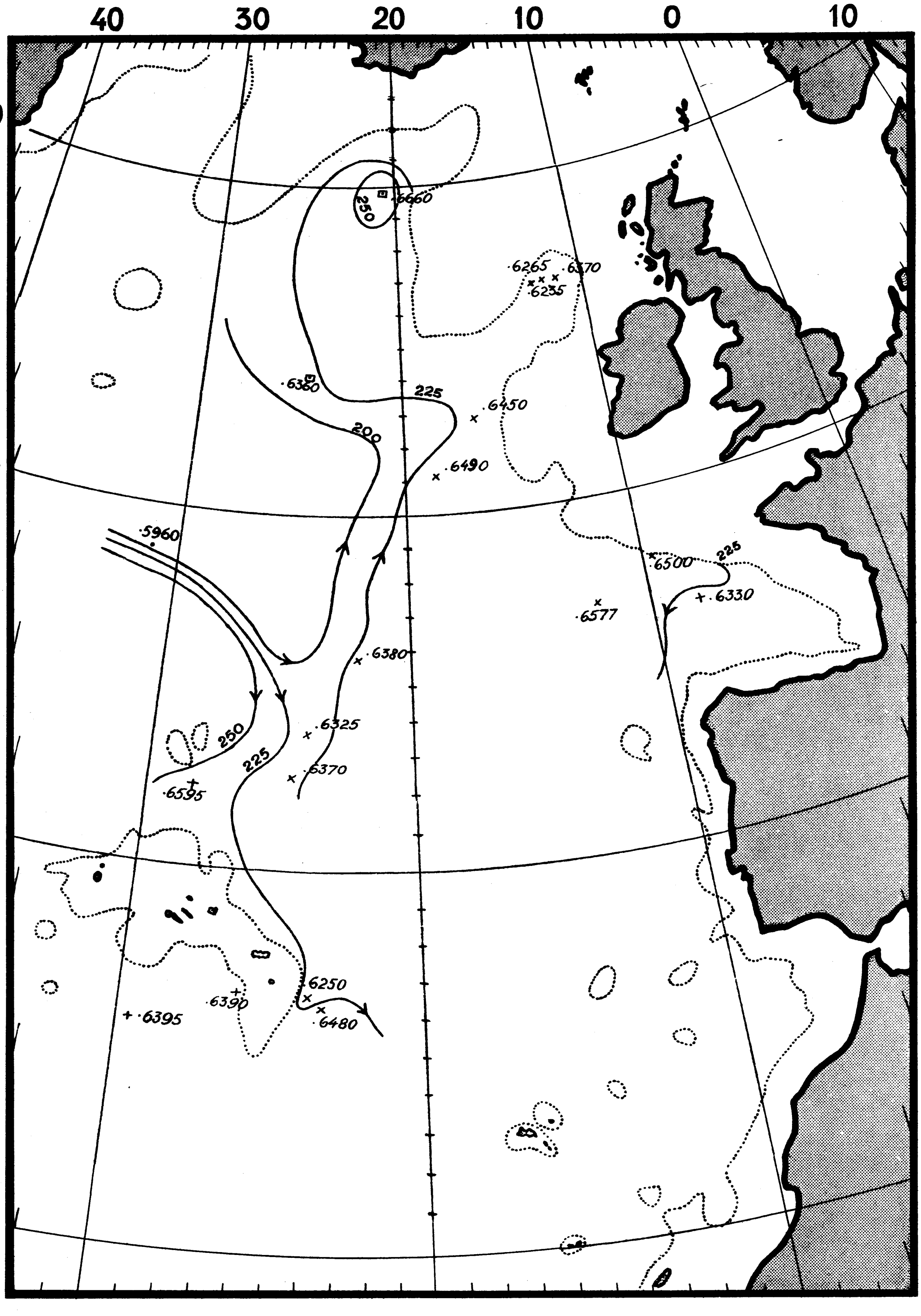
Relative Topography. 2000-<u>1000</u> Decibars.



Relative Topography. 2000-<u>1200</u> Decibars.



Relative Topography. 2000-1400 Decibars.



Relative Topography. 2500 - 2000 Decibars.