III. *The Circulation of the Surface Waters of the North Atlantic Ocean.*

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[Plates 1—4.]

I.

The history of our knowledge of the currents of the North Atlantic Ocean up to the year 1870 has been written once for all by Petermann (1), who in that year published a memoir maintaining, contrary to the opinion of Findlay, Blunt, and Carpenter, that eastern and northern extensions of the Gulf Stream were the prime factors in the circulation. Petermann subjected practically the whole of the material in the way of observations then extant to an exhaustive critical examination, and came to conclusions which are worth quoting, in the summary, inasmuch as the observations of the twenty succeeding years did not seriously modify them:—

1. The hot source and core of the Gulf Stream extends from the Strait of Florida, along the North American coast at all times . . . . up to the 37th degree of northern latitude.

2. Under the 37th and 38th degree of latitude the hot core of the Gulf Stream turns away from the American coast toward the east beyond the meridian of Newfoundland and its banks to long. 40° W. . . . . From there it proceeds to the north-east, diffuses nearly across the entire Atlantic, and surrounds the whole of Europe, to the Arctic and the White Sea of Archangel, with a broad and permanent watercourse . . . . The south-west winds receive their high temperature from the Gulf Stream; and only through the Ocean, not by the winds, can warmth be carried into latitudes as high as those of the European coasts are.

3. The Gulf Stream, as a whole, is as yet but little explored; we only know its influence in some degree. How limited our knowledge of it is may be inferred, for instance, from the fact that there are most contradictory statements of its velocity and strength. A. G. Findlay, one of the principal authorities on the Gulf Stream,

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computed (1869) its velocity as requiring one to two years to reach Europe from Florida, while, according to my computation, two months would suffice. . . . .

4. To conclude from the soundings, obtained so far, the Gulf Stream must be, up to the Arctic Ocean, a deep and voluminous watercourse; if it should not be so, the Polar ice would reach the European coasts. . . . . The Gulf Stream, in its course, is more powerful and steady than all the winds; only the Polar ice and the Polar currents, in spring and summer, exercise a great influence over it. The Polar Stream presses at three places against it; first from the north-west, east of Newfoundland; then from the north, east of Iceland; at both these places the Polar Stream is buried and proceeds beneath the Gulf Stream, after having pushed it off literally to the south-east. But for the third time, at Bear Island, the Polar Stream comes directly against the Gulf Stream, from the north-east, splits it into two or three branches, and in places even presses it beneath its own waters, at least in July . . . .

5. These three conflicts with the Polar currents cause the summer (July) isothermal lines of the Gulf Stream to make deep cuts at the respective places, and to assume a certain concavity of form which will not be found in those of the winter (January). But even if the July curves, when compared with those of January, appear pressed back somewhat to the south, they show, nevertheless, on the whole a very high temperature for the entire Atlantic basin. . . . . A great depression of the temperature of the surface is caused by the Polar Stream descending east of Iceland, and, after its collision with the Gulf Stream, proceeding beneath the latter, principally when reaching the shallow German Sea. It is evident that this branch of the Polar Stream, and the winds blowing from it, are depressing also the summer temperature of a considerable part of Western Germany. . . . . It is pretty certain that a sub-surface Polar current reaches, in summer, from Iceland and Jan Mayen to the German coast, but there have been so far hardly any inquiries made about it. . . . .

6. In winter (January) the Gulf Stream is cut-into much less. The pressure of the Polar Stream at Newfoundland is hardly visible on the chart, the curves being simply parallel with the coasts; east of Iceland a Polar Stream proceeding to the south-east cannot be inferred at all from the observations of the temperature of the sea at Iceland, the Faeroe Islands, Scotland, and Norway, which bear toward each other quite different relations in January and in July. The relations in winter between Bear Island and Spitsbergen are yet unexplored, but we have known for a long time the grand effects of a relatively high-tempered sea up to Spitsbergen and Nova Zembla. . . . . The Polar streams, in conformity with the general laws of nature, are less powerful in the winter than in the summer; the Polar ice does not drift as far southward. . . . . The Gulf Stream is in winter more powerful than in summer; while the Polar streams, so to say, set at rest in some measure, withdraw their ice and concentrate it round the land. . . . .

7. The relations of the temperature of the Gulf Stream within themselves, are

about the same in January as in July. In the latter month the isothermal curve of 7°·5 C. runs from Newfoundland far toward the north, beyond the whole of Europe; it corresponds in general with the January curve of 2°·5 C.; the amplitude of the Gulf Stream, therefore, *i.e.*, the fluctuation between its maximum and minimum temperature (July to January, or August and February) would be, on the average, only about 5° C.

This general description was amplified in many directions by the additional data collected by special expeditions, and by the discussion of surface observations made on board merchant vessels, during the period 1870–90. Amongst the former are to be noted the contributions of H.M.S. "Challenger" (1873–76) (2), which made soundings in the western part of the Atlantic basin; of the Norwegian North Atlantic Expedition (1876), which explored the whole eastern part of the basin up to Spitsbergen; of H.M.SS. "Knight Errant" (1880) and "Triton" (1882), chiefly in the Faeroe-Shetland Channel; the different expeditions to the Polar Seas; the expeditions of the Danish ships "Fylla" and "Ingolf" (1877–79); of the United States Coast and Geodetic Survey (3), especially within the region of the Gulf Stream properly so called; and amongst the latter, the meteorological and hydrographical services of Denmark, Germany, Great Britain, and the United States.

Stated in the most general way, the effect of the increased information was to reduce the relative importance of the Gulf Stream current; it was recognised that while in the first instance most of the stream moving northward near the eastern seaboard of the United States was derived from the region outside the West Indies, and did not pass through the Strait of Florida, that stream did not continue as such much beyond the south-eastern extremity of the Newfoundland Banks (4). At the same time, observations at the higher latitudes, while defining more fully the general northward movement of the waters in the upper layers of the Eastern Atlantic, brought out the unexpected magnitude of the Polar streams moving southward both at the bottom and at the surface. Both results led, after much discussion, to increasing belief in the direct frictional action of wind as the prime factor in oceanic circulation, the gravitational influence of inequalities of specific gravity being relegated to second place, except in the greater depths: this doctrine was finally established by the observations of MURRAY (5) in Scottish lochs.

Up to this point little or no attempt was made to ascertain the limits within which the circulation in different parts of the ocean was liable to periodic or other variations, notwithstanding the emphasis with which PETERMANN had insisted on the need of it. The seasonal variations in the strength of the Gulf Stream, recognised by PETERMANN, and indeed the seasonal variations of all currents except in the monsoon regions, were practically ignored, either because their existence was disbelieved in, or because they were assumed to be so small as to be beyond investigation with the available observations, and therefore too small to prevent any observations being comparable. The only exception to this was the preparation by Meteorological Departments of charts showing the seasonal changes of mean surface temperature, changes which are in part affected, or effected, by variations in the currents, and a few "current charts," showing the mean result of numbers of surface current observations made at different seasons of the year (6). In these cases, however, it was of course necessary to ignore the possibility of irregular or long-period changes, trusting to a sufficiency of observations to give approximate seasonal values from the means.

It seems scarcely necessary to attempt to account for the gradual recognition, during the past decade, of the existence of extensive changes in the circulation of oceanic waters at different times. The discoveries of the "Challenger" Expedition with regard to the geographical distribution of marine organisms raised innumerable questions which demanded fuller knowledge of the physical and chemical conditions than could be obtained by merely extending and continuing observational work along the old lines. The development of a general mathematical theory of atmospheric circulation which agreed with the results of observation in the main outlines, but presented many local anomalies, required more detailed study of the physical conditions of parts of the earth's surface, and especially over the sea, for their elucidation. Lastly, the necessity for the regulation of some of the great fishing industries was becoming increasingly urgent, and it was more and more evident that any such regulation must be based on full scientific knowledge of the physical and chemical conditions upon which, directly or indirectly, the positions of the great fishing grounds had been shown to depend. All these influences worked in the same direction, and the economic importance of the fishery question strengthened the hands of the societies or government departments upon which the expense of further investigation must fall.

The first investigation carried out with the requisite detail and accuracy of method was that undertaken by Professor F. L. EKMAN, who directed the Swedish exploration of the Baltic in the year 1877 (7); and it is to the subsequent labours of Swedish hydrographers, and especially of Professor OTTO PETTERSSON, of Stockholm, that the development of the modern methods of research are very largely due. Put shortly, the outstanding feature may be said to be the application of the idea of the synoptic chart—the survey of the part of the ocean under investigation in such a manner that the physical or chemical conditions in its waters are known at successive instants of time, at intervals sufficiently short to allow of the changes being continuously traced. While allowing a full measure of credit to the Swedish hydrographers in this respect, it is necessary to notice that similar methods were developed independently by the officers of the United States Coast and Geodetic Survey and by Professor W. LIBBEY, Jun. (8), in their work on the Gulf Stream, and by MILL and MURRAY (9) in the Clyde Sea Area, and on various lakes and fjords in Scotland.

As the work of the Swedish hydrographers in the Baltic and Skagerak progressed, they were driven further and further seaward in their inquiries, until, in 1890, PETTERSSON and G. EKMAN (10) began a systematic investigation of the waters of the

North Sea. At the same time, the Swedish scientists, with the support of their government, made efforts to secure the co-operation of other nations interested in the regions under examination, which were so far successful that a preliminary reconnaissance consisting of four sets of observations, at three-monthly intervals, was made during 1893 and 1894 by expeditions sent out simultaneously by Sweden, Norway, Denmark, Germany, and Great Britain. These observations have been worked up and reported on by the directors of the several expeditions, and the results have been combined in a number of important papers by Professor PETTERSSON (11).

During 1891 and 1892 a Danish expedition made important investigations in the seas north of Iceland and east of Greenland, extending a line of soundings as far as Spitsbergen (12).

Although no further joint investigations have been carried on since those of 1893 and 1894, active work has been continued in nearly all the countries concerned. The Danish cruiser "Ingolf," under the command of Commodore C. F. WANDEL, made important investigations in the seas round Iceland and Greenland in 1895 and 1896 (13), and the Danish Hydrographic Office has continued the analysis and prompt publication of observations of surface temperature and of the position of the ice in the northern seas traversed by its merchant vessels (14). Investigations were begun by Norway, under the direction of Dr. JOHAN HJORT (15), in November, 1893, in time to take part in the later of the joint expeditions referred to above, and since then Dr. HJORT has continued his researches, especially with reference to fishery questions, with conspicuous success. Besides these we have the valuable observations made by the Nansen Expedition, and numerous observations have been made by yachts and other vessels cruising in high latitudes. Professor PETTERSSON and his colleagues have continued to follow the changes in the Skagerak and Kattegat. In 1896 some of the stations in the Faeroe-Shetland Channel visited by H.M.S. "Jackal" in the work of 1893–94, and some of the stations of the earlier expeditions near the Wyville-Thomson Ridge, were re-visited by H.M.S. "Research" (16).

Many of these observations, although not made on a preconcerted plan, can be discussed together, and they form a fairly effective continuation of the work of 1893–94, pending a systematic investigation of the whole area by international co-operation.

In tracing the movements of oceanic waters, five elements may be taken into account:—

1. Direct measurement, either by current meter, or by the drift of floating bodies. These measurements are practically restricted to surface movements, and they are attended by difficulties of two kinds; single observations of current from a vessel may be made in merely local and temporary streams, and observations of "drifters" may be affected by errors due to uncertainty of their path, the effect of local drifts in shifting them from one current to another, uncertainty as to the time at which they are found, and so on. The first method gives valuable results where very large

numbers of observations are dealt with, as in the admirable charts published by the Meteorological Office; the second must still be regarded as of doubtful value except where its indications can be very fully controlled by observations of another kind (17).

2. Observations of temperature; important at all depths, but especially at a considerable distance from the surface, where seasonal variations need not be taken into account, and where differences of salinity are extremely small. Temperature observations give as yet by far the most trustworthy information about the slow vertical or horizontal "creep" of waters in the greater depths. In shallow waters near land, temperature observations may be exceedingly difficult to interpret; the oceanic waters tend to have a small annual range of temperature which may vary greatly according to the degree of mixing of the surface waters by sea disturbance, tidal streams, &c., while the normally greater annual range of the land waters is affected by the source from which they are derived, *e.g.*, glaciers, &c.

3. Observations of salinity. In the cases just mentioned, and indeed in all surface waters, the amount of salt affords a surer guide as to movement than does the temperature, provided the determinations of salinity are made with sufficient exactness, chiefly because it is not liable to considerable local or seasonal variations, except by active mixing of waters from different sources. Thus in the open ocean, observations taken in a small area and within a few days of each other may show considerable irregularities of temperature, but the corresponding salinities will agree very closely; hence it is not necessary in the latter case to "generalise" the observations in showing the isohalines, and thereby introduce risk of error due to misinterpretation, to the same extent as in drawing the isothermals.

4. Dissolved Gases. The results of analysis of the gas contents have recently been employed with marked success by PETTERSSON (18) and KNUDSEN (19) in tracing the source of origin of different oceanic waters. It is unnecessary to refer to this in more detail here.

5. Plankton. Qualitative and quantitative examinations of the plankton contained in samples of sea-water have recently, in the opinion of CLEVE and others, proved a valuable assistance to the physical and chemical methods mentioned (20).

In attempting to investigate the movements of water within a given area by applying the synoptic method to the distribution of the elements just enumerated, the limitations imposed are determined by the extent of that area and the nature and rapidity of the changes from the observation of which the movements are to be inferred. Where the changes take place slowly, observations distributed over a considerable period may be regarded as having been made simultaneously in the middle of that period, and treated as in all respects comparable with each other; and further, if with a large number of observations distributed fairly evenly over the "period of observation," we find that the condition revealed by successive sets of observations can be shown to follow naturally from hypothetical continuous changes during the "intervals," we are justified in assuming that we have made a legitimate and adequate application of the method, and ultimately that the supposed changes have actually taken place. A more limited application of the method can be made where sets of observations are separated from others by intervals too long for the assumption of continuous change. Under this heading comes, for example, a comparison of the state of affairs at the same season in different years; which is valuable in that strictly seasonal variations are eliminated, and irregular or long-period changes can be studied by themselves.

The joint observations of 1893–94 were, for the most part, made within a period of a week or ten days, and except in certain localities, or under unusual weather conditions, it was found that, at least in so far as temperature and salinity were concerned, the observations of each set could be treated as simultaneous, and plotted together on curves or charts. Again, the interval of three months was, for the most part, found to be sufficiently short to allow of comparison of each set of observations with its successor, at least in the main outlines (21); and the general nature of the changes in temperature and salinity could be traced.

The net result of these comparisons was to establish, beyond all reasonable doubt, that the variations in the circulation already known to exist in more or less enclosed areas like the Baltic, occurred not only in the comparatively open North Sea, but even in the open channels connecting it with the Atlantic (22); that not only do seasonal variations of wide amplitude take place from month to month, but that irregular variations of probably equal magnitude render the type of circulation markedly different at the same period of different years. These latter variations, about which no chart of *average* conditions can give any information, certainly originate in the waters at or near the surface, and probably involve remote regions of the ocean. Although the existence of irregular variations in the surface conditions of the North Atlantic was recognised by PETERMANN, and probably accounts for the widely divergent views held about the general circulation by scientific men almost up to the present day, as well as for the persistent scepticism of a large number of efficient navigators, the large proportion which they bear to the whole mean movement in circulation has not been realised, and no systematic attempt has hitherto been made to ascertain their nature and extent. The reason for this is perhaps to be looked for in the tenacious hold which the idea of "rivers in the ocean" still retains in the minds of many with regard to currents.

The importance of a knowledge of the changes just referred to was strongly impressed upon me in the course of the work done under my direction on board H.M.S. "Jackal" in 1893 and 1894. Believing that, at least in so far as the open ocean is concerned, the greater part of the information required could be obtained from surface observations, I determined to see if the observations ordinarily recorded in the log-books of sea-going vessels would provide sufficient material for the construction of synoptic charts of temperature and salinity, when, as seemed necessary (partly because of the number of observations required and partly for the sake of comparison with existing charts of "mean" conditions and with meteorological charts) the "period of observation" was extended to one month and the "interval" restricted to the same period. Using data kindly furnished by the Danske Meteorologisk Institut, the British Meteorological Office, and other similar departments, I found it possible to construct, with a fair approximation to accuracy, charts showing the distribution of surface temperature over the North Atlantic during the months of May, August, and November, 1893, and February and May, 1894 (23). The usefulness of these charts, notwithstanding their being altogether of the nature of a first attempt, has been shown by PETTERSSON (24) and MEINARDUS (25). The attempt to construct similar charts of surface salinity was unsuccessful, the material, consisting of rough hydrometer determinations made on board ship, proving, naturally, perfectly worthless. (It was not uncommon to find salinities of 32 and 39 *pro mille* within a few days and miles of each other in the middle of the Atlantic.)

The preliminary experiment being so far successful, it seemed worth while to make a continuous series of monthly temperature charts extending over a considerable period, and if possible to obtain material for adding charts of salinity for the same time.

II. *Material used in Constructing the Charts.*

Having decided to attempt the preparation of charts showing the distribution of surface temperature and salinity for each month of the two years 1896 and 1897, a study of existing charts of mean surface movement and of my 1893 and 1894 charts satisfied me that the parallel of 40° N. lat. should be retained as the southern boundary. The Meteorological Council agreed to furnish me with extracts from logs of all temperature observations made north of that line during the years as they were received. The copying and arranging has been done throughout by Mr. W. G. JAMES, of the Meteorological Office, and the observations extend over 600 sheets, roughly 16,000 observations, forming the greater part of the temperature data utilised. In addition to the Meteorological Office observations the temperature values on the maps published monthly by the Danish Meteorological Department were inserted on the charts, along with occasional data, published and in manuscript, kindly sent to me by the United States Hydrographic Department, the Bureau Central Météorologique de France, and by Professor PETTERSSON. Many of the temperature observations received directly from the observers collecting samples of water were also sent to the Meteorological Office and came to me in duplicate, but a large number of additional observations was received and placed on the charts. In some cases verified thermometers were supplied to observers.

Temperatures were all reduced to the Centigrade scale before charting. Apart from the necessity for making the work comparable with that of workers in other countries, I found the difference of temperature represented by 1° C. better adapted to the work than the smaller Fahrenheit degree; the simpler numbers are also an advantage in charting large numbers of observations, and I found the occasional negative sign no trouble whatever. Taking into consideration the excellent quality of the instruments used, and the general nature of the observations, no attempt was made to correct the observations for either instrumental error or diurnal range.

With the view of obtaining material for constructing salinity charts the following arrangements were made. At my request the Meteorological Council authorised their secretary, Mr. R. H. Scott, F.R.S., to write to a number of the commanders and officers taking temperature observations, asking if they would be willing to undertake the additional trouble of preserving and sending to me samples of the water collected for their temperature and hydrometer observations, in bottles supplied, and to fill up a form with the necessary details as to ship's position, temperature, &c. The bottles, when full, were to be sent to me as soon as the ship reached its nearest point, and were to be replaced by a fresh supply as required.

Favourable replies were received from a considerable number of observers; and this number was added to by observers working for the Danish Hydrographical Department, the officials of which, under Commodore Wandel, took a great deal of trouble in the matter. A number of volunteers were obtained in response to an appeal published in the 'Field' newspaper, amongst whom was the late Sir George Baden Powell. Mr. C. M. Mundahl, of Grimsby, added largely to the material obtained from the regions between Faeroe and Iceland, during 1896, by observations made on board his vessels, and I am indebted to friends for assistance from other observers.

The necessity for restricting the expense connected with the investigation, an important item of which was the cost of carriage of boxes to and from the vessels, made it necessary to keep the number of observers considerably below what could easily have been obtained, and even to diminish the number during the second year of the work. The detailed list of observers is given in Appendix I., and I have to express my most cordial thanks to them for the enthusiasm, skill, and accuracy, with which the work was carried out. In addition to the work of collecting and forwarding the samples, done with one exception altogether gratuitously, I received a number of letters containing valuable hints and suggestions bearing on the interpretation of the results.

The boxes used were each capable of holding thirty 6-ounce bottles, the bottom of the box being lined with felt, and the bottles kept in position by perforated frames, also lined with felt. The tops of the corks in the bottles were exactly level with the top of the box, so as to be in contact with the lid when closed, preventing all possibility of movement, and yet avoiding all need for special packing. The efficacy of the arrangement is apparent from the fact that not one of the 4100 samples was lost through a breakage in transit.

The bottles were made of ordinary blue glass, and were supplied by Messrs. Baird and Tatlock.

A label was affixed to each, bearing a number (1 to 30), and the distinguishing number of its box: these labels were secured by a thick coating of shellac varnish. The corks, which were carefully selected, were soaked in very hot melted paraffin wax, and allowed to drain for a considerable time at a temperature above melting point. Except in cases where the samples had only been a short time in the bottles (as in, *e.g.*, the boxes supplied to R.M.S. "Teutonic"), the corks were stirred together in hot water and dried between each voyage, and all defective or dirty corks replaced. I have not found any difficulty with this method of the nature described by M. KNUDSEN (26), nor have I any reason to suppose that the paraffin could give rise to error in any of the analytical determinations. The trouble caused by particles getting into the pipettes is entirely avoided by taking care to remove superfluous paraffin in the manner described, and in the absence of paraffin particles of cork occasionally find their way into the samples.

As soon as the analyses of each box of samples were examined and booked for charting, the bottles were emptied, thoroughly washed in several changes of warm water, and allowed to drain for at least twelve hours. In view of Instruction *a* (Form A) it was thought unnecessary to attempt further drying.

The details of working were simple. One bottle was filled daily in accordance with the instructions given in Form A (Appendix II.), and the details as to position, &c., filled up in Form B in the line numbered to correspond with the number on the bottle. On the return of the ship to the home port the box was at once sent to Oxford, along with Form C, containing particulars as to forwarding of a fresh box.

III. *The Determinations of Salinity, &c.*

The estimations of salinity of the samples were made, in the first instance, from the amount of halogen contained. My own experience of this and other methods led me to agree entirely with the views so strongly expressed by Professor PETTERSSON as to its superiority; especially in dealing with large quantities of material. The mode of operation adopted was practically the same as that described in a paper published recently by Professor PETTERSSON (27), but a number of details throwing light on the accuracy of the work are of some importance. It is to be distinctly understood that no attempt has been made to obtain the highest possible degree of accuracy of which the methods are capable; the object was rather to work in such a way that the values obtained should be sufficiently close for the geographical purposes of the investigation, and that it should be possible to deal with the large quantities of material in the limited time at my disposal.

The chlorine determinations were made volumetrically with silver nitrate, using potassium chromate as index. The amount of sea-water used for each was 10 cub. centims., the titration being performed with a silver solution of about one-fifth normal strength. The pipette and burette used were made by GEISSLER, the former being furnished with a tap and finely drawn point, and with fiducial marks above and below the bulb, while the latter, also furnished with a very fine point, was divided to 0·1 cub. centim. and read to ·01 cub. centim. by means of a float. After a little practice the delivery of the burette could be easily regulated to ·02 cub. centim. In each determination, the pipette was washed out twice with the sample about to be titrated, and it was always filled direct from the bottle containing the sample.

The volume of the pipettes was ascertained by filling them repeatedly with carefully tested distilled water at different temperatures. The following set of weighings give some idea of the accuracy attained in filling. Pipettes marked ∴ and ⁝—

		Weight of distilled water.	
Pipette.	Temp.	(1).	(2).
∴	7°·3	10·0113	10·0080
⁝	7°·2	10·0118	10·0151
∴	8°·7	—	10·0117
⁝	8°·7	10·0152	10·0130
∴	12°·8	10·0068	10·0048
⁝	12°·8	10·0092	10·0093

These give for volume of pipette ⁝, which was used for the whole of the determinations—

At	7°·2 C.	10·026 cub. centims.
	8°·7 „	10·027 „ „
	12°·8 „	10·025 „ „

showing that the volume of the pipette is constant within limits of measurement throughout the whole range of temperature ordinarily experienced in the laboratory, and that the difference of two fillings is not likely to exceed ·004 cub. centim., a degree of accuracy greater than that required by the burette. The amount of silver solution ordinarily required was something over 25 cub. centims., measured to $\pm$ ·02 cub. centim., whereas the pipette gives $\pm$ ·004 $\times$ 2·5 = ·01 cub. centim.

The determinations of the first 250 samples were made in duplicate, with results as shown by the following half-dozen, taken at random from the laboratory book:—

Sample.	Cub. centims. of silver solution. 1.	2.
11	27·51	27·51
12	25·91	25·91
13	25·59	25·58
14	24·88	24·87
15	28·71	28·72
16	27·56	27·55

These seemed so consistent, and as the work progressed the chance of a serious error failing to be caught on the charts seemed so small, that duplicate determinations were afterwards made of only every fourth or fifth sample, merely to make sure that one's eye was not "out" in deciding on the end-points.

The standardising of the silver solutions with sufficient accuracy gave some little trouble. The silver nitrate was obtained from Messrs. JOHNSON, MATTHEY & Co. as triple crystallised and fused, and notwithstanding very careful testing in various ways, no impurity of significant importance was detected, and in particular no free acid. The solution was made up in quantities of about 5 litres at a time, and each lot was stored in two Winchesters and treated, so far as standardising went, as two separate solutions. The strength of each solution was ascertained by titrating weighed quantities (about 10 grammes) of four different solutions, containing approximately the same amount of chlorine as an average sea-water; two of these solutions were prepared from carefully purified KCl, and two from similar NaCl, and it was arranged that the supply of more than one solution should not run down at the same time, so that each fresh solution should always control, and be controlled by, three old ones. The following specimens, selected at random, indicate the general accuracy obtained :—

	Gramme Cl in 1 cub. centim.
Silver solution No. 24—	
KCl solution A	·006923
,, ,, B	·006936
NaCl ,, C	·006919
,, ,, D	·006930
Mean	·006927
Silver solution No. 65—	
KCl solution A	·007267
,, ,, B	·007259
NaCl ,, C	·007245
,, ,, D	·007252
Mean	·007256

These values are consistent to within ·00002 gramme, again well within the limits required.

In the earlier part of the work, the comparison with some of the Sprengel tube determinations, to be described presently, raised some doubt in my mind as to the real accuracy of the method, and the reason which first suggested itself was the quite distinct difference in the appearance of the end reaction with KCl and NaCl solutions and with sea-water, the last being sharper and showing less tendency to "go back." This seemed to indicate an uncertainty due to a varying personal equation in judging the end-points with the sea-water and with the solutions; but on repeated strength determinations of the same silver solution with the same NaCl solution, it was found that the uncertainty did not exceed 0·1 cub. centim. of the burette, giving as limits

Gramme Cl in 1 cub. centim. . . .	·007747
,, ,, ,, . . .	·007718
	·000029

This satisfied me as to the *consistency* of the strength determinations, but in order to estimate their *accuracy* I compared the mean given by the four solutions (·007724) with the mean of two gravimetric determinations obtained by weighing the AgCl precipitated from 30 cub. centims. of the silver solution, which was ·007722. A further comparison was made by mixing a number of samples together in two lots, A and B, and determining the chlorines by the Dittmar-Volhard method, which gives a better-defined reaction susceptible of "zig-zag" repetition, for comparison with the chromate method, with the following results—

		A.	B.
Dittmar-Volhard . .	1.	19·476	19·523
,, . .	2.	19·470	19·521
Chromate	1.	19·48	19·48
,, ...	2.	19·51	19·50

The following are eight duplicate determinations made with different silver solutions:—

	Cl. Silver solution.			
Sample.	No. 14.	No. 15.	No. 17.	Diff.
592	19·38	—	19·36	— ·02
594	19·48	—	19·47	— ·01
597	19·51	—	19·49	— ·02
599	19·51	—	19·49	— ·02
621	—	18·44	18·45	+ ·01
624	—	19·67	19·69	+ ·02
626	—	19·35	19·38	+ ·03
630	—	19·52	19·56	+ ·04

This gives $\pm$ ·02 as the probable error of any one chlorine estimation. Repeats of the twelve samples 1775—1779, 1787—1790, 1794, 1796, 1797, and 1800, with No. 40, No. 45, and No. 46 gave a probable error for each Cl = $\pm$ ·024.

These experiments, and the further experience gained in the course of the work, gave me perfect confidence in the chromate method for the purpose I had in view. The results seem to show conclusively that without spending the time necessary for the highest degree of accuracy, but merely taking ordinary care, the chlorines of large numbers of samples can be determined with comparatively little trouble, to within the admissible limit of error of $\pm$ ·03.

In working out the chlorine titrations and computing the corresponding salinities, I have employed tables of four-place logarithms, and have in no case gone beyond the second place of decimals in the results. The use of the third figure, which cannot be significant, is misleading, and its absence greatly simplifies the calculations.

Although I was unable to use the material collected for any special investigations into the properties of sea-water, I thought it desirable to determine the specific gravities of a certain number of each batch of samples, partly to get further evidence of the accuracy of the factors used in calculating the salinities, partly to act as a check on the chlorine work, and partly to give warning of any impurity in the samples. Six samples, usually the two saltest, the two freshest, and two others, were, as a rule, taken from each box, after the chlorine estimations were finished, and their specific gravities determined by means of Sprengel tubes containing about 50 cub. centims. The determination was made at 15° C., the tubes being set in a frame immersed in a tank, in which water was kept actively circulating by means of paddles, driven by a small motor. The thermometer used was a standard, made and tested by CASELLA, and repeatedly verified by myself in comparison with standards in use in the laboratory. The tubes were left in the tank for ten to twenty minutes after any change of volume was apparent, and set before the paddle was stopped—the whole time in the bath being thirty to fifty minutes. They were then carefully dried and placed in an open cardboard box beside the balance for some time before weighing.

The general accuracy of the pyknometer method, even when special precautions are not taken to get the best possible results, may be judged from the following, in which the tubes were filled with the same samples 1 and 2 :—

	Sample.		
Tube.	1.	2.	2 re-weighed next day.
1	1026·17	1026·22	1026·24
2	·12	·26	·21
3	·18	·19	·19
4	·13	·23	·19
5	—	·28	·29
6	—	·20	·20

In the case of the second sample the first weighing was made during the damp weather of a cyclone front, and the second under the drier conditions succeeding.

The following is a specimen of duplicate determinations taken in the ordinary course of routine work :—

Sample.	Tube.	$_4S_{15}$. 1.	2.	Diff.
1803	1	1005·12	1005·12	·00
1805	3	07·74	07·74	·00
1809	4	20·15	20·11	+·04
1817	5	20·06	20·05	+·01
1830	6	17·91	17·97	—·06

But these can scarcely be taken as representing the *certainty* of the method in dealing with large numbers of samples. On comparison with the chlorines a Sprengel determination was every now and then found to give a widely different salinity, and repetition almost invariably proved the latter to be wrong. Speaking generally, single Sprengel determinations are much less trustworthy than single chlorines, the possible sources of error in observation are more numerous, and the errors are much less easily detected, while the work is slower and more troublesome. It is worth while to note that thorough rinsing with distilled water before and after each observation, and washing through twice with each sample before filling, is not sufficient to keep the tubes thoroughly clean. A transparent, apparently gelatinous, film is slowly deposited on the walls of the tube, diminishing its volume and very slightly increasing its weight. It was found necessary to wash the tubes thoroughly at intervals with soda and strong nitric acid, drying them in a current of hot air. The following shows the effect of this treatment on a couple of tubes after being in use some time:—

	Tube. No. 3.	No. 4.
Washed with distilled water and dried in hot air: after being in use some time . .	19·4069	20·5916
Washed with soda and water, and dried. .	19·4051	20·5901

differences quite sufficient to affect results unfavourably, although the presence of the film causing it could not be detected by examination of the tube. The occurrence of this deposit was unfortunately not definitely recognised until the work had reached its later stages, and it is possible that its presence may slightly affect the ratios about to be discussed.

Grouping the pairs of values according to the chlorines, and averaging, we get the following table:—

Cl.	No. of samples.	Mean Cl.	Mean $_4S_{15}$.	$_4S_{15}$ from (1) below.
17·00 to 17·99	98	17·640	23·635	23·635
18·00 ,, 18·49	57	18·243	24·478	24·475
18·50 ,, 18·99	43	18·734	25·160	25·160
19·00 ,, 19·49	128	19·327	25·991	25·986
19·50 ,, 19·99	162	19·675	26·489	26·480
20·00 and over	41	20·220	27·239	27·245
	529			

These give the relation between ${}_4S_{15}$ and Cl

$$ {}_4S_{15} = 1{\cdot}399 \text{ Cl} - 1{\cdot}045 \quad (1), $$

a straight line which satisfies excellently the determinations of fifty-two samples in which Cl was less than 17·00 (28).

The samples used as standards in previous work (29) give for the same relation

$$ {}_4S_{15} = 1{\cdot}389 \text{ Cl} - 0{\cdot}805 \quad (2), $$

an equation which gives values agreeing fairly well with (1) for values of Cl met with in open water, but differing to a serious amount for very fresh waters, *e.g.*—

Cl.	${}_4S_{15}$ from (1).	${}_4S_{15}$ from (2).	Diff.
20	26·94	26·97	·03
17	22·74	22·80	·06
5	5·95	6·14	·19

The discrepancy indicates that in the waters of low salinity the chlorine forms a smaller percentage of the total salts in my samples than in those used as standards; the difference may possibly be accounted for by the fact that while in the low-salinity standards the salinity has been reduced by admixture of land water from the Baltic, my samples have been freshened by water from melting ice (30). It seems not impossible that the relative deficiency in chlorides known to exist in surface waters near melting ice may make itself apparent in this way in the North Atlantic, but the differences are so small as to require confirmation by other observers, and it would be quite impossible to deal with differences in variations quantitatively by any known methods. This point will be referred to again in discussing the salinities.

Partly with the object of checking the purity of the water-samples, and partly with a lingering hope that some variation might be found sufficiently large to be useful in studying the circulation, I made determinations of the total sulphates present in a number of the samples received during the first year. The method described by DITTMAR (31) was followed absolutely all through, about 40 cub. centims. (all that could be spared) being taken for each determination. The results are given in the last column of Table I. (p. 117, *et seq.*). The chief interest of these determinations is in the ratio of the total sulphate per kilogramme of water to the chlorine, usually expressed as $\frac{100 \text{ SO}_3}{\text{Cl}}$.

It may be doubted if, under ordinary conditions, the sulphate estimations in sea-water are really trustworthy to much less than 1 per cent. As the chlorines are taken as correct to $\pm$ ·03, we may neglect their errors, and treat the errors of observation in the fraction $\frac{100 \text{ SO}_3}{\text{Cl}}$ as wholly due to errors in the sulphate determinations; *i.e.*, we may take 1 per cent. as the probable error of a value of the fraction. To make this clearer, we may take hypothetical values of Cl and SO_3, such as might be obtained from the examination of one sample, as follows :—

Cl.	SO_3.	$\frac{100\ SO_3}{Cl.}$
19·97	·00236	11·82
19·97	·00234	11·72
20·00	·00236	11·80
20·00	·00234	11·70
20·03	·00236	11·78
20·03	·00234	11·68

Thus we know the value of the fraction to approximately the first decimal place, even with a low standard of accuracy in the sulphate determinations. It would seem, however, that the margin allowed is unnecessarily large, involving, as it does, differences of about 4 milligrammes in weighing in an ordinary sea-water determination. The following duplicate series would indicate that an error of 2 milligrammes, or about $\frac{1}{2}$ per cent., covers most of the errors likely to be made in an analysis :—

Sample.	SO_3.		$\frac{100\ SO_3}{Cl.}$	
	I.	II.	I.	II.
2314	·00238	·00237	11·88	11·84
2318	235	235	11·85	11·86
2326	235	235	11·84	11·86
2331	241	240	11·82	11·77
2337	242	242	11·89	11·89
2338	244	242	11·85	11·78

An examination of some of the values actually obtained confirms this :—

Cl.	No. of samples.	Mean of $\frac{100\ SO_3}{Cl.}$	Probable error of one determination.
15 to 17·5	15	11·77	± ·047
17·5 to 20	20	11·75	± ·055
Over 20	14	11·74	± ·036

i.e., the probable error of any one determination of $\frac{100\ SO_3}{Cl}$ is ± ·05 approximately, or about $\frac{1}{2}$ per cent.

The values of $\frac{100\ SO_3}{Cl}$ obtained for the 322 samples examined were first arranged according to the latitude from which the samples were obtained, with the following result :—

Lat. N.	No. of samples.	Mean $\frac{100\ SO_3}{Cl}$.
Under 50°	139	11·74
50° to 60°	73	11·79
Over 60°	110	11·76

Arranged according to the chlorine contents of the samples, the mean values were :—

Cl.	No. of samples.	$\frac{100\ SO_3}{Cl}$.
0 to 5	2	11·49
5 ,, 10	2	11·64
10 ,, 15	3	11·69
15 ,, 17·5	15	11·77
17·5 ,, 20	286	11·75
Over 20	14	11·74

of which the four samples with chlorine less than 10 may be regarded as untrustworthy, on account of the small amount of the total sulphate weighed.

The net result is to show that so far as the surface waters of the North Atlantic are concerned, the proportion of sulphates to chlorides ($\times$ 100) is 11·754, and that no variation takes place in this quantity which can be determined by these methods. It may be interesting to note here that a mixture of samples collected in the Faeroe-Shetland Channel and North Sea on board H.M.S. "Jackal" n 1893, gave the following values in January, 1896 :—

$$Cl = 19{\cdot}473$$
$$SO_3 = \ {\cdot}00216 \text{ mean of 8 determinations}$$
$$\frac{100\ SO_3}{Cl} = 11{\cdot}10$$

showing a diminution in the proportion of sulphates far beyond possible limits of error, probably caused by reduction of the sulphates by organic matter. It seems therefore necessary that sulphate determinations pretending to high degrees of accuracy must be made from fresh samples.

In calculating salinities (p) from the values of Cl, the tables in the previous work (32) were extended by the formula and constants there employed, and used throughout. As the corresponding tables for obtaining salinity from given values of ${}_4S_{15}$ were computed from formulæ based on an extension of the same data through the chlorine values (33), the values of p obtained from the chlorines (p Cl) and from the Sprengel determination (p S) are not independent. As I fully expected when the work was begun that the ratio ${}_4S_{15}/Cl$ found for the standard samples (34) would hold good all through, the differences in the values of p Cl and p S seemed an easy method of checking the purity of the samples, and the accuracy of the work as it progressed. The following table gives the mean values of these differences :—

p.	No. of samples.	Mean diff. Δ p Cl − p S (*pro mille*).	r.	R.
0 to 5	5	+·17	±·06	±·03
5 „ 10	9	+·17	·05	·02
10 „ 15	7	+·13	·04	·01
15 „ 20	4	+·15	·02	·01
20 „ 25	4	+·12	·07	·03
25 „ 30	12	+·13	·06	·02
30 „ 35	183	+·03	—	—
Over 35	270	·00	·07	·00

The actual values of the differences correspond, of course, to the difference of density and chlorine ratios found, and indicate that while the values of p obtained from the chlorines are substantially correct within limits of error of observation for salinities above 30 *pro mille*, the values for fresher waters are too high by an amount rising to nearly 0·20 in waters below 5 *pro mille* salinity. So far as this inquiry is concerned, these errors are altogether negligible, as isohalines lower than 30 *pro mille* rarely appear on the charts, and when they do the number of observations is never more than sufficient to merely indicate their position roughly; indeed it seems very unlikely that in oceanic waters, sufficiently fresh to make it worth while to take the differences into account, the distribution of salinity would require so great refinements for its elucidation.

If we accept the mean values of Δ in the third column as correct, and allow for them accordingly, the second differences afford a measure of the combined errors of the chlorine and Sprengel determinations; the values of r give the probable error of one observation of the difference Δ, which amounts to about ± 0·05. The quantity R is the probable error of the values of Δ.

Table I. gives particulars as to the samples, and the results of the various determinations. The first column gives the "Laboratory Number" assigned to each sample on its receipt; the next the name of the vessel; the next two the date and hour of collection; the next two the latitude and longitude at time of collection; the next the surface temperature observed; the next the amount of chlorine estimated; the next the salinity calculated, by table (35), from the preceding; the next the ${}_4S_{15}$ from Sprengel tube. The last column gives the amount of SO_3 in grammes per kilo.

The working charts, upon which the temperatures and salinities were plotted, were drawn on MERCATOR's projection, to a scale of 1° long. = ·37 inch; each chart was divided into four sheets. After the plotting of the observations was completed the lines were drawn in in pencil and carefully revised three times, first independently, and then in comparison with the charts for the months preceding and following. The lines were then transferred, point by point, to blank maps, reprints of part of the Polar chart used in the "Challenger" Reports. These were then photographed and a set of prints coloured. From these Plates 1–4 have been prepared. In numbering the lines on the Salinity Maps the first figure and the decimal point have been omitted for all salinities over 30·00 *pro mille*—thus 34·5 appears as 45, and so on. Salinities below 30·0 are given in full. The colours used are as follows:—

Salinity	36·0 or over	dark blue.
,,	35·0 to 36·0	middle blue.
,,	34·0 ,, 35·0	light blue.
,,	33·0 ,, 34·0	dark green.
,,	32·0 ,, 33·0	light green.
,,	31·0 ,, 32·0	dark red.
,,	30·0 ,, 31·0	middle red.
,,	Under 30·0	light red.

The scale of temperature is:—

Over 25°	dark red.
20° to 25°	light red.
15° ,, 20°	yellow.
10° ,, 15°	green.
5° ,, 10°	light blue.
0° ,, 5°	middle blue.
Below 0°	dark blue.

In both the Temperature and Salinity Maps intermediate lines have been drawn where the observations seemed specially well able to define them, or when they seemed to throw additional light on the distribution (36).

IV. *The Distribution of Temperature and Salinity in the Surface Waters.*

January, 1896.—The observations for this month are limited to an area bounded by the 40th parallel and a line joining the Newfoundland Banks and the Faeroe Isles. The isothermal of 15° appears north of 40° N. lat. between the coast of Portugal and 35° W. long., and again between 60° and 65° W.—the mean position of the axis of the Gulf Stream (37). The 10° isothermal cuts the 40th parallel in 50° W., and again in about 60° W., further defining the head of the Gulf Stream; the observations do not define the course of the 10° line between 40° and 50° W., but at 40° it reappears in 50° N. lat., following that parallel to about 22° W., where it swerves up to 55° N. to enclose an area of relatively warm water S.W. of the British Isles, turning south again some distance from their western coasts, and just touching the S.W. point of Ireland. Between the two areas outlined by the 10° isothermal an area of cold water extends S.E. from the Newfoundland Banks, the line of 5° runs to about lat. 48° N., long. 43° W., and then turns W., keeping well to the south of

Newfoundland and the Gulf of St. Lawrence, and approaching the coast between Nantucket Island and New York. Temperature falls quickly on the land side of the 5° line, especially to S.E. of Newfoundland. The isothermal of 7° fits into the loop of the 10° line when the latter follows the 50th parallel, *i.e.*, east of long. 40° W.; it indicates that the temperature gradient is turned southward rather than south-eastward.

On the eastern side, clear of the land, the distribution of temperature is extremely uniform. Temperature falls from 15° to 10° in 15° of latitude; the position of the 9° line is ill-defined. The lines of 7° and 8°, however, indicate that the fall becomes more rapid to north and west of the Faeroe Islands. The Faeroe-Shetland Channel is marked by an axis of over 7°, and a similar axis extends into the North Sea between Scotland and the Shetlands.

The distribution of salinity shows the same general features as that of temperature. On the western side the line of 35 *pro mille* closely agrees with the 10° isothermal in defining the northern border of the Gulf Stream, while the line of 36 *pro mille* agrees with that of 15°. On the eastern side the 36 *pro mille* line again agrees with the 15° isothermal, but the salinity remains about 35 over the whole area covered by the observations up to the Faeroe Islands. The head of the 10° line and the position of that of 7° in mid-ocean are reflected in the form of the line or 35·4 *pro mille* salinity, and again in the detached part of the 35 line running east from lat. 50° N. long. 40° W. The band of low temperature running S.E. from the Newfoundland Banks is represented, but in a much more marked degree, by water of low salinity; there is a steep gradient from 35·0 to 30·0 on both sides, and water of 34·0 extends down to lat. 40° N., and apparently spreads westward along the southern border of the Gulf Stream.

Thus we have in lat. 40° N. two surfaces of almost equally warm and salt water, one on each side of the Atlantic. One—the Gulf Stream water—stops off the land near the deep water line to the south of the Gulf of St. Lawrence; the other extends northwards along the coast of Europe, as far as the observations go, in a steadily narrowing tongue, and westwards to about long. 40° W. These two surfaces are entirely separated, down to 40° N., by a band of fresher colder water, stretching S.E. from the Newfoundland Banks.

February, 1896.—The observations for this month are increased by a line to Reykjavik.

In the lower latitudes the isothermal of 15° now follows the parallel of 40° N., except between about 12° and 22° W. long., when it bends slightly southward, and between 40° and 45° W., where there is a turn northward. The line of 5° has moved southward, but retains practically the same shape as in January. Temperature gradients have thus become much steeper west of 40° W. long. In mid-Atlantic the distribution of temperature shows little change, but in the eastern part of the ocean there is a tendency to equalisation; the water is slightly colder off the coast of Portugal, and apparently warmer between Faeroe and Iceland, the line of 8° having moved northward. Water of 8° or more now occupies the Faeroe-Shetland Channel, but the 8° line does not enter the North Sea. The two parts of the 10° isothermal have not altered their positions much, but they are now joined together by an almost straight line.

The salinity line shows similar changes of form. The line of 34·0 salinity occupies nearly the same position south of the Gulf of St. Lawrence and west of Newfoundland, but south-east of the Newfoundland Banks it does not extend so far south, the two parts of the line being now joined by a nearly straight portion. Water of 36 *pro mille* salinity appears north of 40° N. in patches, as far east as 40° W.; between 40° and 50° W. the fresh waters have entirely disappeared from the low latitudes. Little change is apparent in the eastern Atlantic; the 35·5 line is a little more to the north, and the 35·3 line stretches from Iceland to the Faeroe Islands, and forms a loop extending well into the North Sea. The low temperatures and salinities south-west of Iceland are to be noticed

The most important changes are thus, the advance of a warmer and salter area into the region north of lat. 40° N. and between long. 40° and 50° W., and a very slight northward extension of warmer and salter water along the whole of the European coast.

March, 1896.—The isothermal of 15° now appears north of 40° N. lat. only in mid-Atlantic; the position of its eastern portion remains almost unchanged, but it has retreated southward off the Gulf of St. Lawrence and the American coast. In this region the 5° and 10° lines are somewhat fuller to the south-east, and the gradient below 5° has become steeper, apparently on account of an extensive southward movement of ice-cold water from the Gulf of St. Lawrence and east of Newfoundland. In mid-Atlantic there is little or no change, and in the eastern part the conditions are the same as far north as 60° N., but north of this and east of 30° W. there is a marked fall of temperature, averaging about 1° between East Iceland and the Faeroe Islands. Temperature seems to have risen considerably to the west of Iceland.

Salinity observations are unfortunately not very well distributed for this month, the south-eastern part of the area being unrepresented. The most marked change is the advance of the 36 *pro mille* line to a point in about lat. 50° N. long. 10° W., off the south-west of Ireland, apparently due to a continuation north-eastwards of the movement of this line indicated by the comparison of the January and February maps; the angle formed by the 36 line is fairly acute; in all probability it may be supposed that it crosses long. 20° W. in about lat. 45° N. In the Western Atlantic the fresher waters appear further to the eastward; south-west of long. 50° the 36 line has disappeared. In the north-eastern region there is a slight but distinct freshening of the water; the line of 35·5 now scarcely goes north of lat. 50° N., and between Faeroe and Iceland the line of 35·2 replaces that of 35·3, and the latter does not now appear in the North Sea.

There is thus a marked lowering of temperature and salinity in the western region, a strong increase of salinity without any corresponding change of temperature in the south-eastern region, and a distinct lowering of temperature and salinity in the north-east.

April, 1896.—The area covered by the observations for this month is largely increased by the records of the whaler "Active," and vessels trading to Greenland.

In the south-west the isothermal of 15° reappears in the Gulf Stream region, and north of this the temperature gradient is exceedingly steep, for the 5° line retains the position of the previous month. Further east, in long. 50° W., temperature has fallen, the 15° line disappears, the 10° and 5° lines are packed close together, and the 0° isothermal comes down to lat. 45°. In mid-Atlantic the 15° line has moved northward, chiefly in the region of long. 25° to 30° W., where it appears in about lat. 45°, and it continues in lat. 40° to 42° to the Portuguese coast. There is a distinct rise of temperature west and north-west of the British Isles—the 10° isothermal touches the north-west of Ireland, and the 8° line has recovered its February position. The 5° line starts at the south-eastern corner of Iceland, runs to just north of the Faeroe Islands, turns north-east till it cuts the meridian of 0° in about lat. 64° N., and then goes north to lat. 70°, where it turns eastwards. The line of 0° follows a similar course somewhat to the north-west of the 5° line, but north of 72° it bends repeatedly, recrossing the meridian of 10° E. several times, the warmer water lying always to the eastward.

Temperature has apparently undergone little change to the west of Iceland, the 5° line starting from about the middle of the western coast. To the south and south-west of Greenland the isothermal forms a tongue pointing W. and N.W., temperature 0° to 5°; further up Davis Strait there are very low temperatures near the land.

In the eastern region the chief changes in salinity are a marked fall off the coast of the United States and a rise in about long. 58° W., making the lines run more S.W. and N.E., and packing them closer together. Between the 40th and 50th meridians all the lines have moved south-eastward, the 36 line a little, the 35 and 34 lines more, hence the gradients are steeper. In the south-eastern region the position of the 36 line last month is confirmed, and the 35·5 line remains unaltered.

A narrow belt running through the Faeroe-Shetland Channel, and apparently widening out beyond it, is enclosed by the 35·3 line. The 35 line skirts the coasts of the North Sea and the entrance to the Skagerak, and then sweeps westward to the meridian of 0° in about lat. 64° N. before finally turning N.E. Another branch of it runs close to the south of Iceland, and then apparently turns slowly to the north-east to form the north-western border of a wide belt which runs eastward to the north of Norway and spreads northwards and westwards to Spitsbergen and the meridian of 10° E.

It would seem that between Iceland and the Faeroe Islands the freshening of the surface water noticed last month continued; and that west of Iceland salter waters appeared farther north. The S-shaped form of the 35·0 and 35·3 lines in mid-Atlantic is one of the most important features of this chart, being a complete change, at least for the latter, since the previous month, and representing an increase of salinity over a wide belt just south of lat. 60° N. The westward-pointing tongue formed by these lines is continued into Davis Strait by the 34·5 and 34·0 lines.

Apart from the increased information afforded by this map, the most important features are—marked steepening of gradients, both of temperature and salinity, on the American side; extension of the cold and fresh area south-eastward, between long. 40° and 50° W.; absence of any change in the south-eastern region; slight freshening and steepening of temperature gradients east and south-east of Iceland; sudden extension of a salter area westwards just south of lat. 60° N.

May, 1896.—This month is marked by great rise of temperature, especially in the lower latitudes, with the advancing season. In the Gulf Stream region the isothermal of 20° reaches the 40th parallel between 55° and 65° W. long., and further east the 15° line runs up to lat. 50°. The 10° and 15° lines have again closed in south-east of Newfoundland, by a change like that between January and February. The 5° line has not moved much, but the water between it and the coast has become warmer, the line of 0° now only appearing off Cape Race. In mid-Atlantic the rise of temperature only appears south of 50° N. lat., the 12° and 15° isothermals have moved up, but the 10° line remains unchanged. East of long. 30° W. the distribution has become more complex, there is everywhere a rise of temperature—the 15° line comes up to 50° N. lat., and near to the entrance to the English Channel, the 12° line touches the north of Ireland, the 10° line runs up to 60° N. north-west of Scotland, and the 8° line nearly takes the place of the 5° line east of Iceland, although the latter has been very little displaced. But the *form* of the isothermals has altered considerably, the axis of maximum temperature in the Faeroe-Shetland Channel has become more strongly marked—note the two 9° lines, and the "head" of the 10° line—the 8° line is bent sharply round at the Faeroe Islands, and to south-east and south of Iceland the rise of temperature from last month is relatively small. West and south-west of Iceland the isothermals form a small wedge pointing northwards, while on both sides of the southern extremity of Greenland temperature seems to have fallen somewhat. On the west coast of Greenland temperatures are higher north of about 62° N.

Off the coasts of New England and Nova Scotia the fresher waters have retreated closer to the land, and the 36 line re-appears. There is little change off the Newfoundland Banks, but in the lat. 45° to 50° N. long. 40° to 45° W. area the salinity is greater. In the south-eastern region the 35·5 line retains its position, but east of long. 20° W. the great bend of the 36 line has disappeared, and the line runs straight on to the middle of the Bay of Biscay.

North of 50° N. lat. the 35 line has moved nearly 10° to the west, and it now runs nearly straight south along the meridian of 40° W. In the region between Norway and Iceland the lines have become much crowded together; a patch of water of over

35·2 north of the Shetlands protrudes into the North Sea, and north of the Faeroe Islands has narrow ridges running out N.E. and S.W. Salinity falls rapidly to below 33 *pro mille* between this patch and the Norwegian coast, and a tongue of water below 35 runs south-eastwards from the east of Iceland. There are indications of increased salinity to the west and north of Iceland and along the west coast of Greenland, but the April observations are insufficient to make this quite certain. It is probable that the 34 line reaches a much higher latitude in Davis Strait and keeps nearer the Greenland coast, and that the 35 line west of Spitsbergen has moved westward.

Thus the main features are—great increase of the seasonal element in the changes of temperature; closing in of warmer and salter water towards the land on the American side; equalising of salinity in the south-east; great freshening of water off the Norwegian coast and between Iceland and the Faeroes; probable increase of salinity west of Iceland and Greenland.

June, 1896.—The rise of temperature in the south-western region continues, but the distribution has now become very irregular—the isothermals probably representing only the general features of complex changes. The isothermal of 20° follows the parallel of 40° N. as far east as 35° W., the 10° line skirts the edge of the deeper waters, and the 5° line appears close to the south coast of Newfoundland, and again out to the eastward. Temperature has risen slightly in the south-eastern area, the line of 18° now appearing near the 40th parallel, but the 15° has scarcely moved, except near the land, where there is a marked rise.

In the north-east, the 10° line now follows the 60th parallel from long. 25° W. to long. 10° W., where it turns up into the Faeroe-Shetland Channel, defining a narrow belt of warm water west of the Shetlands. Temperature has risen a little between the Faeroes and Iceland, and east of Iceland, and the band of cold water is rather less clearly marked. West of Iceland a large rise has taken place, the 8° line taking the place of the 5° line and sweeping well out to sea, while to the north-west and north the 5° line replaces that of 0°.

South-east of Cape Farewell the 9° line retains nearly its last month's position, while the 5° bends far to the westward. West of Greenland, in lat. 60° N., temperature has risen 3°, further north there is little or no change along the coast. North of 70° N. temperatures are highest near the American coast, in the freshest waters.

South of Spitsbergen the temperature falls rapidly from 5° to 0° towards the east and north-east, slowly towards the west and north-west.

West of long. 50° W. salinity has diminished—the 36 line has disappeared, and the 33 line is crowded close down to the 35, which, however, has scarcely moved. In the lat. 40° to 50° N., long. 40° to 50° W. area, the increase of salinity noted last month continues, the 33 to 35 lines now running north and south, slightly to the east of long. 50° W. East of this area, salinity has increased, both the 36 and 35·5 lines being again convex northward, but this is partly due to a decrease of salinity in the Bay of

Biscay and off the Portuguese coast. Between 50° and 55° N. lat. the 35 line has moved eastward, almost to its old position, and it is closely followed by the line of 34·5.

Salter waters cover a large area to the eastward and northward, the 34 line touches the Norwegian coast, and the 35 line presses it closely. The lines of lower salinity (33 and 34) have retreated somewhat to the east of Iceland, and salter water extends up to the south coast of that island (line of 35·2). West of Iceland there is an immense increase of salinity; the 35 line, which has the same position as last month in lat. 60°, runs almost due north to the coast of Greenland.

Salinity has apparently increased considerably in the northern parts of Davis Straits. It seems likely that the 35 line should more closely follow that of the 34 west of Spitsbergen.

The general features are thus—lowering of salinity with irregular rise of temperature in the south-west; increase of salinity in the south (middle) and south-east; spreading of salter area in the Faeroe-Shetland region, and more especially towards the Norwegian coast; great increase of salinity west of Iceland; and lowering of salinity in mid-Atlantic just north of lat. 50° N.

July, 1896.—The isothermal of 25° now appears north of 40° N. lat. between about 52° and 64° W. long. The 20° line starts from New York and runs eastward very close to the 25° line, and between it and the land the distribution of temperature is very irregular, with warmer and colder patches, but rarely falling below 10°. East of Newfoundland there is a considerable area of water between 5° and 10°, and off the Labrador coast temperature seems to keep below 5° far to the eastward.

In the middle south region the surface is warmer generally, the line of 20° appears in about lat. 42° N. and the 15° line follows the 50th parallel. The 20° line runs eastward to the Portuguese coast, while the line of 15° goes north-east to the north of Ireland.

West and north-west of Scotland there is a further rise of about 1°, but the 10° and 12° lines continue the sharp bend towards S.E. shown by the 8° and 9° lines in the previous months. Except for a narrow band close to the land, the whole area between East Iceland and Norway is now about 5°, the 5° line cutting the 70th parallel in about long. 5° W., whence temperature falls to 0° off the Greenland coast. West of Iceland temperature rises to 10°, and the cold waters are apparently only met with close to the land. Temperatures are also considerably higher towards the eastern side of Davis Strait.

South of the American coast, as far east as long. 50° W., there is little change in the distribution of salinity, but to the south-east of Newfoundland the fresher waters extend much further eastward, the 35 line having moved nearly to long. 40° W. East of Newfoundland, in lat. 50°, the lines have opened out, the 34 line is further to the west and the 35 line further east. From long. 40° W. the 35 line takes another bend eastward to long. 30°, recurving in a wider loop than before to the same position as last month in lat. 57°. This change of form is closely followed by the line of 34·5.

In the south-eastern region the increase of salinity noticed last month is continued, the 36 line almost reaches the mouth of the Channel, and the 35·5 line takes a fuller northerly bend off the west of Ireland.

Observations are unfortunately not numerous in the Orkney and Shetland region. A central axis of 35 water probably extended far south into the North Sea during both June and July. East of Iceland the water is fresher, and a narrow strip of water of less than 34 *pro mille* salinity runs along the south coast of the island. The belt of 35 water to the west of Iceland is apparently narrower, but the observations do not make this quite clear.

The observations in the north of Davis Strait do not indicate any marked change.

The principal features are thus, continued rise of temperature everywhere, without much change in distribution, except to the south-east of Newfoundland, where the rise is slight; a slight increase of salinity in the south-eastern area; marked freshening east and south-east of Newfoundland and in mid-Atlantic between lat. 50° and 55°; freshening and narrowing of the low-salinity belt east of Iceland, and extension of that belt round the south side.

August, 1896.—In the south-western area, under the land, the distribution of temperature is much simpler. The position of the 20° and 25° isothermals is little changed, but instead of irregular patches of colder water there is a steady fall towards the north-east to 12° just off Cape Race. This means on the whole a considerable rise of surface temperature in the shallower waters. There is a great rise of temperature to the east of Newfoundland, but the area of relatively cold water retains its position, and its form is better defined by the greater number of observations—note the loops in the isothermals of 8°, 10°, 12°, and 15°.

Between the meridians of 30° and 50° W., the isothermal of 20° remains in its position near lat. 50° N., but the temperature has increased further south, the 20° line being now close to it. To the north of lat. 50° there is a very marked change of temperature, the 10° line has moved northward and westward and straightened out, closing in towards the coasts of Labrador and Greenland, while the 8° line, parallel to it, almost touches Cape Farewell.

In the south-eastern area temperature is practically unchanged, but to the west of Ireland it has fallen, causing the 15° isothermal to follow the 50th parallel closely for nearly 30 degrees. The line of 12°, which further west has moved somewhat to the north-west, following the 10° line, remains in the same position to the north and north-west of Scotland, but it has moved far to the eastward from the Faeroe-Shetland Channel, changing from a V to a U shape, and leaving an area with a temperature of 10° or less. This area probably extends far northward and eastward over the Norwegian Sea; the line of 9° reaches long. 30° E., and temperatures over 5° occur far along the north coast of Europe, and again south and west of Spitsbergen. North and east of Iceland the distribution of temperature has probably undergone little change.

Between Iceland and Greenland the cold-water area has increased, the line of 10° having moved to the north-east. Temperature seems somewhat higher in the middle of Davis Strait, but there may be more ice-cold water close to the coast of Greenland.

Salinity observations are unfortunately almost wanting for August along the parallel of 40° N. and 60° N. In the southern latitudes there seems to be little change. The line of 33 *pro mille* is in nearly the same position west of long. 50° W., but the 32 line is no closer to the land. The ends of the 34 and 35 lines in lat. 46° N. are in the same place as last month, and the part of the 36 line shown is also unchanged. In lat. 50° N. the 35 line is bent a little more to the south, and the 35·5 line more to the east, indicating a further lowering of salinity towards south and east. Salinity seems to have increased slightly off the mouth of the English Channel, and a tongue of 35 water protrudes further through the Straits of Dover into the North Sea. The axis of 35 extending into the North Sea, from the north, has withdrawn somewhat.

South of Iceland, the line of 35 salinity has moved closer inshore, and off the Faeroe Islands its position is also a little more to the north. The form of the line has, however, changed; it now runs out to the east, greatly narrowing the belt of water over 35, and the 34 line east of Iceland has moved southward and taken a similar form.

The line of 35 follows the coast of Norway, packing the 34 and 33 lines close in between it and the land, and forms a loop south of Spitsbergen in about long. 20° E.—which bends round westward and probably joins the other part of the line by following the meridian of 0°. An isolated patch of 35 water appears north of the White Sea.

A considerable freshening has apparently taken place to the north of Iceland, and there now seems to be no 35 water between Iceland and Greenland. It appears also from the form of the 35 and 34·5 lines that a considerable lowering of salinity has taken place in the area to the south-east of Cape Farewell.

The principal changes are therefore—small changes in the low latitudes; equalisation of temperatures and salinities west of long. 50° W.; slight rise of temperature in mid-Atlantic; the colder fresher waters form a wider belt to the east and south-east of Iceland, and they occupy more of the Denmark Strait and the area east of Cape Farewell; temperature has risen in mid-Atlantic between 50° and 60° N. lat., salinity has fallen a little in the southern part of that area, and more in the northern.

September, 1896.—In the south-west the 25° isothermal follows the 40th parallel from long. 50° W. to long. 70° W., and between these meridians temperature is unchanged northwards to the land, except for a very narrow strip of cold water (under 15°) close inshore. This strip extends westwards, south of Long Island to New York, bending the 20° line southward, and eastward and south-eastward past Cape Race, where it deflects the 15° and 20° lines southward.

Temperature is practically unchanged in the middle and eastern Atlantic between lat. 40° and 50° N.

Between lat. 48° and 55° N. the principal changes are in the west and north-west: lower temperatures prevail eastward from the coast of Labrador, and to the south-east off Newfoundland, and north-east the form of the isotherms has undergone a marked change, tongues of colder water pointing S.E. and E. respectively. Note especially the changes in the 10°, 9°, and 8° lines.

South of Greenland, temperature has risen: there are loops to the westward in the 8° and 9° lines. The rise of temperature extends north into Davis Strait: note the change of form and position of the isothermal of 5°.

To the west and south-west of Iceland temperature has fallen further, the 10° line does not now touch the west of the island at all. East of Iceland temperature has fallen considerably, and the cold area seems to have extended. A uniform general fall seems to have taken place in the Norwegian Sea up to high latitudes.

Comparing the salinities in the lower latitudes with both July and August; the salter waters appear further north; the 33 line has moved up towards the north-west of long. 55° W., and the gradients have become very steep, the 36 line pressing close up in long. 60° W. In long. 50° the isohalines bend southward, and there is a marked freshening of water south-east of Newfoundland; the 34 line now touching the 40th meridian.

In the south-eastern region the 36 line remains unmoved, but salinities of 36·5 appear near the Azores.

Along the whole length of a belt about 2° or 3° on each side of a line joining lat. 50° N., long. 40° W. with the west of Scotland there is everywhere a marked lowering of salinity: the 35 line is moved about 5° to the east, and the 35·5 line disappears from the area altogether. To the north of this there appears to be a slight increase of salinity across a strip which is widest south of Iceland, but extremely narrow further west. South-east of Greenland the area of fresher water seems to have extended, although the observations are insufficient to be certain of this. East of Iceland and south of Spitsbergen the 35 line has retreated southward.

The chief changes are thus—in the south-west a rise of temperature and salinity at the head of the Gulf Stream: and the appearance of a colder fresher band close to the land, which extends east and west; increase of salinity with small change of temperature in the south-east; slight fall of temperature and marked fall of salinity southwards and eastwards from the east of Newfoundland, and right across the middle belt of the Atlantic to the British Isles; fall of temperature and salinity east of Iceland, south-east of Greenland, and in the north round Spitsbergen.

October, 1896.—In this month the seasonal changes of temperature are again strongly marked. Temperature has fallen considerably near the 40th parallel west of long. 50° W., except in about long. 65° W., where the 25° line still appears. Near land the fall averages about 4°, and the 10° line now clears the south of Newfoundland.

East and south-east of Newfoundland there is a very great fall of temperature; the 20° line is cut through, and the 15° line bends south to lat. 42° N.; the curve of the 10° line has filled out, and moved a long way to the east.

In the lower latitudes the fall of temperature becomes less as we go eastward—till near the Portuguese coast. Near the Azores temperature is unchanged. The 15° line has moved irregularly southward except in mid-Atlantic, where it remains stationary. The 10° line has moved southward, and changed its form, since the greatest change has taken place west of the Faeroe Islands and of long. 30° W. Temperature has fallen considerably west of Iceland and in Davis Strait, and south of Greenland the distribution has become more uniform—note the form of the line of 7°.

Salinity does not appear to have changed much west of long. 50° W., except for a slight increase south of the Gulf of St. Lawrence. Between 50° and 40° W., however, the isohalines up to 35·5 have crowded together to the N.W. East of this the 36·0 line and the 35·5 lines have moved northward, and there is a marked increase of salinity east of 20° W. long. up to the south-east of Iceland. Note the position of 35·3. The 35 line is also pressed towards the coast of Norway, and there is apparently a large surface of 35 water in the North Sea. Salinity has also increased to the west of Iceland.

South of Greenland there is a freshening of the surface water, the bends of the 35 and 34·5 lines retain the form shown last month, but very much compressed, and driven southward and eastward. Salinity has probably diminished in Davis Strait—at least since May, the last month with adequate observations.

The chief points, besides the marked seasonal fall of temperature, are—great fall of temperature and salinity southward on the meridian of 50° W.; increase of salinity towards the north-west, and relatively small change of temperature east of that line; increase of salinity between Scotland and Iceland, in the North Sea, and west of Iceland; lowering of salinity and equalisation of temperature in the central region south of 60° N. lat.

November, 1896.—In this month the seasonal change becomes still more marked, and, as in the season of rising temperature (May), the distribution of temperature becomes very irregular. In mid-Atlantic, the fall of temperature in the lower latitudes is scarcely appreciable—note that the 15° line has hardly moved. On the 50th meridian, south-east of Newfoundland, the fall averages about 5°, but the isothermals retain almost the same form. West of this, the fall near land is 3° to 5°, but much less at the head of the Gulf Stream in lat. 40° N.

Off the European coast, the fall amounts to 2° or less, except in the north, in the Faeroe-Iceland region, where the 5° and 8° lines have scarcely moved. South of

Iceland the 10° line has retreated southward, but further west, *i.e.*, south of Greenland, the fall is inconsiderable till the American coast is approached. A marked fall has taken place east of Cape Farewell—note the change in the 8° line, and the change of places by the 7° and 5° lines.

There is practically no change of salinity from last month south of lat. 50° N. (the loop in the 36 line in mid-Atlantic is uncertain) except for an extension eastward of the 32 line from Cape Race. Between 50° N. and 53° N. the loops of the 35 and 35·5 lines have increased in size and now extend much further to the east, while to the north of 55° the 35·5 line now bends westward, and the 35 line shows a wider and fuller loop (compare September) to the west and north. The fresher waters east of Southern Greenland now extend to the south of Iceland—note the 34 line, and the whole line from the east of Iceland to the Faeroes, Shetlands, and Norway is probably occupied by water under 35. The observations show the 35 line between the Faeroes and Shetlands, but it must be regarded with suspicion.

South of lat. 50° N. there are therefore few variations beyond the ordinary seasonal changes of temperature; north of 50° N. the lines have moved westward; south and south-west of Iceland the water is fresher and colder.

December, 1896.—The distribution of temperature is again very irregular, and the seasonal change from November well marked. The 20° line north of 40° N. lat. has shrunk to a small arc between long. 55° and 60° W. The 10° line has, roughly, taken the place of the 15° line, and the 5° line of the 10°, as far east as long. 50° W. East and south-east of Newfoundland temperature has fallen to 0°; the 10° line has moved little, but beyond it temperature has fallen; the 15° line has retreated to the south-east.

In the south-eastern region a slight fall of temperature has taken place, but there is no marked change.

The 10° line has scarcely moved between long. 20° W. and the Irish coast, and north of this to between Iceland and the Shetlands there is little or no change (lines 8°, 7°, and 5°). Toward the Norwegian coast, however, the fall seems to have been considerable.

A considerable fall of temperature has evidently taken place in the northern central region—note the portion of the 8° line close to that of 10°, which has also moved southward.

Salinity has changed little in the fresher waters off the American coasts, the positions of the 32 and 33 isohalines being practically unaltered. Further seaward there is a marked increase of salinity northward and westward, indicated by the 34, 35, and 36 *pro mille* lines. Off Cape Race the belt of fresher water protrudes further to the south, while in the area bounded by 40° and 50° N. lat. and 40° and 50° W. long. there is a general equalisation—the 33 line has moved westward, and the 36 line southward. A similar tendency to more uniform distribution appears all over the Eastern Atlantic, the 36 line has moved southward, especially near the coast of Europe, while one part of the broken 35 line shown has moved northward, and the other runs along the south coast of Iceland.

The principal features are thus—marked seasonal fall of temperature off the American coast, with increased area of salter water round the head of the Gulf Stream. Slight fall of temperature in the south-eastern and eastern areas, with marked tendency to a more uniform distribution of both temperature and salinity.

January, 1897.—In the lower latitudes temperature has scarcely changed, except near the land—note the isothermals of 15° and 20°. The low temperature area off Cape Race has extended itself eastwards, but very slightly: the axis of the 0° line has not moved. In the Eastern Atlantic temperature has fallen in the Bay of Biscay, to the west of Ireland and Scotland, and in the North Sea, but there is no change in the Faeroe-Iceland region. In the northern region, between long. 30° and 40° W., temperature has fallen very considerably.

West of long. 52° W. the isohalines have straightened out; the 36 line has altered little, but lines of lower salinity have moved southward. East of Cape Race the fresher waters have moved considerably to southward and eastward (note the 30 line), while further south, along 50° W. long., the salter waters tend to close in, giving a similar straightening.

In the eastern and north-eastern part of the ocean there is an increase of salinity in all latitudes; the line of 36·5 reappears east of long. 30° W., and the isohalines 36, 35·5, 35·3, and 35 all trend more to the north. In the northern region (*i.e.*, south of Iceland) this increase seems to extend considerably to the westward.

Thus we have—small changes of temperature near 40° N. lat.; extension eastward of a cold freshwater area from Cape Race; in the eastern region a fall of temperature, decreasing northward, but a marked increase of salinity, which extends also north-westward.

Compared with the corresponding month of 1896, the area west of 50° W. long. is warmer and salter, the axis of greatest warmth and salinity being more to the east. The same differences hold good east of Cape Race, hence there is not the same southward protrusion of a cold and fresh area. There is again greater warmth and saltness in the south-eastern region. In the Faeroe-Iceland region temperatures appear to be lower, and probably also salinities, but it is impossible to be certain about the latter. In the northern central portion temperatures are certainly lower, probably also salinities.

February, 1897.—West of long. 50° W. a fairly uniform fall of about 5° has taken place; the observations are insufficient to specify details, but there does not appear to be much change in the general distribution. In the area between 40° and 50° N., and 50° and 60° W., the axis of low temperature has moved eastwards—a rise has taken place in the south-western part of the area—see line of 15°, and a fall in the north-eastern part—line of 10°.

East of long. 40° W., the line of 15° has moved southward, the 12° line remains stationary, and the lower isothermals have moved southward west of long. 10° W. Off the west of Scotland and in the Faeroe-Shetland Channel the water is warmer West of the Faeroes temperature has scarcely changed.

Salinity appears to have changed little in the western region, except for a fall in the neighbourhood of lat. 50° N. long. 40° W. East of long. 40° W. there is a further equalisation; the 36 line has moved down to lat. 40° N., the 35·5 line has straightened out towards the N.W. of Ireland, and salinity has increased slightly in the Faeroe Channel and towards the south of Iceland. The 35 line has moved northward in the North Sea, but a tongue of 35 water protrudes through the Straits of Dover.

The changes in distribution during the month are therefore small, colder and fresher water has spread east of Newfoundland, the distribution of temperature and salinity has become more uniform in the south-east, north-east the surface water is slightly warmer and salter.

Compared with February, 1896, the distribution of temperature is more irregular in the south-west, the lines showing a double bend, while the 5° line is apparently further from the land. Salinity, on the other hand, shows more uniform distribution. Temperature and salinity are lower in the south central and south-eastern regions—note the lines of 15° and 36 *pro mille*; and again south-east of Newfoundland. In lat. 50° N., long. 30° to 40° W., the conditions are little different from last year. Temperature and salinity are lower in the north-eastern regions and in the North Sea.

March, 1897.—South of Newfoundland and the Gulf of St. Lawrence the isothermals have crowded together—the 15° line has moved northward and straightened out between 50° and 60° W. long., and the 0° line appears nearly parallel and a long way from land. In the south central region the tongue formed by the 10° and 12° lines has disappeared, giving a rise of temperature in about lat. 46° N., long. 43° W. Further east little change is apparent south of lat. 50° N., except that the 15° line has reappeared on the Portuguese coast.

West of Ireland and Scotland, and south of Iceland, a distinct rise of temperature is apparent, and this extends along a narrow axis west of the Orkneys and Shetlands, and into the North Sea. East and south-east of Iceland, on the other hand, temperature seems to have fallen.

In the south-west the isohalines seem to be crowded together in a manner similar to the isothermals, but the February observations are hardly sufficient for comparison. Between 40° and 50° N. lat. there is a very distinct movement of the isohalines to the N.W. off the Newfoundland Banks. East of this salinity has also increased, the 36 line having moved northward. In the north-east there appears to be little change, there is if anything a slight increase of saltness, except north-west of the Faeroe Islands.

Thus the principal features are—a rise of temperature and salinity at the head of the Gulf Stream, and a fall of temperature, and probably also of salinity, in the same region off the land; a rise of temperature and salinity in all the south central and south-eastern regions; and a rise of temperature in the north-eastern, probably with slight increase of salinity, except between Iceland and the Faeroes.

Comparing 1897 with 1896, the characteristic difference in the south-west is the greater warmth and saltness along the line of 40° N. to the west of long. 50° W., and the crowding together of the lines immediately to the north of this. In the south-east and east, and probably in mid-Atlantic, the distribution of both temperature and salinity is much the same as last year, but in the Faeroe-Shetland Channel and North Sea temperature and salinity are lower. Temperature is very markedly lower to the west of Iceland.

April, 1897.—The distribution of temperature in the south-west has become very irregular: there is no very clear rise or fall, but the crowding together of last month has given rise to bending or "interdigitating" of the lines. Little change is apparent in the south centre, south-east, and east, except a slight seasonal rise, and in the south a tendency to equalisation of temperature shown by the straightening out of the 12° and 15° lines. North of the Faeroes temperature has fallen slightly—the 5° line has filled out southwards and eastwards. Temperature has risen to the west of Iceland, and west of Cape Farewell.

In the south-west there is distinct increase of salinity just north of lat. 40° N. and about long. 50° W.—note the appearance of the 36·5 line and the retreat of the 34 line, which now has a sharp bend. In the south centre there does not seem to be much change, but there is an increase of salinity in the east and north-east—note the position of the 35·5 line, and the replacing of the 35 line by that of 35·3. The increase of salinity does not, however, appear to extend north or west of the Faeroe Islands, to judge from the form of the 35·3 line.

Thus the changes are, on the whole, slight; the distribution of temperature has become irregular in the south-west, and in the south centre, south-east, and east up to the Faeroe Channel salinity has increased.

Compared with April, 1896, the temperature is much the same west of long. 50° W., but east of that meridian it is lower—the lines running more east and west—note the isothermals of 8°, 10°, 12°, 15°. Temperature is lower in the Faeroe-Shetland Channel, but while the 5° line is in nearly the same position, the water east and north-east of Iceland is warmer. East of Greenland temperature is lower—note the 5° line S.W. of Iceland and S. of lat. 60°, but to the west slightly warmer (3° line).

West of long. 50° W. salinity is on the whole greater, and between long. 40° W. and 50° W. there is a marked increase. The increase holds good all over the south-eastern and eastern area, up to the Faeroes, and across to the south of Iceland. Beyond this the form of the 35 line, so far as it can be depended on, supports the temperature observations in indicating more uniform conditions than last year.

West and south-west of Iceland the water is fresher, the 35 and 35·3 lines have retreated south-eastward.

May, 1897.—In the south-western region the seasonal rise of temperature is great near the land, and in lat. 40° N. the 20° line has reappeared. The 10° and the 15° lines have not altered their positions much. In the south central region temperature has risen, and there is again a marked rise near the European coast, but north and north-east of the Azores there is little or no change. The 8° line has filled out north-eastward between Iceland and the Faeroes, and off the Faeroes the 5° line has retreated northward, but east of Iceland itself there is little change. West of Iceland there is also little change; temperature has risen considerably south-east ot Greenland and again to the west of Greenland. The greater number of observations east and north-east of Newfoundland show a warm area extending westwards towards Labrador.

Salinity has fallen along the 40th parallel west of long. 50° W., the 36 line has moved southward and eastward, while the lines of lower salinity bend southward, along the coast, towards the west. East of Newfoundland the salter waters extend further to the north and west—note the 35 line.

In the south-eastern region the 36 line has retreated from the European coast and moved south-westward nearly to the Azores, while in the north-east the 35·5 line sends a tongue into the Faeroe Channel. The greatest change appears in the north central region, where the 35 line has moved westward and north-westward—bending up into Denmark and Davis Straits, and apparently running parallel to the Labrador coast. The 34·5 line runs well to the N.W. of Iceland. Note the position of the 35 line west and south of Spitsbergen and off the Norwegian coast.

The characteristic changes are therefore marked fall of salinity and absence of seasonal rise of temperature north and north-east of the Azores; increase of salinity and rise of temperature in the whole of the northern area—in the Faeroe Channel, east of Greenland, west and south-west of Greenland, across to Labrador.

Comparing the distribution with 1896, the Gulf Stream "axis" in the south-west lies further to the eastward—compare temperature 20° and salinity 36 *pro mille*. In the central southern area temperature and salinity are both greater, the lower lines being crowded northwards and westwards towards Newfoundland and Labrador. In the south-eastern region temperature and salinity are lower.

In the north-eastern region temperature is very markedly lower—note the isothermals of 10°, 9°, 8°, and 5°. This difference holds good to a greater or less extent over the whole distance from south-eastern Iceland to the coast of Norway, into the North Sea, and along the south coast of Iceland. West of Spitsbergen temperature seems higher, east and south-east of Greenland rather lower, and west of Greenland markedly higher.

The salinity observations do not, unfortunately, show the distribution east of Iceland in 1897. It appears, however, that while salter water extended up the west side of the British Isles, the surface of the North Sea was fresher. The salter waters apparently spread farther to the west of Spitsbergen, but not so far north, and a similar difference occurs off the Labrador coast and in Davis Strait.

June, 1897.—The isothermal of 20° apparently follows the 40th parallel closely almost all the way across, representing a marked rise except at the head of the Gulf Stream. Temperature has also risen near the land, but has remained almost steady to the south-east of Newfoundland.

Temperature has risen markedly everywhere else, but on the whole uniformly; the general tendency is for the isothermals to become somewhat straighter, and to trend more S.W. to N.E.

In the south-western region, salinity has increased to the west of long. 60° W., but diminished east and south-east of Newfoundland. North and west of the Azores salinity has increased again, the 35·5 and 36 lines have moved northward, and the 36·5 line reappears. The 36 line fails, however, to reach the Portuguese coast, and to the west of the British Isles salinity has diminished slightly. In the north-western region the 35 line has retreated southward and eastward.

Thus the chief changes are:—the increased salinity in the central southern area; the small change of temperature and distinct fall of salinity on the north-west and off Newfoundland; and the slight fall of salinity west of the British Isles.

Comparing with 1896, the distribution of temperature is more regular. West of long. 50° W. the waters near land are warmer, and the gradients seawards not so steep. A lower temperature extends east from Cape Race, but to the south-east the lines are rather more crowded together.

In the eastern area there is little difference till we come to the Shetland-Iceland region, where temperature is distinctly lower—note the 10°, 8°, and 5° lines. To the west of Iceland and east and south-east of Greenland there is no marked difference.

The differences of salinity closely follow those of temperature in the south-west. The isohalines are not so crowded, the very fresh waters not extending so far southwards from the land; but on the other hand the fresher water shows farther eastward.

Observations in the eastern region are rather deficient for 1897, but so far as they go they indicate little or no difference. The 35 line is more to the westward between lat. 50° N. and 57° N., but below lat. 60° N. it is bent sharply eastward again, instead of continuing northward as in 1896.

July, 1897.—In the south-west the axis of highest temperature is now far to the west in about long. 65° W., where it has risen to 25°. In about long. 50° W. temperature has fallen a little, the 20° line is broken, and the 15° line is further south. The 10° line now forms a loop east of Newfoundland, extending to nearly 40° W., and recurving westward at least to long. 50° W. On the 40th meridian the isothermals have scarcely moved; temperature has risen towards the coast of Europe, but the lines have straightened out farther. West of Iceland there is a rise close to the land, but the direction of the isothermal has changed. Note also the changed form of the 10° line S.E. of Greenland. In the south-western region an immense freshening of the surface water has taken place. West of long. 50° W. the 35 line now encloses a wide area south and east of the land. East of this area, in long. 45° W., the lines up to 36 are crowded closely together, and beyond this little change is apparent from last month. In the north-eastern region there is again little change.

In mid-Atlantic the S-shape of the 35 line is more marked, and there is an eastward movement of the whole.

Thus the great feature is an expansion of a large cold fresh area east and south-east of Newfoundland, and the freshening and cooling of the water east of Labrador and east and south-east of Greenland.

Comparing with 1896: the cold fresh area extends further south and about the same distance east of Newfoundland; salinity and temperature are somewhat lower in the south-eastern area. In the Faeroe-Shetland Channel, temperature is lower; west of the Faeroes the 10° line takes a similar course to the south-east of Iceland; east of Iceland the course of the 5° line shows much lower temperatures. To the east and south-east of Greenland the surface water is colder and fresher, while in Davis Strait the general tendency is towards greater warmth and saltness.

August, 1897.—In this month the relatively cold area to the east of Newfoundland is less pronounced, but it becomes more marked towards the south; the lines close in eastward off the land, and westward in about long. 45° W. In the eastern region there is a general rise of temperature, which becomes very marked in the Faeroe-Shetland Channel—note the changed position of the 10° line. To the east, south-east, and west of Greenland the type of distribution remains the same. There is a great rise of temperature in the north of Davis Strait.

There is a marked fall of salinity west of Cape Race along the land. East of this the isohalines tend to run more north and south, but the higher lines are more to the eastward. In the north-eastern region the 35·3 line has opened out across the Faeroe-Shetland Channel, and the 35 line has shifted to the W. and N.W.

The most important changes are therefore the spreading of the fresh water area, which has become hotter near the land; and of the salter waters towards the north-east and north-west.

Temperature and salinity are higher off the United States coast than in 1896, but off Newfoundland the cold fresh area extends both farther east and farther south. In the south-east temperatures are much the same, salinities slightly lower; north-east temperatures are higher in the Faeroe-Shetland Channel, salinities apparently nearly the same. South of Spitsbergen the 35 water does not seem to cover such a large area, but (if we compare also July, 1897) it curves more to the west.

To the south-west of Iceland temperatures and salinities are both lower—note the 35 line and the 10° line—but this difference does not persist over any great area to the south or south-east of Greenland, at least in the case of the salinity.

September, 1897.—Temperature has fallen considerably in the south-western area, and especially to the east of Newfoundland, where the bend of the 12° line has filled out. In the south central and south-eastern region temperature is unchanged. East of Iceland, and in the Iceland-Scotland region, a considerable fall has taken place; the 10° line takes a wider bend, and the 12° line is turned round into the North Sea. To the east of Greenland the 10° line has retreated south-eastward, but in the area south of Greenland and east of Newfoundland and Labrador temperature has risen slightly, the 10° line and the 12° line being fuller. There appears to be little change in Davis Strait.

Salinity has changed little under the land west of Cape Race. To the east of Newfoundland the isohalines have become crowded together towards the land, and the 35 line has moved irregularly north-westward into the area north of 50° N. lat., and between long. 40° and 50° W. The 35·5 line appears close to the Greenland coast. West of the British Isles the 35·5 line has moved northward.

The principal change is therefore the extension of salter areas northward and north-westward.

Comparison with the corresponding month of 1896 is somewhat difficult in the south-western regions, as the observations for this year do not extend down to lat. 40°. Salinity is higher close to the land south and south-east of Newfoundland; temperature slightly lower—the 12° line has a wider bend. In the south centre and south-east temperature and salinity seem nearly the same in both years, but north of a line joining Cape Race and the north of Scotland salinity and temperature are nearly everywhere higher—note specially the 35 *pro mille* and 10° lines.

October, 1897.—A considerable fall of temperature appears all over the south-western region, but the fall is most marked round the south and east of Newfoundland, where a large area of relatively cold water runs S.W. and N.E. East of this area the fall of temperature is very slight, even along the west coast of Europe to north-west Scotland. East and south of Iceland a considerable fall has taken place—note the retreat of the 8° and 10° lines, and there is another marked fall south of Greenland, in about lat. 55°, and from there towards the Labrador coast.

The changes of salinity correspond to those of temperature. The cold area south-east of Newfoundland is an area of relatively fresh water: in the eastern and south-eastern regions there is little change: south of Greenland, in about lat. 55° N. a fresh water area extends eastwards, while between it and the Newfoundland area there is a narrow ridge of salter water pointing westward.

The principal change is thus the extension of a colder and fresher area south and east from the coast of Labrador.

The *type* of distribution of both temperature and salinity is the same as in 1896, but there are marked differences. The fresh cold area off Newfoundland was broader, and its axis turned more east and west, in 1897 than in 1896: in the eastern and south-eastern regions temperature was slightly higher in 1897, but salinity markedly lower. Salinity is, however, higher than in 1897 along the 55° N. lat. region west of long. 20° W., the area of relatively cold fresh water not extending so far eastward. Temperature and salinity seem both lower on the western side of Davis Strait

November, 1897.—In the south-western region the higher isothermals at the head of the Gulf Stream have scarcely moved, but temperature has fallen to the west along the land, and in the area south and east of Newfoundland. East of this area temperature remains unchanged till about long. 30° W., where there is a marked fall, the 15° line opening out southward: east of 25° W. there is again no change. In the north-eastern region the temperature has fallen very slightly, chiefly to the west of Scotland, where a large area of about 10° temperature appears. In the region north of 50° N. lat. and on each side of 40° W. long. a very marked fall has taken place—the 10° isothermal is bent sharply round in lat. 50° N. long. 47° W., and runs almost due east for about 8°.

West of Cape Race there is no significant change of salinity. The fresh water off Newfoundland extends further eastward, and east of long. 45° W. all the lines have spread out south-eastward and southward in the direction of the Azores. In the north-east all the higher isohalines have moved southward—the 35·5 line does not get beyond 54° N. lat., and the 35·3 line scarcely crosses lat. 60° N. Note, however, that the 35 line appears between Norway and Spitsbergen. In the central area between the 50th and 60th parallels there is little change in the north (35·0 and 35·3 lines south of Greenland); in the southern half there is the southward movement already referred to, and the 35 and 35·3 lines also bend farther eastward.

The chief changes are thus the increased area occupied by relatively cold and fresh water east of Newfoundland and Labrador, and the extension of this area southward towards the Azores.

At the head of the Gulf Stream (long. 55° to 60° W.) the temperature and salinity are much the same in the two years, but south of the Gulf of St. Lawrence and Newfoundland a much larger area is occupied in 1897 by water of temperature about 5° and salinity below 34 *pro mille*. The steep salinity gradients and complex distribution of temperature east of the intersection of the 50th parallel and 40th meridian in 1896 are not reproduced, for the colder fresher area extends more to the southward (*i.e.*, towards the Azores), and not so much to the eastward (towards Ireland). Note the different positions of the 10°, 12°, and 15° isothermals, and the 35·0, 35·5, and 36·0 isohalines.

In the north-eastern region and south of Iceland temperature and salinity are markedly higher in 1897: the isohaline of 35 runs south-west from Iceland right across the area occupied by water below 34 in 1896. The type of distribution is on the whole the same, the fresher and colder areas extending more *eastwards* in 1896 and *southwards* in 1897.

December, 1897.—West of Cape Race a considerable fall of temperature has taken place, the 10° line touching lat. 40° N. just off Cape Cod. South and east of Newfoundland temperature has fallen largely, an axis of ice-cold water stretching south-eastward over the region covered by the 15° line last month. North of the Azores temperature has risen a little, but elsewhere there is a general fall of about

2° in the south-eastern area. Temperature has not fallen much in the north-east, but south-west of Iceland the 10° line has moved a long way to the south-east. This line keeps its position in lat. 50° N. on the 40th meridian, but to the north temperature has fallen in this longitude—note the movement of the 5° isothermal.

The salinity observations are, unfortunately, not very numerous for this month, being the last. They are sufficient, however, to show an immense extension of the fresh-water area east and south-east of Newfoundland, and some increase of salinity in the south-eastern and eastern areas.

The most important facts are therefore the extension south-eastward of the cold and fresh area from Newfoundland, and the fall of temperature, and probably also of salinity, in the region south-east and south of Greenland.

Except near the United States coast, temperature and salinities are lower in 1897 than in 1896, and this difference is greatly exaggerated east and south-east of Newfoundland. In the east and south-east temperature and salinity are higher than in 1896. The line of 8° runs along the east side of the Faeroe-Shetland Channel instead of the west, but the line of 7° is rather more to the north, and the salinity seems practically the same.

V. *The Movements of the Surface Waters.*

The detailed description of the charts has shown that while considerable variations of an irregular type occur, there are nevertheless changes over the whole area covered which evidently represent a continuous sequence. The charts for each month differ from those for the months immediately preceding and following in such a way as to form a satisfactory intermediate step between the two: they tell, in fact, an intelligible story about the distribution of both temperature and salinity, showing progressive changes bearing certain relations to each other, having certain seasonal phases which occur in both years, and certain features in which the one year differs materially from the other. The important point is accordingly established, that the method employed is adequate to its purpose. Hence, without employing special ships or observers, a continuous survey of the surface changes in the North Atlantic could be kept up with comparatively little trouble or expense: a much larger number of observations than I was able to deal with could be obtained, worked up, and charted for about £300 a year.

In attempting to explain changes of temperature and salinity in the surface waters without a knowledge of those occurring in the layers below the surface, it is necessary to consider separately the probable effects on these elements of seasonal changes without movement of water, and of horizontal or vertical movements with or without seasonal changes superposed. The most important points appear to be these:—

1. The annual range of temperature increases with the latitude, and the normal temperature gradient northward is greater in winter than in summer. Temperature

rises and falls quickly in spring and autumn, and the changes of temperature are slow near the minimum and maximum. The waters in areas enclosed by land are abnormally warmed in summer, forming a *Sprungschicht*, and cold water tends to sink below the surface in winter on account of its greater specific gravity.

Salinity has practically no seasonal variation (38), except perhaps in regions of permanent winds, where the evaporation is great, as in the region of the Trades, and possibly also on the north side of the Atlantic anticyclone. Thus while changes of temperature of water are due both to actual warming or cooling and to admixture with other water, changes of salinity are almost wholly due to the latter.

2. In the North Atlantic surface water in low latitudes is normally warmer and salter than water to the north of it or below it; hence an intrusion of water from the north, or a mixture with waters from below, reduces both temperature and salinity at the surface; and a movement of this water northward is indicated by an increase of temperature and salinity. This holds good at all seasons, but it is specially true of temperature in summer.

3. Surface water in high latitudes and near land is normally relatively fresh, on account of the large admixture of water derived from the land or from ice in proportion to the amount of evaporation. During autumn, winter, and early spring the low temperature of this water is strongly marked, but in the hotter months of the year this is not so characteristic, especially where land influences are strong, either in the way of direct heating or addition of large quantities of warm land water. Similarly the surface layer is normally fresher than that underlying it, colder than it in winter, and warmer in summer.

A southward movement of this water is therefore indicated by the extension of relatively low salinity at all seasons, and this is accompanied by a fall of temperature, which is in general well marked in winter, but not in summer. It is to be noted that any considerable southward freshening is a certain indication of southward movement, for the freshening by mixture with underlying layers or by heavy rainfall is slight, even in low latitudes (39).

4. A mixture of the surface water with the underlying layer produces the same apparent effect, in (*a*) low latitudes as an intrusion of water from the north, and in (*b*) high latitudes as an intrusion of water from the south.

5. In the case of water moving in an easterly or westerly direction, inequalities of temperature tend to disappear, through prolonged exposure to uniform conditions, and such movements can frequently be traced on the salinity maps after they have ceased to appear on those of temperature. In spring and autumn, when the distribution of temperature on land and sea tends to great local irregularities of heating and cooling, the isothermals give no reliable information about such movements.

Applying these as general principles, and keeping especially in mind the constant danger of misinterpretation due to No. 4, the rate and amount of mixing of surface and under layers being practically an unknown quantity, the following seems a fair description of the movements of the surface waters so far as can be gathered from the charts:—

In January, 1896, two surfaces of warm and salt water, one off the American coast and the other extending eastward from mid-Atlantic to the coast of Europe, were entirely separated from each other at the surface by a band of cold fresh water running south-eastward from Newfoundland to the parallel of 40° N. This band is evidently an offshoot from a large area occupying the whole of the region off the Labrador coast, and another band extends due east from this area. There was probably a third similar band south-east of Greenland, and certainly one east of Iceland.

During the two following months there was a persistent movement eastward and slightly northward over nearly the whole distance between lat. 40° and 60° N. The result is the cutting off of the southern end of the cold fresh band from Newfoundland, and the banking up of warm salt water towards the eastern side in the lower latitudes. The greater part of this escapes northward, but to the north of lat. 50° N. it is overlaid by the colder, fresher water from the Labrador coast, which has also moved eastward, and takes part in the northerly drift movement as it nears the land (note the 8° isothermal and the 35·2 isohaline to the south of Iceland in February and March).

In the month of April there is the first marked indication that the general easterly movement is losing strength in the higher latitudes. The easterly drift from Labrador begins to retreat, or rather to be absorbed by mixing, and it shrinks rapidly all round its edge, giving the appearance of warm salt water, moving westward, to the south of Iceland. Farther south there is not the same weakening of the eastward movement, but there *is* evidence, both from temperature and salinity, that more water is making its escape south-eastward.

At the same time (April and May) the southward movement of the fresher waters along the land begins again. South-east of Newfoundland the higher isohalines do not give way, but the lower lines are crowded together by an increase in the streams from the land. The area covered by this water shows a great rise of temperature in May, and in June it expands southwards and contracts eastward, indicating that it is then largely due to the water from the Gulf of St. Lawrence, which rapidly becomes warmer.

All this time a strong current of cold fresh water runs south-eastward from the north and east of Iceland; the north-easterly drift from the Atlantic comes to the surface only on the east side of the Faeroe-Shetland Channel, and the 35 water appears over a large part of the North Sea. This south-easterly current apparently covers a larger and larger area as the spring progresses; the north-easterly drift gets narrower and narrower, and the fresher surface water extends westward along the south coast of Iceland, though this is, no doubt, partly due to increased outflow of water from the land.

To the west of Iceland the branch of the Irminger current going northward gains strength quickly in spring, and apparently reaches its greatest surface extension in June. During the same period salt water makes its way steadily northward along the west coast of Greenland; this is the westerly branch of the Irminger current discovered by the "Ingolf" expedition.

In July the drift of water eastward from the American coast attains immense proportions in the lower latitudes. The "banking-up" of salt water (35·5 *pro mille* and over) towards the European coast becomes more marked, and with it the tendency to spread northward. But the eastward movement is still apparent farther north, a tongue of land water makes its way east from Cape Race, and again there is a drift from the Labrador coast.

Along with this there is everywhere a large increase in the supplies of Polar water. Strong currents appear running southward close to the Labrador coast; the Irminger current is overwhelmed by a rush of water southward across the whole breadth of the Denmark Strait, which gradually spreads over a large area to the south-east of Greenland; the current to the east and north-east of Iceland is strengthened, though to a less degree; and to the north of Europe currents of relatively cold and fresh water extend southward to the coast, entirely covering the 35 *pro mille* water except in isolated patches.

These conditions continue for two months, with the general result that gradients of both salinity and temperature become steeper and steeper on the margins of the areas described. In September a drift, consisting partly of fresh water from near the Newfoundland Banks which has been delivered there by the Labrador current, extends across towards the British Isles; the northern area is largely covered by Polar water, and between the two is the only part of the western branch of the Irminger current which appears at the surface.

The autumn conditions following the culmination of the summer type in August and September are chiefly the result of a weakening of the easterly currents south of lat. 50° N., and a strengthening of them to the north. The Labrador current again makes its way to the southward round the Newfoundland Banks, the stream being not now turned eastward, hence there is an increase of salinity immediately to the eastward (due, according to the temperature observations, to mixture from below; it is interesting to note the rapidity with which the fresh water advances and retreats south of the Newfoundland Banks, where it evidently forms a very thin though widespread layer), while the weakening of the easterly movement also causes lower temperature and salinity in the south-east Atlantic.

North of lat. 50° N. there is a strong easterly drift from the coast of Labrador, and another from the east coast of Greenland. The current from the east coast of Iceland is also deflected more to the north-east, broadening the north-easterly current between that island and Scotland.

This brings us to a distribution of temperature and salinity in December very similar to that observed in the preceding January, the principal difference being that the salter and warmer waters press closer up in the south-east and south centre, the current south-east of Newfoundland being much restricted, while temperature and salinity are much lower between the Azores and Portugal.

The development of the conditions observed in the spring of 1896 accordingly occurs earlier in 1897, but with this difference, that the movement appears to be, on the whole, more from the south, and the easterly components are weaker. The result is that the salter warmer waters spread more uniformly northwards and westwards over the whole of the central area of the North Atlantic; they come closer to the south-east coast of Greenland and the coast of Labrador, and occupy a wider area in Davis Strait. At the same time, perhaps because there is less "banking-up" against the European coast, the stream northwards and through the Faeroe Channel appears to be weaker—this appears chiefly from the temperatures. Both branches of the Irminger current seem to have less penetrative power. East and north-east of Iceland the distribution is altogether more uniform, as if both warm and cold currents were weaker than last year.

This development evidently culminates in May, but in April the enlargement of the southern end of the Labrador current is already apparent. Another change is the increasing southward movement between the Azores and the coast of Portugal, which becomes more marked than in 1896.

The easterly drift from the lower latitudes becomes well defined in June and July, but it does not attain the same development eastwards as in 1896; off the Labrador coast the fresh waters do not extend so far to the east, while the higher isohalines retain their position near the Greenland side of the entrance to Davis Strait. The branch of the Irminger current west of Iceland is evidently weaker; Polar water spreads south-east from Greenland, but again to a less extent than in 1896. The current east of Iceland tends to spread eastward, but northward rather than southward.

In August the characteristic change is a large extension southward and eastward of the Labrador current, and the apparent retreat southward and eastward of the salter waters in the Azores region. At this season the easterly drift was more to the south-east than in 1896.

The increase of the Polar current in Denmark Strait is well marked, but not so well as in 1896, and the Polar waters are slower in making their way eastward. Salinity observations are unfortunately wanting to the east of Iceland, and it is dangerous to draw any conclusions from the temperatures on account of the higher temperatures everywhere near land. It would seem that the Polar water continued to move eastward from the east and north-east of Iceland, but there is no information as to how far it covered the north-easterly current from the Atlantic.

So far as the information goes, the north-east current between Scotland and Iceland was weaker during the whole of the early part of 1897 than in the corresponding period of 1896, and in the far north the whole circulation of both warm and cold streams at the surface seems to have been slower.

In September, 1897, the general direction of the drift loses its southerly component, and in October it becomes due east. Hence there is at first "banking-up" of water against the European coast and escape northward, causing the northward stream west of the British Isles to run stronger, and salter water to spread over the central area generally. After October the supply from the lower latitudes diminishes, but the drift eastward from the Labrador coast continues into November. It is to be remarked that the spreading of the Polar water eastward from the south-east of Greenland, so strongly marked in 1896, is scarcely noticeable in 1897.

Towards the end of the year the drift from the Labrador current, which has not contracted to its usual size after the expansion in August, expands southward again, and the "north and south" distribution becomes more marked than in 1896, partly because of this, and partly because of the belated strengthening of the northward streams on the eastern side.

It is a matter of some difficulty to ascertain with any detail how far the features common to the circulation in the two years described are reproduced every year. The most reliable means of comparison is probably the series of temperature and current charts published by the Meteorological Office (40), but these do not contain much information about the circulation north of 40° N. during the winter months. In the lower latitudes they show, however, what is important to our purpose, that the circulation round the Atlantic anticyclone is more active and definite in summer than in winter (January and August).

The current chart, of course, cannot define the source of the surface waters off the Newfoundland Banks, but in spring and early summer (April and June charts) the apparent direct continuation of the Gulf Stream becomes shorter, while there is increased eastward movement from the east of Newfoundland.

In August the easterly drift shows a tendency to divide near the south-west of Ireland, the greater part appearing to go southward, while a narrow stream moves to the north. Further north the general direction of movement is more to the south.

The charts for October and November show that the head of the Gulf Stream broadens and retreats, while in the north the easterly component becomes well marked; note the easterly direction of the arrows south-east of Greenland. The dividing line formed by a band of "no current" between Newfoundland and the British Isles is an important feature: it moves northward in winter, southward in summer.

It appears, therefore, that there are certain important seasonal changes in the surface circulation which occur in the two years 1896 and 1897, and which can, to some extent at least, be traced in the less definite outlines of the composite pictures obtained by the method of averages. These changes may be summarised as follows:—

The surface circulation in the North Atlantic between the parallels of 40° and

60° N., forms during winter part of a cyclonic movement, resulting in a southerly and south-easterly drift on the western side, and a northerly drift on the eastern side. In the lower latitudes, about 40° N., the easterly movement is comparatively weak. The northerly movement in the easterly half of the area is considerable, but it is hampered by the configuration of the land—the Faeroe Isles, Iceland, Greenland, &c., hence the water tends to spread widely over the surface northward and north-westward, but stream currents of any marked degree of energy are not developed. Hence there is a tendency at the end of winter towards uniform distribution of salinity and temperature, which is aided by a diminution in the supplies of Polar water.

In spring the north and south components become less marked, and the easterly movement becomes stronger everywhere south of lat. 50° N., the increase being most noticeable in the lowest latitudes. The greater angle now made by the drift with the European coast line causes increased "banking-up" of water against the land, and this water escapes by stream currents running northward and southward. The total discharge of these streams must depend on the rate and volume of the easterly drift, and the proportions discharged to north and south on the angle made by the drift with the coast. The direction of drift is probably always somewhat towards the north, but the resistance due to the configuration of the land and to the influence of the earth's rotation hinders the development of a northward stream sufficient to carry off the water as fast as it accumulates, and the banked-up water tends also to sink below the surface, causing the high temperatures observed at low levels in the Eastern Atlantic (41), and to accumulate further westward and north-westward, flowing out wherever opportunity presents itself, as in the branches of the Irminger current.

The northward discharge of Atlantic water from the lower latitudes is therefore greater during the months of spring and summer, when a stream current, independent of the local surface drift, sets northward between Scotland and Iceland, attaining its greatest strength in the Faeroe-Shetland Channel, and having marked inductive effects on the Polar bottom water at the Wyville-Thomson Ridge (42).

As the summer progresses, the drift circulation in the higher latitudes becomes weaker, but after midsummer the increased strength of the current from the south is replied to by an enormous delivery of Polar water—first and chiefly from the area between the east and north-east of Iceland and Jan Mayen, then later, as the ice breaks up, from the Polar current east of Greenland. The Labrador current also increases largely in volume, but a greater proportion of this increase is likely to be due to melting of ice by the warm air sent up by the cyclonic circulation developed over the continent of North America.

Except in the case of the Iceland—Jan Mayen Stream, which develops the features of a stream current of great energy, for reasons recently set forth by PETTERSSON (43), the Polar water forms large pools of fresh water to the east of the southern part of Greenland, and off the Labrador coast, where it seems to collect in a comparatively limited area, mixing little with the waters on which it lies, and being gradually warmed by the direct rays of the sun. Between Iceland and Jan Mayen, and in the Spitsbergen area, the quantity of water coming from the south is greater, the melting of the ice takes place more rapidly, and there is therefore a greater return of Polar water on the surface, forming streams which may cover over large portions of the northerly current, and penetrate southward into the Faeroe Channel and along the coasts of the British Isles.

This circulation reaches its greatest development in August or early in September, when the easterly movement again becomes marked in the higher latitudes—50° to 60° N.—and weakens in the lower. The northward discharge by a stream current in the eastern area accordingly diminishes, but the increased drift is shown by the spreading eastward of the Polar water from south-east of Greenland and from the Labrador coast. This can be distinctly traced in October and November, and it is followed by a transition into the partial cyclonic circulation first described, the *drift* nature of the circulation being characterised by the gradual lessening of gradients, both of temperature and salinity.

If it be admitted that the surface circulation undergoes the periodic changes described, it appears that they follow directly from the seasonal changes in the circulation of the atmosphere at the surface, modified by the position and form of the land.

During winter the prevailing winds on the east coast of Canada are north-westerly. Large cyclones make their way in continuous succession north-eastward across the Atlantic, the region of lowest average pressure forming a belt from the south-east of Greenland, round Iceland, and thence in a north-easterly direction; so that the prevailing winds to the right of that belt are west in the central area, south-west nearer Europe. Pressure is high, with anticyclonic circulation, over the Eurasian continent. The Atlantic anticyclone is during the winter months at its smallest and weakest, and the whole area down to 40° N. is therefore practically under the control of the equatorial side of the cyclonic circulation. Under the influence of the strong winds, which nowhere form a large angle with the coast-line, an immense system of surface drifts is developed, the water moving northward in the eastern half of the basin, and southward in the western half, while the main area of purely easterly drift is confined to the centre and to lower latitudes (44).

The characteristic feature of the winter circulation is therefore the purely drift nature of the surface currents: it is specially important to notice this in relation to the north-eastern part of the area, for the water moving northward between Scotland and Iceland is then a wide surface stream of small depth, consisting of mixed waters brought from different sources into the central Atlantic area during the preceding autumn.

The transition from winter to summer conditions in the atmospheric circulation consists of a gradual increase in size and strength of the Atlantic anticyclone, and diminution in the number and energy of the cyclones following the Iceland low-pressure belt. The effect is to weaken the drifts in the higher latitudes, and to strengthen them in the south, the latter being supported by the fall of pressure over the North American continent. The fall of pressure over Europe, and the tendency of the Atlantic anticyclone to project north-eastwards, causes steady westerly winds to prevail over a broad belt in the widest part of the North Atlantic, and the drifts accordingly set eastward against the land in much greater volume, and much further north, than in winter. Hence there is a great increase in the relief current moving northward: this current is known to extend down to 300 fathoms at the Wyville-Thomson Ridge, and to penetrate far into the Arctic regions (45).

The enormous quantities of warm Atlantic water sent north by this current are much more effective than the seasonal warming of the air in melting the ice of the Arctic seas, and the southward movement of the Polar water is apparent in July and August. The light variable winds prevalent at that season do not induce any marked drift of these waters.

During autumn the transition phases of spring are reversed; the coast currents again become weaker through the changes of wind force and direction due to the shrinkage of the Atlantic anticyclone, and the drift system is re-established. The first result is to spread the Polar waters eastward over the Atlantic area, where they are more or less rapidly absorbed by mixture with underlying water; but the mixed waters may partly or wholly cover over the weakened and retreating coast current so well marked in the summer season.

The additions made to our knowledge of the warm northerly currents in the higher latitudes of the Atlantic by recent expeditions have been fully summarised and discussed by PETTERSSON since this investigation was begun (46), and the conclusions arrived at with regard to them are fully supported by the extended surface observations in the lower latitudes. The great development of these streams is to be accounted for by the transfer of the warm salt waters, sent up along the American coast by the Gulf Stream, as surface drifts to the south-western coasts of Europe, where they are banked up, stored as it were in a vast reservoir, from which they escape northwards, southwards, and downwards, filling the whole basin of the eastern and north-eastern Atlantic, and overflowing as northward streams wherever the form of the basin makes it possible. These northward currents are permanent, but they suffer variations corresponding to the changes in the rate at which the drift-water is accumulated, and in their more remote branches they have a surface circulation superposed upon them—a *thermal* circulation in the late summer and early autumn, and a *drift* circulation in late autumn and winter.

The general circulation of the North Atlantic is therefore the result of a large number of factors, each of which is subject to wide variation. From a consideration of the mean result in its relation to the mean atmospheric circulation, it appears that the oceanic circulation is directly controlled by the winds; the form, position, and intensity of the whole of the Atlantic anticyclone, and of the cyclonic area to the north of it being taken into account. The movements of water set up directly by these systems are modified by, firstly and chiefly, the configuration of the land, and secondly by the effects of melting of ice.

The precise effects of variations in the atmospheric systems, which must in the first instance be regarded as the independent variables, can be ascertained to some extent by comparing the circulation in the two years 1896 and 1897. The changes in circulation required to account for the observed differences in the distribution of temperature and salinity have already been suggested, but it seems desirable to state them in a more general form before attempting to discuss their causes.

The principal point to be considered in the early part of 1897 is the weakness of the drift circulation compared to 1896. The south-easterly drift from the north-western area is weaker, and the surface waters generally are therefore warmer and salter. Again, the easterly drift towards Europe is weaker, there is less "banking up" of water on the European coast, and the outflow to the north-east and to the Irminger current is weaker; the main easterly drift appears, in fact, to be further south than last year, it consists more exclusively of Gulf Stream water, and its course is more towards the African coast.

The differences are of the same general type until August, when the large delivery southward in the Azores region becomes most strongly marked. The effect of the decreased strength of the northward streams during spring and early summer appears in the diminution in the supply of Polar water; the melting of ice has obviously gone on more slowly, and the increase in the fresh-water streams is smaller and occurs later. The difference is least marked in the case of the Labrador current, which depends least on the warm streams for its supply.

In the autumn the movement becomes more easterly and northerly, and the direction of the easterly drift is more towards the land in the south-west of Europe, causing more "banking-up" and consequently stronger northerly streams than at the corresponding period of 1896. The change, however, comes too late for these streams to produce the enormous melting of ice and consequent outflow of Polar water observed in the previous year, and the phase quickly gives way to the drift circulation of winter. The characteristic "north and south" feature becomes strongly developed, owing to the form of the autumn distribution just noted, and to the absence of Polar water spreading over the surface.

The construction of charts showing the distribution of atmospheric pressure and temperature during individual months is a matter of great difficulty. The discussion of material obtained from ships' logs is beyond the resources of the private investigator; the only means of getting at the information required is to utilise the monthly averages of observations made at coast stations surrounding the area, or on islands situated within it, and to eke out the information obtained with the excellent general summaries published in the 'U.S. Pilot Chart,' and the 'Bulletin mensuel du

Bureau météorologique de France.' Even this is a troublesome matter, as it is not easy to get all the corrections necessary for rendering the observations fully comparable, and many of the data are only published after long delays.

The simplest method of obtaining an approximate view of the atmospheric conditions prevalent during 1896 and 1897 seemed to be to use the *differences* of the monthly means from the long-period averages at a number of stations, thus avoiding all the troublesome reductions to sea-level, and to plot the differences on charts. The data for the two years were partly obtained from the publications of the meteorological services concerned, but through the kindness of the Director I was furnished with the as yet unpublished means for a large number of the stations of the Danske Meteorologisk Institut. The long-period means used were those in the "Challenger" Report on Atmospheric Circulation, and the differences are given in Table III.

The anomalies shown by the charts are not, of course, to be regarded as having sufficient local accuracy to be worth detailed quantitative discussion; even if they were it would not be possible to deal with them rigorously, for the relation between a drift current and the wind which causes it is still quite uncertain. It is necessary to look merely at the broader outlines, and to seek for differences which occur consistently over considerable areas and continue for successive months.

The most marked departure from the average distribution of pressure in 1896 is the excess in the lower latitudes during the first half of the year. With the single exception of the month of June there is continued high pressure from January to August, and the excess is greatest to the south and south-west of the British Isles. This indicates an unusual extension of the Atlantic anticyclone north-eastwards, and consequently stronger and steadier westerly and south-westerly winds, which would produce an unusually large easterly surface drift south of the 50th parallel, and excessive banking-up of water south-west of Great Britain. Hence we should expect all the branches of the northerly current to exceed their usual strength, and later in the year to find large supplies of Polar water making their appearance, the result of excessive melting of the Polar ice: this is precisely what the observations have shown.

In January 1896 the area of high barometric pressure extended over Iceland and Southern Greenland, the least excess being in the south-western area round Newfoundland; but during February, March, and April pressure was below the average in the north, and the deficiency increased eastwards to form a belt of specially low pressure lying along lat. 60° to the Norwegian coast in March. This would lead to abnormal easterly drifts from the Labrador-Greenland region during spring, which would ultimately join the northerly currents on the eastern side. The waters of the northerly streams are therefore chiefly derived in winter from the Gulf Stream area, while in spring there is an increasing admixture of water from the Labrador currents.

During the midsummer period, pressure was on the whole above the average; but the differences did not lead to any definite disturbance of the normal gradients, and so far as the winds are concerned the conditions are to be regarded as normal.

The months of September and October are characterised by deficient pressures in the low latitudes, due to the passage of cyclones from the south-west to the Bay of Biscay and the British Isles, and by relatively high pressures in Greenland and Iceland. This distribution would give an easterly tendency to the winds in the north, and the slowness of the easterly movement of the fresh surface waters derived from the ice is therefore probably abnormal. In November the cyclone track moved northward, and an anticyclone developed over South-western Europe, conditions which would increase the easterly movements in the higher latitudes in the Atlantic.

In December 1896 we find the beginning of a different distribution of pressure, which continues, somewhat irregularly, but with little interruption, till August 1897. The characteristic feature is pressure above the average in the north and west, and below it in the south and south-east, the region of deficient pressure being chiefly south and south-west of the British Isles. The Atlantic anticyclone does not therefore expand north-eastwards as far as it did in 1896, and the track of cyclones skirting it is further south and more directly eastward; it appears also that the cyclones were shallower or less numerous than usual.

Hence the main easterly drift is weaker on its northern margin, and the direction of movement is more to the southward, the chief region of banked-up water, the source of the northward-moving currents, is further south, and the currents receive less direct aid from the surface drifts. The relatively high pressure in the higher latitudes would give weaker westerly winds in the Atlantic, and therefore a weaker drift circulation, and less spreading of the Labrador stream water eastward. The drift delivery northward on the eastern side would be less, the winds being weaker and more westerly; but, on the other hand, the southward deflection of the main cyclone track would increase the easterly component of the winds between Iceland and Spitsbergen. The water sent northward by the current from the coast of Europe would therefore tend to mix less with the water underlying it, and on reaching the Spitsbergen region to drift westwards. We know, as a matter of fact, that an unusually large area west and south-west of Spitsbergen was open during 1897—probably the result of the enormous amount of warm water sent up in the preceding year, and that the open area was covered to an unusual extent by Atlantic water (47).

The supplies of Atlantic water being smaller, and the ice more remote, in 1897 than in 1896, the increase of the Polar streams in autumn is much less marked; hence an unusually large area is then occupied by the warmer and salter surface waters, and this is maintained by the peculiar atmospheric changes which take place in the latter part of the year.

In September pressure is somewhat above the average south and south-west of the British Isles, but below it over Norway, a phase which would increase the strength of the westerly winds, but which is quickly modified by the spreading northward of the relatively high pressure over nearly the whole of Western Europe, while further west pressure keeps to the average, or falls a little below it. The gradients are thus stronger than usual for southerly winds, and the "north-and-south" form of the winter drift circulation becomes specially well marked.

The circulation of waters in the North Atlantic therefore not only follows the general seasonal changes in the atmospheric circulation, but the irregularities in the seasonal changes, which in these latitudes may amount to a large fraction of the whole, are accompanied by irregular variations in the oceanic streams, also amounting to large changes in the total movement; the oceanic changes bear similar relations to the atmospheric in both cases. The effect of changes in the direction and force of prevailing winds makes itself felt almost immediately on the "drift" circulation, while the relief currents produced by the banking-up of water are longer in responding, and "thermal" currents due to melting of ice by warm water below the surface take longer still. The difference in the time-interval arising in this way must lead to a smoothing out of the effects on the deeper movements of water, and it is probably only when unusual conditions persist for a long time, as in the case of the Atlantic anticyclone during 1896, that there is any considerable variation in them.

The principal conclusions may therefore be summed up as follows:—

1. The surface waters along the whole of the eastern seaboard of North America north of (about) lat. 30° N., consisting partly of water brought from the equatorial currents by the Gulf Stream and partly of water brought down by the Labrador current, are drifted eastward across the Atlantic towards south-western Europe, and banked up against the land outside the continental shelf (48). This continues all the year round, but it is strongest in summer, when the Atlantic anticyclone attains its greatest size and intensity; and the proportion of Gulf Stream water is greatest at that season.

2. The drifts in the northern part of the Atlantic area are under the control of the cyclones crossing it. The circulation set up accordingly reaches its maximum intensity in winter, and almost dies out in summer. In the winter the drifts tend to be south-eastward from the mouth of Davis Strait, eastward in mid-Atlantic, and north-eastward in the eastern region. In spring and autumn the movement is more easterly over the whole distance, and a larger quantity of water from the Labrador current is therefore carried eastward.

3. The water banked up in the manner described in (1) escapes partly downwards, partly southwards, and partly northwards. It occupies the whole of the eastern basin of the North Atlantic, and to the north it extends westward to Davis Strait, being confined below 300 fathoms depth by the ridges connecting Europe, the Faeroes, Iceland, and Greenland. Above that level it escapes northward by a strong

current through the Faeroe-Shetland Channel and between Faeroe and Iceland, and by the two branches of the Irminger current, one west of Iceland, the other west of Greenland. As it seems desirable that this northerly current should have a distinctive name, it might be well to call it the European stream, and its branches the Norwegian, Irminger, and Greenland streams respectively.

The strength and volume of the European stream is liable to considerable variation, according to the form and position of the Atlantic anticyclone, which causes the amount of banked-up water and the proportions escaping northward and southward to vary. It is also modified by the strength and direction of the surface drifts in its course. It is, however, always strongest in summer.

4. The Norwegian stream is by far the largest branch of the European, and it traverses the Norwegian Sea and enters the Arctic Ocean. The warm water thus sent northward melts enormous quantities of ice, and the fresh water derived from the ice moves southward in autumn, chiefly in a wide surface current, between Iceland and Jan Mayen, which may entirely cover over parts of the Norwegian stream. Part of the surface water also comes southward through the Denmark Strait, but the amount is much smaller, probably chiefly because the melting of the ice is slower, and the channel is longer blocked.

The Greenland branch of the European stream also causes melting of ice in Davis Strait, but the warm winds from the American continent and the large quantity of water received from the land are probably more effective in increasing the volume of the Labrador current.

5. The water from the melted ice is spread over the surface of the North Atlantic during late autumn and winter by the increasing drift circulation, and it is gradually absorbed by mixing with the underlying water.

6. The circulation described is liable to extensive variations corresponding to variations in the atmospheric circulation.

The meteorology of the North Atlantic area during the period under discussion, and the reaction of the oceanic upon the atmospheric circulations, really form part of a separate investigation, and will be discussed in another paper. Special interest attaches to the departures of the monthly temperatures from the mean and their relation to the pressure anomalies. One or two important points, however, may be touched on.

Quite recently, PETTERSSON and MEINARDUS (49) have shown that a relation exists between the mean barometric pressure over an oceanic area during the winter months, and the temperature of its surface waters; high temperatures tending to lower pressures, and low temperatures to higher pressures. This is probably seen on its largest scale in the southern hemisphere, where the areas west of the land masses (50), supplied with cold water by the Antarctic currents, coincide with the strongest developments of the southern high-pressure belt.

It has been shown that the expansion north-eastward of the Atlantic anticyclone during the early part of 1896 led to increased strength in the European stream, resulting in the delivery of unusually large quantities of warm water by the Norwegian stream, with subsequent excessive melting of Polar ice. Hence at the end of 1896 the northern seas were covered with water below the average temperature. But the characteristic of the first half of 1897 is the relatively high pressure persisting in this region, and the deflection southward of the main cyclone tracks, which is therefore probably the result of the low surface temperature in autumn, prolonged automatically by the weakness induced in the drift circulation. The presence of unusual quantities of warm water below the surface would, on the other hand, keep up the melting and retard the formation of ice, and temperature would be above the average in the higher latitudes, but below it in the regions usually free of ice because of the spreading of the ice-cold water. The influence of the warmer water would become gradually more apparent at the surface late in the winter, as the colder waters were absorbed by mixture.

The weakness of the Norwegian stream in 1897 and the comparatively open sea left in the preceding winter resulted in less melting of ice, and, consequently, a more limited distribution of Polar water; hence in the autumn the warmer water appeared more at the surface, and the result is relatively low pressure over the northern sea areas and a rapid development of the drift type of circulation.

The main result obtained by PETTERSSON is accordingly confirmed, but the problem is complicated by the varying influence of the high-pressure areas to the south and over the land. The key to the position seems to be the Atlantic anticyclone, which controls the low-pressure areas, both directly and indirectly, by its far-reaching effect on the oceanic circulation; and it seems scarcely likely that the causes modifying this system are confined to the Atlantic, even if they are to be found at the surface at all.

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28. The Laboratory Numbers of these samples (Table I.) are given in Appendix III.

29. Twelfth Report of the Fishery Board for Scotland, Part III., p. 379. The values of Cl and S for these samples are given in Table II., with the S calculated from the Cl by equation (2).
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32. Twelfth Report of the Fishery Board for Scotland. Part III., p. 340, and Table XI.
33. *Loc. cit.*, p. 341, and Table XII.
34. Table II.
35. Notes 32 and 33.
36. In addition to my own data, salinity observations have been added to the charts from the Report of the "Ingolf" Expedition, Professor HJORT'S papers, the Iagttagelser over Overfladevandets Temperatur, Saltholdighed og Plankton, paa Islandske og Grønlandske Skibsroute of Commodore WANDEL, PETTERSSON and EKMAN'S papers on the North Sea and the Baltic, 1893–97 (Stockholm, 1897), and on Die hydrographischen Verhältnisse der oberen Wasserschichten des nördlichen Nordmeeres (Stockholm, 1898).
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TABLE I.

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1895.		N.	W.					
1	Teutonic. .	Dec. 19	midnight	51° 24′	13° 58′	10·6	19·79	35·75	—	—
2	,,	,, 20	noon. .	51 22	20 24	11·7	19·68	35·56	—	—
3	,,	,, 20	midnight	50 45	26 37	11·1	19·79	35·75	—	—
4	,,	,, 21	noon. .	50 24	31 40	5·6	19·64	35·48	—	—
5	,,	,, 21	midnight	49 18	37 28	6·1	19·67	35·54	26·45	—
6	,,	,, 22	noon. .	48 44	41 25	11·1	19·68	35·56	—	—
7	,,	,, 22	midnight	47 24	44 45	2·8	18·78	33·94	—	·00219
8	,,	,, 23	noon. .	45 44	50 3	2·8	17·96	32·48	—	·00209
9	,,	,, 23	midnight	44 23	55 17	6·1	18·07	32·66	24·23	—
10	,,	,, 24	noon. .	43 0	60 39	6·1	17·83	32·24	—	·00208
11	,,	,, 24	midnight	41 25	65 38	6·7	18·83	34·03	—	—
12	,,	,, 25	noon. .	40 22	70 8	8·9	18·90	34·16	—	·00217
		1896.								
13	,,	Jan. 1	midnight	40 22	68 37	2·8	19·22	34·72	—	—
14	,,	,, 2	noon. .	41 11	64 11	11·7	19·45	35·14	—	—
15	,,	,, 2	midnight	42 28	59 34	4·4	17·95	32·46	—	·00205
16	,,	,, 3	8 A.M. .	43 15	56 25	6·1	18·41	33·28	—	—
17	,,	,, 3	noon. .	43 38	54 45	5·0	18·14	32·79	24·32	—
18	,,	,, 3	midnight	45 5	49 58	5·6	18·06	32·64	—	·00208
19	,,	,, 4	8 A.M. .	46 3	46 42	8·3	18·47	33·39	—	—
20	,,	,, 4	noon. .	46 34	44 58	6·1	18·58	33·58	—	—
21	,,	,, 4	midnight	47 53	39 50	12·8	19·82	35·80	—	·00231
22	,,	,, 5	8 A.M. .	48 46	36 22	11·7	19·73	35·64	—	—
23	,,	,, 5	noon. .	49 19	34 41	11·7	19·67	35·54	—	—
24	,,	,, 5	midnight	50 16	28 59	9·4	19·81	35·79	26·69	—
25	,,	,, 6	8 A.M. .	50 37	25 12	8·9	19·70	35·59	—	—
26	,,	,, 6	noon. .	50 53	23 0	10·0	19·72	35·63	—	—
27	,,	,, 6	midnight	51 8	17 1	11·1	19·67	35·54	—	—
28	,,	,, 7	8 A.M. .	51 18	13 4	11·7	19·68	35·56	—	—
29	,,	,, 7	noon. .	51 33	10 44	7·8	19·67	35·54	26·54	—
30	,,	,, 7	midnight	52 32	5 56	8·3	19·22	34·72	—	·00224
		1895.								
31	Ethiopia. .	Dec. 22	noon. .	55 21	11 19	9·4	19·52	35·27	26·28	·00229
32	,,	,, 23	,,	55 1	19 27	10·0	19·59	35·40	26·34	—
33	,,	,, 24	,,	54 1	27 39	8·9	19·39	35·03	—	—
34	,,	,, 25	,,	52 31	35 19	7·2	19·31	34·89	—	—
35	,,	,, 26	,,	50 27	42 27	8·9	18·93	34·21	—	—
36	,,	,, 27	,,	47 54	49 30	1·1	17·87	32·31	—	—
37	,,	,, 28	,,	45 11	55 35	3·3	17·80	32·19	23·88	·00208
38	,,	,, 29	,,	42 40	60 59	5·0	17·80	32·19	23·82	—
39	,,	,, 30	,,	41 5	67 20	8·3	18·24	32·97	24·46	—
40	,,	,, 31	,,	40 30	72 50	6·7	18·06	32·64	—	·00211
		1896.								
41	,,	Jan. 12	,,	40 41	69 32	5·6	18·18	32·86	—	—
42	,,	,, 13	,,	41 49	63 54	6·7	18·05	32·63	24·23	—
43	,,	,, 14	,,	43 16	58 29	3·9	17·97	32·49	24·26	·00208
44	,,	,, 15	,,	44 54	52 51	3·9	17·92	32·40	—	—
45	,,	,, 16	,,	47 7	47 5	0·6	17·94	32·44	—	·00207
46	,,	,, 17	,,	49 24	41 32	11·1	19·39	35·03	26·05	—
47	,,	,, 18	,,	51 20	35 45	8·3	19·39	35·03	26·04	—
48	,,	,, 19	,,	52 58	29 10	7·8	19·32	34·91	—	·00226

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3
		1896.		N.	W.					
49	Ethiopia . .	Jan. 20	noon . .	54° 23′	21° 42′	10·6	19·58	35·38	26·33	—
50	,,	,, 21	,,	55 1	13 35	10·6	19·59	35·40	—	·00229
51	,,	,, 22	,,	55 16	6 26	7·2	19·32	34·91	25·97	·00225
52	Teutonic . .	,, 16	midnight	51 8	13 39	11·1	19·70	35·59	26·56	—
53	,,	,, 17	noon . .	50 39	19 29	11·1	19·66	35·52	—	·00231
54	,,	,, 17	midnight	49 57	23 41	11·1	19·60	35·41	—	—
55	,,	,, 18	noon . .	49 14	27 54	5·6	19·67	35·54	—	—
56	,,	,, 18	midnight	47 57	33 22	5·0	19·57	35·36	—	·00229
57	,,	,, 19	noon . .	46 40	38 51	7·2	19·69	35·58	—	—
58	,,	,, 19	midnight	44 45	42 53	16·1	19·81	35·79	26·66	—
59	,,	,, 20	noon . .	42 50	47 55	5·6	18·23	32·95	24·52	·00214
60	,,	,, 20	midnight	42 13	53 21	12·8	19·65	35·50	—	—
61	,,	,, 21	noon . .	41 35	58 48	11·1	19·88	35·91	—	·00234
62	,,	,, 21	midnight	41 23	63 44	10·0	19·71	35·61	—	—
63	,,	,, 22	noon . .	40 37	68 46	7·2	18·38	33·22	—	—
64	,,	,, 29	,,	Off Sandy Hook L. V.		0·0	17·76	32·11	23·91	·00207
65	,,	,, 29	midnight	40° 1′	68° 36′	6·1	18·48	33·41	—	—
66	,,	,, 30	noon . .	40 36	64 2	17·2	20·10	36·30	—	—
67	,,	,, 30	midnight	40 59	59 59	12·2	19·48	35·19	—	—
68	,,	,, 31	noon . .	41 23	53 15	6·1	18·87	34·10	—	·00221
69	,,	,, 31	midnight	42 38	49 9	6·1	18·51	33·46	24·75	—
70	,,	Feb. 1	noon . .	43 54	44 22	12·8	19·77	35·72	—	—
71	,,	,, 1	midnight	45 38	39 34	13·9	19·82	35·80	26·66	—
72	,,	,, 2	noon . .	47 20	34 46	11·1	19·64	35·48	—	·00231
73	,,	,, 2	midnight	48 33	29 15	10·0	19·76	35·70	—	—
74	,,	,, 3	noon . .	49 46	23 43	11·7	19·63	35·47	—	—
75	,,	,, 3	midnight	50 31	18 0	11·1	19·70	35·59	—	—
76	,,	,, 4	noon . .	51 17	12 16	11·1	19·69	35·58	—	—
77	Laura . . .	Jan. 24	11 A.M. .	59 52	3 20	7·6	19·49	35·21	—	—
78	,,	,, 24	10 P.M. .	60 49	5 5	8·0	19·57	35·36	—	·00229
79	,,	,, 25	6 A.M. .	61 42	6 4	6·5	19·47	35·17	—	·00226
80	,,	,, 26	11 A.M. .	61 52	6 15	6·0	19·14	34·58	25·79	—
81	,,	Feb. 1	,,	62 8	6 20	6·2	19·39	35·03	—	—
82	,,	,, 3	2 P.M. .	62 28	7 2	6·2	19·46	35·15	—	—
83	,,	,, 3	10 P.M. .	62 36	9 30	8·0	19·54	35·30	—	—
84	,,	,, 4	11 A.M. .	62 39	12 55	8·0	19·54	35·30	26·39	—
85	,,	,, 4	10 P.M. .	62 42	15 7	8·2	19·60	35·41	—	—
86	,,	,, 5	11 A.M. .	62 54	17 45	8·0	19·56	35·34	—	—
87	,,	,, 5	10 P.M. .	63 19	19 46	8·0	19·55	35·32	—	—
88	,,	,, 6	11 A.M. .	63 17	20 18	7·0	19·48	35·19	—	—
89	,,	,, 6	4 P.M. .	63 35	22 0	6·0	19·36	34·98	—	·00224
90	,,	,, 6	10 P.M. .	64 0	23 2	5·5	18·18	32·86	24·41	·00212
91	,,	,, 7	1 A.M. .	64 18	22 45	4·5	19·30	34·87	—	·00225
92	,,	,, 11	8 A.M. .	64 17	22 42	4·2	18·91	34·17	—	·00220
93	,,	,, 11	noon . .	64 1	22 59	5·0	18·35	33·17	24·66	—
94	,,	,, 11	10 P.M. .	63 7	21 15	6·8	19·54	35·30	—	—
95	,,	,, 12	7 A.M. .	62 45	19 18	7·2	19·55	35·32	—	—
96	,,	,, 12	noon . .	62 40	18 10	7·8	19·50	35·23	—	—
97	,,	,, 12	10 P.M. .	62 32	15 23	8·1	19·55	35·32	—	·00228
98	,,	,, 13	7 A.M. .	62 26	12 31	8·0	19·54	35·30	—	·00229
99	,,	,, 13	noon . .	62 31	11 3	8·0	19·53	35·28	26·28	·00227
100	,,	,, 13	10 P.M. .	62 33	7 55	7·2	19·53	35·28	—	—
101	,,	,, 14	7 A.M. .	62 35	6 58	7·0	19·50	35·23	—	—
102	,,	,, 15	,,	62 9	6 20	6·7	19·47	35·17	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
103	Laura . .	Feb. 15	10 P.M. .	61° 11′	5° 15′	7·0	19·49	35·21	—	—
104	,,	,, 16	7 A.M. .	60 8	3 31	8·3	19·61	35·43	26·48	—
105	,,	,, 16	noon . .	59 40	2 25	8·2	19·52	35·27	—	—
106	Teutonic . .	,, 13	midnight	—	—	8·9	19·77	35·72	—	—
107	,,	,, 14	noon . .	50 39	20 49	10·6	19·66	35·52	—	—
108	,,	,, 14	midnight	49 39	25 58	11·7	19·69	35·58	—	—
109	,,	,, 15	noon . .	48 40	31 7	12·2	19·71	35·61	—	—
110	,,	,, 15	midnight	47 18	35 37	9·4	19·71	35·61	—	·00231
111	,,	,, 16	noon . .	45 57	40 7	11·7	19·67	35·54	—	—
112	,,	,, 16	midnight	44 18	44 30	11·7	19·14	34·58	—	—
113	,,	,, 17	noon . .	42 40	48 53	8·9	18·69	33·78	25·08	·00219
114	,,	,, 17	midnight	42 6	53 41	5·0	19·08	34·47	—	—
115	,,	,, 18	noon . .	41 32	58 50	11·1	19·38	35·01	—	·00228
116	,,	,, 18	midnight	41 2	64 3	11·1	19·36	34·98	—	—
117	,,	,, 19	noon . .	40 32	69 36	3·9	18·26	33·00	—	·00214
118	,,	,, 19	midnight	off Fire	Island	−1·7	18·02	32·58	—	—
119	,,	,, 26	,,	—	—	−2·2	17·54	31·71	23·46	—
120	,,	,, 27	noon . .	40° 33′	64° 14′	15·6	20·19	36·46	27·21	·00237
121	,,	,, 27	midnight	40 56	59 21	10·0	19·40	35·05	26·06	—
122	,,	,, 28	noon . .	41 20	54 28	10·0	20·09	36·29	—	·00235
123	,,	,, 28	midnight	42 13	50 20	5·0	19·19	34·67	25·75	—
124	,,	,, 29	noon . .	43 6	46 12	15·6	19·98	36·09	26·91	—
125	,,	,, 29	midnight	44 51	41 43	15·6	19·92	35·98	—	—
126	,,	Mar. 1	noon . .	46 36	37 13	13·9	19·77	35·72	—	·00231
127	,,	,, 1	midnight	47 44	31 50	12·8	19·73	35·64	—	—
128	,,	,, 2	noon . .	49 13	26 27	12·2	19·71	35·61	—	—
129	,,	,, 2	midnight	50 6	21 0	11·1	19·71	35·61	—	·00233
130	,,	,, 3	noon . .	50 31	15 33	11·1	19·75	35·68	—	—
131	,,	,, 3	midnight	51 3	11 56	10·6	19·97	36·07	—	—
132	Ethiopia . .	Feb. 2	noon . .	55 6	14 55	10·0	19·65	35·50	26·43	—
133	,,	,, 3	,,	54 7	22 49	10·6	19·62	35·45	—	—
134	,,	,, 4	,,	53 22	28 46	8·3	19·36	34·98	—	—
135	,,	,, 5	,,	51 53	34 35	7·2	19·25	34·78	—	·00224
136	,,	,, 6	,,	50 8	39 48	11·1	19·62	35·45	—	—
137	,,	,, 7	,,	47 49	45 26	2·8	18·74	33·87	—	—
138	,,	,, 8	,,	45 26	50 28	2·8	17·92	32·40	24·10	·00211
139	,,	,, 9	,,	44 11	54 17	1·7	18·35	33·17	—	—
140	,,	,, 10	,,	42 58	60 14	4·4	18·37	33·20	—	—
141	,,	,, 11	,,	41 58	62 34	3·9	18·28	33·04	—	—
142	,,	,, 12	,,	41 12	64 49	5·0	18·40	33·26	24·74	—
143	,,	,, 13	,,	40 41	69 5	4·4	18·23	32·95	—	·00215
144	,,	,, 23	,,	40 34	68 13	4·4	18·15	32·80	—	—
145	,,	,, 24	,,	41 38	61 50	2·8	18·00	32·54	—	—
146	,,	,, 25	,,	42 31	55 37	3·9	18·28	33·04	—	·00216
147	,,	,, 26	,,	43 43	49 29	2·8	17·93	32·42	24·06	—
148	,,	,, 27	,,	46 29	44 4	3·9	18·68	33·76	25·08	—
149	,,	,, 28	,,	49 0	38 12	11·1	19·52	35·27	—	·00231
150	,,	,, 29	,,	51 9	31 32	9·4	19·35	34·96	—	—
151	,,	Mar. 1	,,	52 53	24 10	9·4	19·42	35·08	—	—
152	,,	,, 2	,,	54 15	16 26	10·0	19·57	35·36	26·39	—
153	,,	,, 3	,,	55 17	8 33	8·3	19·42	35·08	—	·00227
		1895.								
154	Loughrigg Holme	Dec. 29	,,	51 10	9 16	10·3	19·57	35·36	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1895.		N.	W.					
155	Loughrigg Holme	Dec. 30	noon . .	49° 41′	13° 11′	11·8	19·63	35·47	—	·00228
156	„	„ 31	„	48 12	16 57	11·8	19·63	35·47	26·40	—
		1896.								
157	„	Jan. 1	„	46 31	21 15	13·2	19·76	35·70	26·61	—
158	„	„ 1	8 P.M. .	45 51	22 41	12·9	19·71	35·61	—	—
159	„	„ 2	4 A.M. .	45 6	24 16	12·7	19·73	35·64	—	·00229
160	„	„ 2	noon . .	44 20	25 53	13·8	19·80	35·77	—	—
161	„	„ 2	8 P.M. .	43 34	27 22	13·4	19·81	35·79	—	—
162	„	„ 3	4 A.M. .	42 49	28 48	13·9	19·89	35·93	—	—
163	„	„ 3	noon . .	42 4	30 14	14·4	19·86	35·88	—	—
164	„	„ 3	8 P.M. .	41 19	31 35	14·6	19·87	35·89	—	—
165	„	„ 4	4 A.M. .	40 32	32 47	14·0	19·87	35·89	—	—
166	„	„ 4	noon . .	39 47	33 59	15·8	20·02	36·16	26·96	—
167	„	Feb. 15	„	41 14	49 22	13·0	19·60	35·41	—	—
168	„	„ 15	midnight	41 59	47 13	14·0	19·82	35·80	—	·00233
169	„	„ 16	noon . .	42 41	45 10	13·9	19·75	35·68	—	—
170	„	„ 16	midnight	43 26	43 6	15·6	19·96	36·05	26·82	—
171	„	„ 17	noon . .	44 16	40 54	14·6	19·81	35·79	—	·00226
172	„	„ 17	midnight	45 9	39 0	14·4	19·76	35·70	—	—
173	„	„ 18	noon . .	45 53	36 45	13·1	19·75	35·68	—	—
174	„	„ 18	midnight	46 25	34 13	12·2	19·75	35·68	—	—
175	„	„ 19	noon . .	46 53	32 0	12·2	19·68	35·56	—	—
176	„	„ 19	midnight	47 23	29 40	12·6	19·73	35·64	26·58	—
177	„	„ 20	noon . .	47 59	27 9	12·1	19·66	35·52	—	·00229
178	„	„ 20	midnight	48 17	24 40	11·8	19·74	35·66	—	—
179	„	„ 21	noon . .	48 20	22 11	11·7	19·64	35·48	—	—
180	„	„ 21	midnight	47 55	19 48	11·3	19·71	35·61	—	—
181	„	„ 22	noon . .	47 53	17 28	11·7	19·69	35·58	—	—
182	„	„ 22	midnight	48 25	15 20	11·6	19·68	35·56	—	—
183	„	„ 23	noon . .	49 0	12 54	11·7	19·67	35·54	—	·00229
184	Laura . .	Mar. 7	6 A.M. .	59 42	2 38	6·5	19·52	35·27	26·23	—
185	„	„ 7	noon . .	60 1	3 13	8·0	19·70	35·59	—	—
186	„	„ 7	10 P.M. .	60 47	4 52	8·0	19·59	35·40	—	—
187	„	„ 8	6 A.M. .	61 37	6 33	6·3	19·49	35·21	—	—
188	„	„ 12	10 P.M. .	62 27	7 45	6·2	19·50	35·23	26·30	—
189	„	„ 13	6 A.M. .	62 40	10 25	7·2	19·50	35·23	—	—
190	„	„ 13	noon . .	62 47	12 49	7·6	19·52	35·27	—	—
191	„	„ 13	10 P.M. .	63 4	16 27	7·4	19·50	35·23	—	—
192	„	„ 14	6 A.M. .	63 17	19 21	7·4	19·50	35·23	—	—
193	„	„ 14	noon . .	63 34	21 10	6·2	19·48	35·19	26·22	·00229
194	„	„ 14	10 P.M. .	64 7	23 0	4·2	19·23	34·74	—	·00226
195	„	„ 17	6 A.M. .	64 12	22 10	2·5	18·81	34·00	—	·00222
196	„	„ 17	noon . .	64 4	22 24	2·7	18·85	34·07	—	·00222
197	„	„ 19	„	63 46	22 41	5·4	19·26	34·80	—	·00227
198	„	„ 19	10 P.M. .	63 23	20 42	6·4	19·48	35·19	—	·00226
199	„	„ 20	6 A.M. .	63 1	19 41	7·5	19·51	35·25	—	—
200	„	„ 20	noon . .	62 54	18 50	7·6	19·49	35·21	—	—
201	„	„ 20	10 P.M. .	62 46	17 24	7·6	19·51	35·25	26·25	—
202	„	„ 21	6 A.M. .	62 37	16 18	7·8	19·49	35·21	—	—
203	„	„ 21	noon . .	62 13	14 27	7·9	19·52	35·27	—	—
204	„	„ 21	10 P.M. .	62 11	11 55	7·9	19·53	35·28	26·22	—
205	„	„ 22	6 A.M. .	62 15	9 0	7·7	19·53	35·28	—	—
206	„	„ 22	noon . .	62 16	7 35	6·8	19·48	35·19	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
207	Laura . .	Mar. 23	noon . .	62° 10′	6° 15′	6·0	19·45	35·14	—	—
208	,,	,, 24	10 P.M. .	61 34	6 20	6·4	19·47	35·17	—	—
209	,,	,, 25	6 A.M. .	60 50	5 14	7·2	19·53	35·28	—	—
210	,,	,, 25	noon . .	60 10	3 46	8·2	19·57	35·36	26·34	—
211	Teutonic . .	,, 12	midnight	51 7	14 19	11·1	19·64	35·48	—	—
212	,,	,, 13	noon . .	50 42	20 48	11·1	19·58	35·38	—	·00231
213	,,	,, 13	midnight	49 35	26 36	10·0	19·60	35·41	—	—
214	,,	,, 14	noon . .	48 28	32 25	11·1	19·70	35·59	—	—
215	,,	,, 14	midnight	46 48	37 47	10·6	19·45	35·14	—	—
216	,,	,, 15	noon . .	45 7	42 10	6·7	19·92	35·98	26·89	—
217	,,	,, 15	midnight	43 42	46 29	1·1	18·64	33·69	25·03	—
218	,,	,, 16	noon . .	42 17	51 48	3·9	18·31	33·10	—	—
219	,,	,, 16	midnight	41 54	57 0	6·7	18·37	33·20	—	·00218
220	,,	,, 17	noon . .	41 20	62 12	6·7	18·58	33·58	—	—
221	,,	,, 17	midnight	40 57	66 59	4·4	19·10	34·51	—	—
222	,,	,, 18	noon . .	40 33	71 47	4·4	18·46	33·37	—	—
223	,,	,, 25	midnight	40 16	68 30	5·6	18·25	32·98	24·51	·00216
224	,,	,, 26	noon . .	40 34	64 12	8·9	18·90	34·16	—	·00223
225	,,	,, 26	midnight	40 55	59 34	13·3	19·17	34·63	—	—
226	,,	,, 27	noon . .	41 16	54 57	14·4	19·66	35·52	—	·00233
227	,,	,, 27	midnight	42 23	50 4	10·6	19·03	34·39	25·57	—
228	,,	,, 28	noon . .	43 30	45 12	15·0	19·85	35·86	26·70	—
229	,,	,, 28	midnight	45 14	40 22	13·3	19·50	35·23	—	·00233
230	,,	,, 29	noon . .	46 58	35 32	13·3	19·72	35·63	—	—
231	,,	,, 29	midnight	48 16	30 45	12·2	19·65	35·50	—	—
232	,,	,, 30	noon . .	49 34	24 48	11·7	19·71	35·61	—	—
233	,,	,, 30	midnight	50 26	18 54	11·7	19·72	35·63	—	—
234	,,	,, 31	noon . .	51 9	13 1	11·7	19·65	35·50	—	—
235	Ethiopia . .	,, 14	,,	54 58	14 17	10·0	19·51	35·25	—	—
236	,,	,, 15	,,	53 57	20 48	10·6	19·50	35·23	—	—
237	,,	,, 16	,,	52 54	25 56	8·9	19·20	34·69	—	—
238	,,	,, 17	,,	51 41	30 13	10·6	19·59	35·40	—	—
239	,,	,, 18	,,	50 16	35 17	11·1	19·48	35·19	—	·00230
240	,,	,, 19	,,	49 11	36 19	11·1	19·67	35·54	—	—
241	,,	,, 20	,,	48 14	39 8	11·1	19·68	35·56	—	—
242	,,	,, 21	,,	46 9	45 7	5·0	18·59	33·60	—	—
243	,,	,, 22	,,	44 22	50 40	2·8	17·81	32·21	23·90	·00210
244	,,	,, 23	,,	43 22	56 48	3·9	18·21	32·91	—	—
245	,,	,, 24	,,	42 2	63 36	2·8	18·02	32·58	—	—
246	,,	,, 25	,,	40 24	70 5	3·3	18·07	32·66	—	·00212
247	,,	,, 29	,,	40 28	69 0	3·9	18·26	33·00	—	—
248	,,	,, 30	,,	41 28	63 22	2·8	17·80	32·19	23·89	—
249	,,	,, 31	,,	42 20	58 17	7·8	18·75	33·89	25·18	—
250	,,	Apr. 1	,,	42 50	54 30	2·2	18·15	32·80	24·32	·00214
251	,,	,, 2	,,	44 28	49 0	0·0	18·17	32·84	26·43	—
252	,,	,, 3	,,	46 54	43 44	3·9	18·80	33·98	—	—
253	,,	,, 4	,,	49 17	37 46	13·3	19·62	35·45	—	·00230
254	,,	,, 5	,,	51 23	30 57	11·1	19·38	35·01	—	—
255	,,	,, 6	,,	53 8	23 34	11·1	19·48	35·19	—	—
256	,,	,, 7	,,	54 30	16 19	10·6	19·52	35·27	—	—
257	,,	,, 8	,,	55 19	8 5	9·4	19·22	34·72	—	·00221
258	Monarch . .	Feb. 13	,,	50 21½	2 33	8·3	19·55	35·32	—	—
259	,,	,, 14	,,	52 12½	5 19	9·4	19·45	35·14	—	—
260	,,	,, 15	,,	52 56½	4 43¾	8·3	19·40	35·05	—	—
261	,,	,, 16	,,	52 56¾	4 32	8·3	19·34	34·94	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
262	Monarch. .	Feb. 17	noon . .	52° 31½′	5° 42′	8·3	19·35	34·96	—	—
263	„	„ 18	„	52 13¾	6 18	8·9	19·33	34·93	—	—
264	„	„ 19	„	52 17	6 31	8·3	19·13	34·56	—	·00226
265	„	„ 20	„	52 13	6 14½	9·4	19·33	34·93	—	—
266	„	„ 21	„	Off	Passage	10·0	14·91	27·02	19·83	·00174
267	„	„ 23	„	„	„	8·9	11·47	20·82	15·06	·00134
268	„	„ 24	„	„	„	7·8	19·38	35·01	26·04	—
269	„	Mar. 1	„	56° 17′	5° 49¾′	7·8	18·89	34·14	—	—
270	„	„ 2	„	57 13	5 39½	7·8	18·63	33·67	—	—
271	„	„ 3	„	57 57½	5 45	7·2	18·95	34·24	—	—
272	„	„ 4	„	58 55	3 14½	7·2	19·14	34·58	—	—
273	„	„ 5	„	Cairston Rd.,	Stromness	6·7	18·84	34·05	—	—
274	„	„ 6	„	58° 43′	3° 0′	6·7	19·16	34·62	—	—
275	„	„ 7	„	Leith	Roads	6·1	17·80	32·19	—	—
276	„	„ 8	„	—	—	6·1	17·92	32·40	—	—
277	„	„ 9	„	—	—	5·6	17·85	32·28	—	—
278	„	„ 10	„	—	—	5·6	—	—	—	—
279	„	„ 11	„	Inch Keith Lt. Ho. N. 62½° E. (true) dist. 3·45′.		6·7	18·59	33·60	—	—
280	„	„ 12	„	Leith	Roads E.	5·6	18·60	33·62	—	—
281	„	„ 13	„	53° 37½′	0° 40′	7·8	18·71	33·82	—	—
282	„	„ 21	„	Zandvoort 1′ E.		7·8	11·97	21·73	15·81	—
283	„	„ 22	„	52° 25′	4° 8′	6·7	18·55	33·53	—	—
284	„	„ 24	„	52 21¾	3 41	7·8	17·82	32·22	—	—
285	„	Apr. 3	„	50 42½	0 10	8·9	19·46	35·15	—	—
					W.					
286	„	„ 4	„	50 13	5 54½′	10·6	19·67	35·54	26·47	·00230
287	„	„ 5	„	51 23½	5 58	8·9	18·90	34·16	—	—
288	Frolic . .	„ 2	„	59 30	6 10	7·8	19·44	35·12	—	·00230
289	„	„ 2	6 P.M. .	60 0	7 56	8·9	15·57	35·36	—	—
290	„	„ 3	6 A.M. .	60 50	10 53	9·4	19·48	35·19	—	—
291	„	„ 3	noon . .	61 10	12 3	9·4	19·45	35·14	—	·00230
292	„	„ 3	6 P.M. .	61 40	13 46	8·9	19·47	35·17	—	—
293	„	„ 4	6 A.M. .	62 30	16 48	8·9	19·46	35·15	—	—
294	„	„ 4	noon . .	62 40	17 28	8·9	19·45	35·14	—	—
295	„	„ 4	6 P.M. .	63 0	18 42	8·3	19·41	35·07	26·05	—
296	„	„ 5	6 A.M. .	63 10	19 18	7·8	19·33	34·93	—	—
297	„	„ 5	noon . .	63 20	19 55	7·8	19·36	34·98	26·01	—
298	„	„ 17	„	63 30	20 16	8·9	19·42	35·08	26·14	—
299	„	„ 17	6 P.M. .	63 10	19 9	8·9	19·43	35·10	—	·00230
300	„	„ 18	6 A.M. .	62 20	16 8	8·9	19·43	35·10	26·11	—
301	„	„ 18	noon . .	61 50	14 18	8·9	19·45	35·14	—	—
302	„	„ 18	6 P.M. .	61 10	11 56	8·9	19·44	34·12	—	—
303	„	„ 19	6 A.M. .	59 50	7 14	8·9	19·44	35·12	—	·00230
304	„	„ 19	noon . .	59 30	6 5	10·0	19·50	35·23	26·23	—
305	„	„ 19	6 P.M. .	59 0	4 25	9·4	19·03	34·39	—	—
306	„	„ 20	6 A.M. .	57 40	—	8·3	19·17	34·63	—	—
307	„	„ 20	noon . .	56 30	—	8·9	19·17	34·63	—	—
308	„	„ 20	6 P.M. .	55 40	—	8·9	19·16	34·62	—	·00226
309	Teutonic. .	„ 10	noon . .	50 39	19 58	11·1	19·59	35·40	—	·00232
310	„	„ 10	midnight	49 43	27 14	12·2	19·64	35·48	—	—
311	„	„ 11	noon . .	48 47	34 31	12·2	19·58	35·38	—	—
312	„	„ 11	midnight	47 17	37 1	13·3	19·83	35·82	26·63	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
313	Teutonic .	Apr. 12	noon . .	45° 47′	41° 32′	13·3	19·59	35·40	—	—
314	,,	,, 12	midnight	44 5	47 20	8·3	18·68	33·76	—	—
315	,,	,, 13	noon . .	42 24	51 8	8·3	18·31	33·10	—	—
316	,,	,, 13	midnight	41 52	56 38	10·0	20·10	36·30	—	—
317	,,	,, 14	noon . .	41 20	62 8	5·6	18·30	33·08	—	·00216
318	,,	,, 14	midnight	40 57	67 37	6·1	18·17	32·84	—	—
319	,,	,, 15	noon . .	40 34	73 7	7·8	17·72	32·04	23·71	—
320	,,	,, 22	midnight	40 9	69 47	6·7	18·36	33·19	—	·00215
321	,,	,, 23	noon . .	40 27	65 37	7·2	18·46	33·37	—	·00217
322	,,	,, 23	midnight	40 53	60 43	11·7	19·65	35·50	26·43	—
323	,,	,, 24	noon . .	41 19	55 48	16·7	20·25	36·57	27·17	·00238
324	,,	,, 24	midnight	42 10	50 56	6·1	18·47	33·39	24·93	—
325	,,	,, 25	noon . .	43 1	46 3	16·7	20·01	36·14	—	—
326	,,	,, 25	midnight	44 51	41 18	12·8	19·78	35·73	—	·00233
327	,,	,, 26	noon . .	46 41	36 33	13·3	19·77	35·72	—	—
328	,,	,, 26	midnight	48 0	31 11	12·2	19·71	35·61	—	—
329	,,	,, 27	noon . .	49 19	25 50	13·3	19·65	35·50	—	—
330	,,	,, 27	midnight	50 17	20 2	10·0	19·74	35·66	—	—
331	,,	,, 28	noon . .	51 16	14 14	12·2	19·63	35·47	—	—
332	Capricornus.	,, 14	1.30 P.M.	59 24	4 25	8·1	19·40	35·05	—	—
333	,,	,, 15	8 A.M. .	61 11	7 23	7·2	19·45	35·14	—	·00230
334	,,	,, 15	1.30 P.M.	61 42	8 55	7·5	19·47	35·17	—	—
335	,,	,, 15	7 P.M. .	62 15	10 23	7·5	19·45	35·14	—	—
336	,,	,, 16	8 A.M. .	63 15	14 4	7·8	19·43	35·10	—	—
337	,,	,, 16	2 P.M. .	63 46	15 42	6·7	19·39	35·03	—	—
338	,,	,, 16	9 P.M. .	63 37	17 0	7·2	19·40	35·05	26·08	—
339	,,	,, 17	8 A.M. .	63 28	17 53	5·8	18·65	33·71	25·00	—
340	,,	,, 18	,,	63 22	20 23	6·4	19·38	35·01	—	·00229
341	,,	,, 19	noon . .	63 22	20 23	6·1	19·29	34·86	—	—
342	,,	,, 20	,,	63 22	20 23	6·1	19·29	34·86	—	—
343	,,	,, 21	,,	63 22	20 23	6·4	19·30	34·87	—	—
344	,,	,, 22	,,	63 22	20 23	6·1	19·28	34·84	—	—
345	,,	,, 23	,,	63 22	20 23	6·4	19·29	34·86	—	—
346	,,	,, 24	,,	63 22	20 23	6·7	19·28	34·84	25·90	—
347	,,	,, 25	7 P.M. .	63 42	16 55	7·2	18·26	33·00	24·48	·00216
348	,,	,, 26	8 A.M. .	63 50	16 11	7·8	19·42	35·08	26·11	—
349	,,	,, 26	noon . .	63 50	16 11	8·1	19·42	35·08	—	·00228
350	,,	,, 26	6 P.M. .	63 50	16 11	8·1	19·42	35·08	—	—
351	,,	,, 27	8 A.M. .	62 39	11 6	8·1	19·41	35·07	—	—
352	,,	,, 27	noon . .	62 18	9 37	8·3	19·46	35·15	—	·00230
353	,,	,, 27	6 P.M. .	61 57	8 0	7·8	19·46	35·15	—	—
354	,,	,, 28	8 A.M. .	60 30	5 35	8·6	19·47	35·17	—	—
355	,,	,, 28	noon . .	60 0	4 45	9·7	19·52	35·27	—	·00229
356	,,	,, 28	6 P.M. .	59 24	3 54	8·6	19·47	35·17	—	—
357	Hercules. .	,, 24	7.30 A.M.	59 50	6 10	14·7	19·52	35·27	—	—
358	,,	,, 24	1 P.M. .	60 11	7 8	11·4	19·52	35·27	—	—
359	,,	,, 24	7.30 P.M.	60 38	8 25	8·6	19·52	35·27	—	—
360	,,	,, 25	8.30 A.M.	61 20	10 48	8·3	19·52	35·27	—	—
361	,,	,, 25	4 P.M. .	61 44	12 6	8·3	19·48	35·19	—	—
362	,,	,, 25	8 P.M. .	62 3	13 6	8·3	19·46	35·15	—	—
363	,,	,, 26	8.30 A.M.	62 49	15 6	8·3	19·47	35·17	—	—
364	,,	,, 26	noon . .	63 6	16 30	8·3	19·47	35·17	—	—
365	,,	,, 26	5 P.M. .	63 45	22 45	8·3	19·39	35·03	—	—
366	,,	,, 27	4 P.M. .	64 47	24 11	4·3	19·07	34·46	—	—
367	,,	,, 27	7 P.M. .	64 57	24 15	4·3	19·07	34·46	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
368	Hercules . .	Apr. 28	noon . .	64° 47′	24° 12′	4·3	19·09	34·49	—	—
369	,,	,, 28	6 P.M. .	64 57	24 15	4·3	19·07	34·46	—	—
370	,,	,, 29	10 A.M. .	64 57	24 15	4·3	19·08	34·47	—	—
371	,,	,, 29	5 P.M. .	64 47	24 12	4·3	19·06	34·44	—	—
372	,,	,, 30	2 P.M. .	64 57	24 15	4·3	19·07	34·46	—	—
373	,,	,, 30	8 P.M. .	64 47	24 12	4·3	19·07	34·46	—	—
374	,,	May 1	3 P.M. .	64 57	24 15	4·3	19·08	34·47	—	—
375	,,	,, 2	9 P.M. .	64 47	24 12	4·3	19·06	34·44	—	—
376	,,	,, 3	4 P.M. .	66 8	24 20	2·8	19·06	34·44	—	—
377	,,	,, 4	8 P.M. .	66 7	24 20	2·8	19·06	34·44	—	—
378	,,	,, 5	10 A.M. .	66 25	24 0	2·8	19·07	34·46	—	—
379	,,	,, 6	4 P.M. .	63 27	19 24	6·5	19·41	35·07	—	—
380	,,	,, 7	7 P.M. .	62 27	19 24	6·5	19·41	35·07	—	—
381	,,	,, 8	noon . .	62 45	16 50	8·3	19·42	35·08	—	—
382	,,	,, 8	4 P.M. .	62 26	15 27	8·9	19·45	35·14	—	—
383	,,	,, 8	9 P.M. .	62 8	14 18	8·9	19·41	35·07	—	—
384	,,	,, 9	9 A.M. .	61 38	11 45	10·0	19·51	35·25	—	—
385	,,	,, 9	5 P.M. .	60 52	9 38	10·0	19·50	35·23	—	—
386	,,	,, 9	9.30 P.M.	60 30	8 30	10·0	19·47	35·17	—	—
387	Ethiopia . .	Apr. 18	noon . .	54 46	13 29	10·6	19·54	35·30	—	—
388	,,	,, 19	,,	53 26	20 35	10·6	19·53	35·28	—	—
389	,,	,, 20	,,	51 43	27 25	11·1	19·53	35·28	—	—
390	,,	,, 21	,,	49 44	33 21	12·2	19·64	35·48	—	·00230
391	,,	,, 22	,,	47 57	38 6	11·7	19·59	35·40	—	—
392	,,	,, 23	,,	46 11	42 24	12·2	19·54	35·30	26·31	—
393	,,	,, 24	,,	44 17	46 50	4·4	18·43	33·32	—	·00214
394	,,	,, 25	,,	42 59	53 7	2·8	18·20	32·90	—	—
395	,,	,, 26	,,	42 35	59 57	3·9	18·10	32·72	—	—
396	,,	,, 26	,,	41 21	66 39	5·0	18·07	32·66	24·32	—
397	,,	,, 28	,,	40 25	73 32	7·2	17·66	31·93	—	·00208
398	,,	May 3	,,	40 30	68 18	6·7	18·10	32·72	—	—
399	,,	,, 4	,,	40 36	62 10	19·4	19·93	36·00	—	—
400	,,	,, 5	,,	41 14	55 38	18·9	20·05	36·21	27·06	·00233
401	,,	,, 6	,,	41 42	48 53	14·4	19·54	35·30	—	—
402	,,	,, 7	,,	44 43	43 29	13·9	19·66	35·52	26·49	—
403	,,	,, 8	,,	47 25	38 8	12·2	19·47	35·17	—	—
404	,,	,, 9	,,	49 39	32 6	11·1	19·35	34·96	26·11	—
405	,,	,, 10	,,	51 56	25 28	12·8	19·47	35·17	—	·00228
406	,,	,, 11	,,	53 42	17 54	12·2	19·53	35·28	—	—
407	,,	,, 12	,,	55 8	10 15	12·8	19·53	35·28	—	—
408	Fiolie . .	Apr. 27	6 A.M. .	59 10	5 3	10·0	19·48	35·19	—	·00231
409	,,	,, 27	noon . .	59 40	6 44	10·0	19·50	35·23	—	—
410	,,	,, 27	6 P.M. .	60 10	8 30	9·4	19·53	35·28	—	—
411	,,	,, 28	6 A.M. .	61 10	12 0	8·9	19·45	35·14	—	—
412	,,	,, 28	noon . .	61 35	13 26	8·9	19·45	35·14	—	—
413	,,	,, 28	6 P.M. .	62 0	15 3	8·9	19·47	35·17	—	—
414	,,	,, 29	6 A.M. .	62 40	17 26	8·3	19·46	35·15	—	—
415	,,	,, 29	noon . .	63 0	18 41	8·3	19·40	35·05	26·07	—
416	,,	,, 29	6 P.M. .	63 10	19 18	8·9	19·15	34·60	25·74	·00226
417	,,	,, 30	6 A.M. .	63 25	19 54	8·3	19·40	35·05	—	—
418	,,	,, 30	noon . .	63 25	20 2	8·9	19·45	35·14	—	—
419	,,	,, 30	6 P.M. .	63 25	20 8	8·9	19·45	35·14	—	—
420	,,	May 4	6 A.M. .	64 30	23 8	7·2	19·38	35·01	—	—
421	,,	,, 4	noon . .	64 50	24 24	6·7	19·39	35·03	—	—
422	,,	,, 4	6 P.M. .	65 10	24 10	6·7	19·34	34·94	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
423	Frolic. . .	May 5	6 A.M. .	65° 10′	24° 20′	5·6	19·27	34·82	—	—
424	,,	,, 5	noon . .	65 30	24 56	6·7	19·28	34·84	—	—
425	,,	,, 8	,,	65 50	24 48	6·7	19·28	34·84	—	—
426	,,	,, 9	6 A.M. .	64 0	23 46	7·8	19·31	34·89	25·97	·00228
427	,,	,, 9	noon . .	63 40	23 30	7·8	19·09	34·49	25·57	—
428	,,	,, 9	6 P.M. .	63 0	20 16	9·4	19·47	35·17	26·18	—
429	,,	,, 10	6 A.M. .	62 20	16 28	10·0	19·42	35·08	—	—
430	,,	,, 10	noon . .	62 0	14 44	10·6	19·45	35·14	—	—
431	,,	,, 10	6 P.M. .	61 40	13 25	10·6	19·44	35·12	—	—
432	,,	,, 11	6 A.M. .	60 40	10 2	11·1	19·52	35·27	—	—
433	,,	,, 11	noon . .	60 0	8 26	11·7	19·52	35·28	—	—
434	,,	,, 11	6 P.M. .	59 20	5 46	12·8	19·54	35·30	—	·00229
435	Laura. . .	Apr. 27	6 A.M. .	60 4	3 26	9·2	19·53	35·28	—	—
436	,,	,, 27	noon . .	60 30	4 42	9·0	19·53	35·28	—	—
437	,,	,, 27	10 P.M. .	61 30	6 10	8·0	19·42	35·08	—	—
438	,,	,, 28	noon . .	61 54	7 26	7·0	19·44	35·12	—	—
439	,,	,, 28	10 P.M. .	62 17	11 4	7·7	19·48	35·19	—	—
440	,,	,, 29	6 A.M. .	62 32	13 47	7·6	19·49	35·21	—	—
441	,,	,, 29	noon . .	62 40	16 7	8·0	19·48	35·19	—	—
442	,,	,, 29	10 P.M. .	63 17	19 20	7·7	19·34	34·94	—	—
443	,,	,, 30	6 A.M. .	63 20	20 0	7·2	19·40	35·05	—	·00229
444	,,	,, 30	noon . .	63 44	22 14	7·2	18·95	34·24	25·50	—
445	,,	May 3	10 P.M. .	64 30	23 32	6·0	19·26	34·80	25·95	—
446	,,	,, 4	6 A.M. .	65 5	23 45	4·3	19·14	34·58	—	·00226
447	,,	,, 5	,,	65 16	24 0	4·7	18·95	34·24	—	—
448	,,	,, 8	,,	66 4	23 53	2·8	18·81	34·02	—	·00223
449	,,	,, 8	10 P.M. .	66 17	23 35	3·0	18·80	33·98	—	—
450	,,	,, 9	6 A.M. .	65 19	24 34	4·7	19·20	34·69	—	—
451	,,	,, 9	noon . .	64 34	23 24	6·8	19·26	34·80	—	—
452	,,	,, 13	6 A.M. .	63 47	22 48	8·0	18·07	32·66	24·24	·00214
453	,,	,, 13	noon . .	63 34	21 17	8·0	19·13	34·56	25·69	—
454	,,	,, 13	10 P.M. .	63 7	18 12	8·5	19·40	35·05	26·15	—
455	,,	,, 14	6 A.M. .	62 50	14 54	8·9	19·45	35·14	—	—
456	,,	,, 14	noon . .	62 38	12 37	8·7	19·44	35·12	—	—
457	,,	,, 14	10 P.M. .	62 27	8 40	8·6	19·45	35·14	—	—
458	,,	,, 15	6 A.M. .	62 26	7 0	7·5	19·39	35·03	—	—
459	,,	,, 16	10 P.M. .	61 8	5 45	9·0	19·45	35·14	—	·00231
460	,,	,, 17	6 A.M. .	60 25	4 17	9·7	19·54	35·30	—	—
461	,,	,, 17	noon . .	59 45	2 50	9·7	19·49	35·21	—	—
462	Loughrigg Holme	Mar. 21	,,	58 43	3 52	7·4	19·08	34·47	25·70	·00223
463	,,	,, 21	midnight	58 30	7 7	8·6	19·43	35·10	—	·00228
464	,,	,, 22	noon . .	58 18	10 8	9·9	19·48	35·19	—	·00230
465	,,	,, 22	midnight	58 1	12 21	9·1	19·49	35·21	—	—
466	,,	,, 23	noon . .	57 48	13 46	8·4	19·47	35·17	26·30	—
467	,,	,, 23	midnight	57 20	15 48	8·6	19·50	35·23	—	—
468	,,	,, 24	noon . .	56 33	18 48	9·5	19·44	35·12	—	—
469	,,	,, 24	midnight	55 40	21 32	9·4	19·47	35·17	—	—
470	,,	,, 25	noon . .	55 3	23 50	8·9	19·40	35·05	—	—
471	,,	,, 25	midnight	54 27	25 40	8·4	19·40	35·05	—	—
472	,,	,, 26	noon . .	53 47	27 49	8·0	19·34	34·94	—	·00225
473	,,	,, 26	midnight	53 1	29 39	7·8	19·29	34·86	—	—
474	,,	,, 27	noon . .	52 34	30 51	7·3	19·23	34·74	—	—
475	,,	,, 27	midnight	51 47	32 28	9·5	19·35	34·96	—	—
476	,,	,, 28	noon . .	50 54	34 14	8·1	19·25	34·78	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
477	Loughrigg Holme	Mar. 28	midnight	50° 14′	35° 44′	12·2	19·63	35·47	—	—
478	,,	,, 29	noon . .	49 32	37 0	11·8	19·52	35·27	—	—
479	,,	,, 29	midnight	48 54	38 30	12·8	19·60	35·41	—	—
480	,,	,, 30	noon . .	48 17	39 48	11·8	19·57	35·36	—	—
481	,,	,, 30	midnight	48 2	40 35	10·1	19·66	35·52	—	·00230
482	,,	,, 31	noon . .	47 53	41 8	11·6	19·53	35·28	—	—
483	,,	,, 31	midnight	47 21	42 11	12·3	19·71	35·61	26·63	—
484	,,	Apr. 1	noon . .	46 16	43 55	4·3	18·76	33·90	25·31	—
485	,,	,, 1	midnight	45 21	45 41	8·5	18·90	34·16	—	—
486	,,	,, 2	noon . .	44 39	47 4	4·6	18·46	33·37	—	—
487	,,	,, 2	midnight	43 43	48 36	2·8	18·43	33·32	—	·00213
488	,,	,, 3	noon . .	42 54	50 24	1·7	18·07	32·66	24·34	—
489	,,	,, 3	midnight	42 54	52 45	5·6	18·54	33·51	—	—
490	,,	,, 4	noon . .	43 3	54 49	3·7	18·25	32·98	—	—
491	,,	,, 4	midnight	43 2	57 10	3·0	18·22	32·93	—	—
492	,,	,, 5	noon . .	43 2	59 18	2·4	18·07	32·66	—	—
493	,,	,, 5	midnight	42 49	61 39	2·2	18·01	32·64	—	—
494	,,	,, 6	noon . .	42 36	64 1	1·3	17·48	31·63	23·52	·00206
495	,,	,, 6	midnight	42 28	66 35	3·9	18·11	32·73	—	—
496	,,	,, 7	noon . .	42 28	69 10	3·7	18·25	32·98	—	—
497	,,	,, 14	,,	43 2	66 34	4·1	17·87	32·31	—	—
498	,,	,, 14	midnight	42 58	65 8	2·2	17·60	31·83	—	—
499	,,	,, 15	noon . .	43 54	62 20	1·9	17·64	31·90	23·69	·00205
500	,,	May 12	,,	46 33	54 35	1·9	17·93	32·42	24·17	—
501	,,	,, 13	,,	46 51	51 17	1·8	17·95	32·46	—	·00211
502	,,	,, 13	midnight	47 14	48 44	0·8	18·10	32·72	—	—
503	,,	,, 14	noon . .	47 46	46 19	2·1	18·73	33·85	—	—
504	,,	,, 15	,,	48 47	41 13	11·5	19·55	35·32	—	—
505	,,	,, 15	midnight	49 11	38 33	8·3	18·67	33·75	—	—
506	,,	,, 16	noon . .	49 33	36 54	11·5	19·40	35·05	—	—
507	,,	,, 16	midnight	49 50	34 15	12·8	19·67	35·54	—	—
508	,,	,, 17	noon . .	50 7	30 36	12·9	19·55	35·32	—	·00227
509	,,	,, 17	midnight	50 15	27 55	13·0	19·54	35·30	—	—
510	,,	,, 18	noon . .	50 23	25 7	13·3	19·42	35·08	—	—
511	,,	,, 18	8 P.M. .	50 24	23 12	14·1	19·54	35·30	—	—
512	,,	,, 18	midnight	50 25	22 14	13·9	19·60	35·41	—	—
513	,,	,, 19	4 A.M. .	50 25	21 16	14·2	19·60	35·42	26·38	—
514	,,	,, 19	noon . .	50 25	19 17	14·7	19·62	35·45	—	—
515	,,	,, 19	4 P.M. .	50 22	18 22	14·8	19·67	35·54	—	—
516	,,	,, 19	midnight	50 14	16 33	14·1	19·63	35·47	—	·00231
517	,,	,, 20	8 A.M. .	50 8	14 45	14·9	19·62	35·45	—	—
518	,,	,, 20	noon . .	50 5	13 40	14·8	19·65	35·50	—	—
519	,,	,, 21	8 A.M. .	49 56	9 1	13·7	19·55	35·32	—	—
520	,,	,, 21	noon . .	49 55	8 5	14·1	19·68	35·56	26·58	—
521	,,	,, 21	6 P.M. .	49 49	6 37	12·8	19·67	35·54	—	—
522	Capricornus	,, 3	midnight	W. side of Pent-land Firth.		8·1	19·16	34·62	—	—
523	,,	,, 4	8 A.M. .	59°23′	5° 4′	9·7	19·49	35·21	—	—
524	,,	,, 4	noon . .	59 48	6 20	10·3	19·49	35·21	—	—
525	,,	,, 4	7 P.M. .	60 17	7 47	9·2	19·46	35·15	—	—
526	,,	,, 4	midnight	60 42	9 2	8·6	19·53	35·28	—	—
527	,,	,, 5	8 A.M. .	61 18	10 52	8·9	19·45	35·14	—	—
528	,,	,, 5	noon . .	61 38	11 54	9·2	19·50	35·23	—	—
529	,,	,, 5	7 P.M. .	62 13	13 44	8·6	19·45	35·14	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
530	Capricornus	May 5	midnight	62° 40′	15° 7′	8·3	19·45	35·14	—	—
531	,,	,, 6	8 A.M.	63 3	16 22	8·9	19·45	35·14	—	—
532	,,	,, 6	noon	63 20	17 27	9·2	19·44	35·12	—	—
533	,,	,, 6	midnight	63 26	17 32	8·1	19·29	34·86	—	—
534	,,	,, 7	noon	63 50	16 24	8·3	19·30	34·87	—	—
535	,,	,, 7	midnight	63 50	16 24	7·8	19·33	34·93	—	—
536	,,	,, 8	8 A.M.	63 3	19 46	8·3	19·42	35·08	—	—
537	,,	,, 8	noon	63 36	21 37	7·5	19·41	35·07	—	—
538	,,	,, 8	6 P.M.	63 45	22 45	7·2	19·26	34·80	—	—
539	,,	,, 8	midnight	64 44	24 0	6·7	19·37	35·00	—	·00226
540	,,	,, 9	noon	65 50	24 10	3·9	19·00	34·33	25·53	—
541	,,	,, 9	midnight	66 36	22 47	3·3	19·12	34·54	25·66	·00224
542	,,	,, 10	noon	66 39	22 28	2·5	18·85	34·07	—	·00222
543	,,	,, 11	,,	66 39	22 28	2·2	18·79	33·96	25·26	·00221
544	,,	,, 17	midnight	63 44	16 0	8·1	19·38	35·01	—	·00228
545	,,	,, 18	noon	63 7	12 3	9·2	19·41	35·07	—	—
546	,,	,, 19	midnight	62 18	9 10	6·7	19·39	35·03	—	—
547	,,	,, 20	8 A.M.	61 45	7 0	7·2	19·40	35·05	—	—
548	,,	,, 21	noon	61 9	6 26	8·9	19·49	35·21	26·12	—
549	,,	,, 21	,,	60 15	5 12	9·2	19·06	34·44	25·64	—
550	,,	,, 22	midnight	59 42	4 32	8·9	19·05	34·42	—	—
551	,,	,, 21	noon	59 0	3 36	9·7	19·06	34·44	—	—
552	Teutonic	,, 7	midnight	51 6	14 22	12·8	19·58	35·38	—	—
553	,,	,, 8	noon	50 39	20 46	13·3	19·58	35·38	—	·00229
554	,,	,, 8	midnight	49 28	27 1	13·9	19·63	35·47	—	—
555	,,	,, 9	noon	48 20	33 4	13·3	19·68	35·56	—	—
556	,,	,, 9	midnight	46 28	38 23	13·3	19·58	35·38	—	—
557	,,	,, 10	noon	44 50	43 10	14·4	19·78	35·73	—	—
558	,,	,, 10	midnight	43 18	47 42	8·9	18·43	33·32	—	—
559	,,	,, 11	noon	42 26	52 28	6·7	18·30	33·08	—	·00215
560	,,	,, 11	midnight	41 49	57 50	11·1	19·56	35·34	—	—
561	,,	,, 12	noon	41 12	63 31	14·4	19·67	35·54	—	·00231
562	,,	,, 12	midnight	40 43	68 43	7·2	18·21	32·91	—	·00213
563	,,	,, 20	,,	40 8	69 43	10·0	18·29	33·06	—	—
564	,,	,, 21	noon	40 31	64 58	16·7	19·78	35·73	—	·00232
565	,,	,, 21	midnight	40 50	60 6	17·8	20·13	36·35	—	·00235
566	,,	,, 22	noon	41 12	54 47	14·4	19·54	35·30	—	—
567	,,	,, 22	midnight	41 44	49 46	14·4	19·68	35·56	—	—
568	,,	,, 23	noon	43 21	45 0	17·8	20·14	36·37	—	—
569	,,	,, 23	midnight	45 15	40 15	16·1	19·67	35·54	—	—
570	,,	,, 24	noon	47 0	35 21	15·0	19·54	35·30	—	—
571	,,	,, 24	midnight	48 20	29 53	14·4	19·68	35·56	—	—
572	,,	,, 25	noon	49 32	24 16	15·6	19·68	35·56	—	—
573	,,	,, 25	midnight	50 32	18 26	15·0	19·67	35·54	—	—
574	,,	,, 26	noon	51 10	12 22	14·4	19·68	35·56	—	—
575	Frolic	,, 17	6 A.M.	59 10	5 4	10·0	19·49	35·21	—	—
576	,,	,, 17	noon	59 35	6 32	11·1	19·60	35·41	—	—
577	,,	,, 17	6 P.M.	60 0	8 0	11·1	19·53	35·28	—	—
578	,,	,, 18	6 A.M.	60 50	10 58	8·9	19·49	35·21	—	—
579	,,	,, 18	noon	61 10	12 17	9·4	19·47	35·17	—	—
580	,,	,, 18	6 P.M.	61 35	13 47	9·4	19·50	35·23	—	—
581	,,	,, 19	6 A.M.	62 20	16 37	8·9	19·50	35·23	—	—
582	,,	,, 19	noon	62 40	17 48	8·9	19·48	35·19	—	—
583	,,	,, 19	6 P.M.	63 0	19 0	8·3	19·49	35·21	26·25	—
584	,,	,, 20	6 A.M.	63 40	22 8	7·8	17·45	31·53	23·42	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
585	Frolic. . .	May 20	noon . .	64° 20′	23° 16′	7·2	19·34	34·94	25·99	—
586	,,	,, 20	6 P.M. .	65 0	24 35	6·7	19·23	34·74	—	—
587	,,	,, 21	noon . .	65 40	25 8	5·6	19·31	34·89	—	·00227
588	,,	,, 24	,,	66 20	24 38	5·0	19·02	34·37	—	·00223
589	,,	,, 26	,,	66 35	23 28	2·8	18·66	33·73	—	·00218
590	,,	,, 27	,,	66 50	23 15	1·1	18·30	33·08	24·55	·00216
591	,,	,, 30	,,	65 0	24 36	6·7	19·33	34·93	25·99	·00226
592	,,	,, 30	6 P.M. .	64 20	23 50	7·2	19·38	35·01	—	·00229
593	,,	,, 31	noon . .	63 20	22 46	7·8	18·50	33·44	—	—
594	,,	June 1	6 A.M. .	62 25	17 18	8·3	19·48	35·19	—	—
595	,,	,, 1	noon . .	62 5	16 10	8·9	19·56	35·34	—	—
596	,,	,, 1	6 P.M. .	61 40	14 38	8·9	19·49	35·21	—	—
597	,,	,, 2	6 A.M. .	60 30	10 36	9·4	19·51	35·25	—	—
598	,,	,, 2	noon . .	60 0	8 45	10·0	19·52	35·27	—	—
599	,,	,, 2	6 P.M. .	59 30	6 56	10·6	19·51	35·25	—	—
600	California .	Mar. 20	noon . .	31 6	47 36	—	20·20	36·48	—	·00238
601	,,	,, 20	midnight	31 6	49 56	—	20·08	36·27	—	·00238
602	,,	,, 21	noon . .	31 51	52 19	—	20·23	36·53?	—	·00239
603	,,	,, 21	midnight	32 39	54 39	—	20·49	37·00	—	·00242
604	,,	,, 22	noon . .	33 35	56 34	—	20·06	36·23	—	—
605	,,	,, 22	midnight	34 16	58 27	—	20·20	36·48	—	—
606	,,	,, 23	noon . .	34 59	60 21	—	20·08	36·27	—	—
607	,,	,, 24	,,	36 43	64 51	—	20·21	36·49	—	·00237
608	,,	,, 24	midnight	37 17	66 43	—	20·24	36·55	—	—
609	,,	,, 25	noon . .	37 51	68 18	—	20·07	36·25	27·15	·00236
610	,,	,, 25	midnight	38 41	70 35	—	19·66	35·52	26·47	·00228
611	,,	,, 26	noon . .	39 37	71 50	—	19·40	35·05	26·18	·00229
612	,,	,, 26	midnight	40 27	73 53	—	18·12	32·75	—	·00213
613	,,	April 9	noon . .	40 25	70 22	—	18·30	33·08	—	·00215
614	,,	,, 10	,,	40 49	66 6	—	19·22	34·72	—	·00226
615	,,	,, 11	,,	41 27	61 34	—	18·11	32·73	—	·00211
616	,,	,, 11	midnight	41 49	59 14	—	19·78	35·73	—	—
617	,,	,, 12	noon . .	42 21	56 50	—	20·02	36·16	—	—
618	,,	,, 12	midnight	42 41	54 18	—	18·88	34·12	—	—
619	,,	,, 13	,,	45 15	49 9	—	18·15	32·80	—	—
620	,,	,, 14	noon . .	43 58	47 6	—	18·33	33·13	—	—
621	,,	,, 14	midnight	45 5	45 0	—	18·44	33·34	—	—
622	,,	,, 15	noon . .	46 19	42 52	—	18·27	33·02	—	—
623	,,	,, 15	midnight	47 22	40 39	—	18·60	33·62	—	—
624	,,	,, 16	noon . .	48 27	38 18	—	19·61	35·43	—	—
625	,,	,, 16	midnight	49 21	35 50	—	19·54	35·30	—	—
626	,,	,, 17	noon . .	50 20	35 10	—	19·35	34·96	—	—
627	,,	,, 17	midnight	51 4	30 18	—	19·45	35·14	—	—
628	,,	,, 18	noon . .	52 5	27 39	—	19·53	35·28	—	—
629	,,	,, 18	midnight	52 45	24 47	—	19·45	35·14	—	—
630	,,	,, 19	noon . .	53 25	21 52	—	19·52	35·27	—	—
631	,,	,, 19	midnight	53 55	18 56	—	19·61	35·43	—	—
632	,,	,, 20	noon . .	53 33	16 8	—	19·61	35·43	—	—
633	Corean . .	May 3	,,	off Quee	nstown	11·7	19·68	35·56	—	—
634	,,	,, 4	,,	51° 25′	15° 35′	12·2	19·72	35·63	26·68	—
635	,,	,, 5	,,	51 32	22 50	12·2	19·58	35·38	—	—
636	,,	,, 6	,,	51 44	30 15	11·1	19·55	35·32	—	—
637	,,	,, 7	,,	50 38	37 14	10·0	19·34	34·94	—	—
638	,,	,, 8	,,	48 44	43 35	7·8	18·74	33·87	—	·00221
639	,,	,, 9	,,	47 47	47 1	0·6	18·49	33·43	—	·00217

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
640	Corean . .	May 10	noon . .	47° 28′	50° 15′	1·1	18·07	32·66	24·24	—
641	,,	,, 11	,,	6′ off St. Newfoundland	John's,	−2·2	18·14	32·79	—	—
642	,,	,, 15	,,	off C.	Race	−1·1	17·75	32·09	—	—
643	,,	,, 16	,,	44° 50′	59° 20′	0·0	17·67	31·95	23·76	—
644	,,	,, 19	,,	41 45	66 0	7·8	18·32	33·11	—	—
645	,,	,, 20	,,	39 37	70 45	13·9	19·58	35·38	—	·00230
646	,,	,, 27	,,	39 32	70 47	14·4	18·94	34·23	—	—
647	,,	,, 28	,,	41 6	65 40	11·7	18·52	33·48	—	—
648	,,	,, 29	,,	42 48	60 23	5·6	18·09	32·70	—	—
649	,,	,, 30	,,	45 18	55 40	1·7	17·87	32·31	—	—
650	,,	,, 31	,,	46 12	53 45	2·2	17·80	32·19	—	—
651	,,	June 1	,,	off C.	Race	1·7	17·69	31·99	—	—
652	,,	,, 3	,,	off St.	John's	1·1	17·52	31·68	23·41	·00206
653	,,	,, 4	,,	48° 48′	48° 38′	0·0	17·77	32·13	—	·00209
654	,,	,, 5	,,	50 48	43 30	11·1	19·48	35·19	—	—
655	,,	,, 6	,,	52 30	37 20	8·9	19·20	34·69	—	—
656	,,	,, 7	,,	53 53	30 40	8·9	19·37	35·00	—	—
657	,,	,, 8	,,	54 55	23 50	12·8	19·55	35·32	—	—
658	,,	,, 9	,,	55 22	16 40	10·6	19·53	35·28	—	—
659	,,	,, 10	,,	55 17	9 30	13·3	19·51	35·25	26·26	—
					E.					
660	Otra . . .	Jan. 12	,,	57 38	1 47	7·2	19·49	35·21	—	—
661	,,	,, 28	,,	60 41	2 57	7·5	19·61	35·43	—	·00231
662	,,	,, 28	11 P.M. .	60 4	2 6	6·7	19·53	35·28	26·35	—
663	,,	,, 29	noon . .	58 54	0 37	6·9	19·51	35·25	—	—
664	,,	Feb. 5	,,	57 40	0 17	7·2	19·35	34·96	—	—
665	,,	,, 6	,,	60 4	4 57	5·8	18·68	33·76	25·19	·00221
666	,,	,, 19	,,	61 4	2 25	7·8	19·51	35·25	—	—
667	,,	,, 19	11 P.M. .	60 18	1 4	6·7	19·44	35·12	—	—
668	,,	Mar. 27	noon . .	59 22	1 41	6·4	19·47	35·17	—	·00230
669	,,	Apr. 13	7 P.M. .	62 22	5 10	5·6	18·45	33·36	24·85	·00219
670	,,	,, 14	noon . .	60 29	2 5	7·8	19·54	35·30	—	—
671	,,	,, 15	8 A.M. .	58 5	1 12	6·9	19·29	34·86	—	—
					W.					
672	,,	May 3	noon . .	60 19	7 51	8·3	19·44	35·12	—	—
673	,,	,, 3	midnight	61 8	10 54	8·3	19·50	35·23	—	—
674	,,	,, 4	noon . .	61 56	13 58	8·3	19·65	35·50	—	—
675	,,	,, 4	midnight	62 46	16 44	7·8	19·64	35·48	—	—
676	,,	,, 5	noon . .	63 35	20 40	7·2	19·62	35·45	—	—
677	,,	,, 5	midnight	64 5	23 15	7·5	19·20	24·69	—	—
678	,,	,, 10	,,	64 50	24 10	5·6	18·95	34·24	—	—
679	,,	,, 14	noon . .	66 10	19 50	0·8	18·58	33·58	—	—
680	,,	,, 15	2 A.M. .	66 15	18 55	0·6	18·12	32·75	—	—
681	,,	,, 17	noon . .	66 12	17 55	1·7	19·10	34·51	—	—
682	,,	,, 17	midnight	66 35	19 45	2·2	19·19	34·67	—	—
683	,,	,, 18	noon . .	66 18	23 50	2·2	19·29	34·86	—	—
684	,,	,, 22	midnight	64 30	13 50	2·5	19·08	34·47	—	—
685	,,	,, 24	1 A.M. .	65 25	13 40	2·8	18·09	32·70	—	·00213
686	,,	,, 24	10 P.M. .	65 45	14 5	2·8	18·26	33·00	—	—
687	,,	June 6	midnight	64 20	11 58	8·3	19·54	35·30	—	—
688	,,	,, 7	noon . .	63 5	10 5	8·3	19·61	35·43	26·30	—
689	,,	,, 8	1 A.M. .	61 35	7 45	7·8	19·60	35·41	—	·00231
690	Capricornus.	May 30	6 A.M. .	59 0	4 0	9·7	19·56	35·34	—	—
691	,,	,, 30	noon . .	59 33	5 38	10·0	19·56	35·34	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
692	Capricornus.	May 30	6 P.M. .	60° 4′	7° 5′	9·4	19·57	35·36	—	—
693	,,	,, 30	midnight	60 32	8 22	9·4	19·48	35·19	—	—
694	,,	,, 31	8 A.M. .	61 3	10 4	9·7	19·56	35·34	—	·00230
695	,,	,, 31	noon . .	61 22	11 3	9·4	19·55	35·32	26·38	·00230
696	,,	June 1	8 A.M. .	62 55	16 42	8·6	19·48	35·19	—	—
697	,,	,, 1	midnight	63 23	18 10	7·8	19·48	35·19	—	—
698	,,	,, 2	8 A.M. .	63 36	21 20	7·5	18·18	34·65	—	—
699	,,	,, 2	noon . .	63 45	22 42	7·5	19·40	35·05	—	—
700	,,	,, 3	,,	66 17	23 47	5·0	19·06	34·44	—	—
701	,,	,, 4	midnight	66 17	23 47	4·7	19·13	34·56	—	—
702	,,	,, 5	noon . .	66 27	24 15	5·6	19·17	34·63	—	—
703	,,	,, 7	,,	66 43	23 13	5·3	18·75	33·89	—	—
704	,,	,, 8	,,	66 43	23 13	5·0	18·89	34·30	—	—
705	,,	,, 11	,,	66 33	22 24	4·7	19·07	34·46	—	—
706	,,	,, 12	,,	66 33	22 24	5·0	19·02	34·37	—	—
707	,,	,, 13	,,	66 40	22 17	4·4	18·88	34·12	—	—
708	,,	,, 13	midnight	66 23	18 25	3·3	18·37	33·20	—	—
709	,,	,, 14	6 A.M. .	66 37	16 18	3·1	18·29	33·06	—	—
710	,,	,, 14	noon . .	66 22	14 27	2·8	18·34	33·15	—	—
711	,,	,, 14	6 P.M. .	65 40	13 27	3·9	18·24	32·97	—	·00216
712	,,	,, 14	midnight	65 0	12 24	3·1	18·68	33·76	25·19	·00222
713	,,	,, 15	noon . .	63 30	9 40	7·2	19·25	34·78	26·03	—
714	,,	,, 15	6 P.M. .	63 0	8 30	9·2	19·41	35·07	—	—
715	,,	,, 15	midnight	62 35	7 48	8·9	19·60	35·41	26·18	—
716	,,	,, 16	6 A.M. .	61 52	6 15	8·6	19·53	35·28	26·20	·00231
717	,,	,, 16	noon . .	61 2	5 25	10·6	19·67	35·54	—	·00231
718	,,	,, 16	6 P.M. .	60 10	4 37	10·6	19·56	35·34	—	—
719	,,	,, 16	midnight	59 26	4 6	11·9	19·23	34·74	—	—
720	Longhirst .	Jan. 28	noon . .	50 58	4 47	9·4	19·71	35·61	—	—
721	,,	,, 29	,,	48 22	7 29	12·2	19·73	35·64	—	—
722	,,	,, 30	,,	45 29	9 12	12·5	19·76	35·70	26·78	·00233
723	,,	,, 31	,,	42 27	10 35	14·4	19·97	36·07	26·86	·00235
724	,,	June 6	,,	48 13	61 56	7·2	16·80	30·40	22·54	·00198
725	,,	,, 7	,,	47 2	58 11	5·6	17·71	32·02	23·77	·00209
726	,,	,, 8	,,	46 25	54 10	5·0	17·87	32·31	—	—
727	,,	,, 9	,,	47 12	50 13	5·6	18·08	32·68	—	—
728	,,	,, 10	,,	48 32	46 14	5·0	18·42	33·30	—	·00217
729	,,	,, 11	,,	49 58	42 10	12·8	19·40	35·05	—	·00227
730	,,	,, 12	,,	51 28	38 29	11·1	19·13	34·56	—	—
731	,,	,, 13	,,	52 47	34 35	11·7	19·30	34·87	—	—
732	,,	,, 14	,,	53 37	29 55	11·4	19·40	35·05	—	—
733	,,	,, 15	,,	54 28	24 37	12·2	19·56	35·34	—	—
734	,,	,, 16	,,	54 58	19 20	13·3	19·68	35·56	26·38	—
735	,,	,, 17	,,	55 7	13 58	13·9	19·68	35·56	—	—
736	,,	,, 18	,,	55 18	8 17	15·0	19·59	35·40	—	—
737	,,	,, 19	,,	53 48	4 22	12·2	19·45	35·14	26·01	—
738	Teutonic. .	,, 4	midnight	51 5	14 25	13·9	19·61	35·43	—	—
739	,,	,, 5	noon . .	50 43	20 47	14·4	19·80	35·77	—	—
740	,,	,, 5	midnight	49 28	26 46	13·9	19·17	34·63	—	—
741	,,	,, 6	noon . .	48 20	32 56	13·3	19·71	35·61	—	·00233
742	,,	,, 6	midnight	46 48	38 28	15·0	19·78	35·73	—	—
743	,,	,, 7	noon . .	44 52	43 46	18·3	20·01	36·14	26·96	·00234
744	,,	,, 7	midnight	43 4	48 44	10·6	18·30	33·08	—	—
745	,,	,, 8	noon . .	42 2	53 50	15·6	18·21	32·91	—	—
746	,,	,, 8	midnight	41 37	58 18	8·9	18·38	33·22	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
747	Teutonic . .	June 9	noon . .	41° 2′	64° 46′	10·6	17·88	32·33	24·04	·00208
748	,,	,, 9	midnight	40 34	70 2	13·3	17·90	32·37	—	·00211
749	,,	,, 17	,,	40 20	69 59	20·6	18·14	32·79	—	—
750	,,	,, 18	noon . .	40 34	64 51	22·2	19·21	34·71	—	—
751	,,	,, 18	midnight	40 56	59 58	17·8	19·29	34·86	—	—
752	,,	,, 19	noon . .	41 19	54 41	16·7	19·22	34·72	—	—
753	,,	,, 19	midnight	42 3	49 34	12·2	18·30	33·08	—	—
754	,,	,, 20	noon . .	43 27	44 44	20·0	20·02	36·16	26·89	·00235
755	,,	,, 20	midnight	45 0	40 6	16·1	19·72	35·63	—	—
756	,,	,, 21	noon . .	47 28	34 53	15·0	19·62	35·45	—	·00231
757	,,	,, 21	midnight	48 41	29 1	14·4	19·51	35·25	—	—
758	,,	,, 22	noon . .	49 54	23 12	15·6	19·50	35·23	—	—
759	,,	,, 22	midnight	50 31	17 11	15·0	19·65	35·50	26·52	—
760	,,	,, 23	noon . .	51 16	11 5	15·6	19·68	35·56	—	—
761	Laura . .	,, 8	4 A.M. .	59 55	3 12	9·0	19·47	35·17	26·33	·00230
762	,,	,, 8	noon . .	60 56	4 54	9·2	19·53	35·28	26·31	·00231
763	,,	,, 8	8 P.M. .	61 45	6 20	8·0	19·39	35·03	—	—
764	,,	,, 10	4 A.M. .	62 8	6 26	7·0	19·40	35·05	—	—
765	,,	,, 11	,,	62 4	8 20	8·0	19·45	35·14	—	—
766	,,	,, 11	noon . .	62 16	11 28	9·0	19·45	35·14	—	—
767	,,	,, 11	8 P.M. .	62 32	14 25	9·2	19·48	35·19	—	—
768	,,	,, 12	4 A.M. .	62 48	17 30	9·0	19·40	35·05	—	—
769	,,	,, 12	noon . .	63 14	20 4	8·7	19·39	35·03	26·18	·00230
770	,,	,, 12	8 P.M. .	63 50	23 2	8·7	18·08	32·68	24·30	·00215
771	,,	,, 16	noon . .	64 35	23 23	8·5	19·24	34·76	—	·00228
772	,,	,, 16	8 P.M. .	64 59	24 25	8·1	19·09	34·49	—	·00225
773	,,	,, 17	4 A.M. .	66 4	23 59	6·0	18·87	34·10	—	—
774	,,	,, 18	,,	66 13	23 46	5·9	18·87	34·11	—	—
775	,,	,, 20	,,	65 22	24 26	7·6	18·65	33·71	—	—
776	,,	,, 22	,,	65 16	23 28	7·9	18·75	33·96	—	—
777	,,	,, 22	noon . .	64 28	23 26	9·2	18·93	34·21	—	—
778	,,	,, 25	4 A.M. .	64 5	22 55	9·8	18·73	33·85	—	—
779	,,	,, 25	noon . .	63 34	20 15	9·8	19·24	34·76	—	—
780	,,	,, 25	8 P.M. .	62 55	19 5	10·0	19·37	35·00	—	—
781	,,	,, 26	4 A.M. .	62 40	16 8	10·5	19·42	35·08	—	—
782	,,	,, 26	noon . .	62 30	13 7	10·5	19·47	35·17	—	—
783	,,	,, 26	8 P.M. .	62 25	9 56	10·0	19·41	35·07	—	—
784	,,	,, 27	4 A.M. .	62 26	7 4	8·7	19·39	35·03	—	—
785	,,	,, 28	8 P.M. .	61 22	6 20	9·7	19·46	35·15	—	—
786	,,	,, 29	4 A.M. .	60 38	4 38	10·7	19·47	35·17	26·32	—
787	,,	,, 29	noon . .	59 39	2 39	11·1	19·41	35·07	—	—
		1895.								
788	Moor . . .	Dec. 8	,,	48 6	5 35	12·8	19·61	35·43	26·53	·00232
789	,,	,, 8	midnight	45 41	7 45	13·3	19·71	35·61	—	—
790	,,	,, 9	noon . .	43 7	9 50	16·1	19·81	35·79	—	·00234
791	,,	,, 9	midnight	40 44	11 36	16·7	19·96	36·05	26·95	—
		1896.								
792	,,	Feb. 2	4 A.M. .	40 40	11 16	13·9	19·83	35·82	—	·00233
793	,,	,, 2	noon . .	42 4	10 10	13·6	19·86	35·88	—	—
794	,,	,, 2	midnight	44 22	8 30	12·8	19·79	35·75	—	·00234
795	,,	,, 3	noon . .	46 47	6 52	12·2	19·74	35·66	—	—
796	,,	Apr. 27	midnight	40 14	11 37	15·0	19·92	35·98	—	·00236
797	,,	,, 27	4 A.M. .	39 24	12 12	13·9	19·89	35·93	26·94	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
798	Moor . . .	June 18	4 P.M. .	39° 55′	11° 49′	19·4	19·92	35·98	—	·00236
799	,,	,, 18	midnight	41 41	10 39	16·7	19·89	35·93	—	—
800	,,	,, 19	noon . .	44 11	8 50	16·7	19·75	35·68	—	·00234
801	Corean . .	,, 17	,,	Off Ballycottin		16·7	19·41	35·07	—	—
802	,,	,, 18	,,	51° 7′	14° 23′	14·4	19·61	35·43	—	—
803	,,	,, 19	,,	51 40	20 33	14·4	19·73	35·64	26·56	·00231
804	,,	,, 20	,,	51 37	26 35	14·4	19·62	35·45	—	—
805	,,	,, 21	,,	51 26	34 0	12·8	19·10	34·51	25·75	—
806	,,	,, 22	,,	50 34	40 25	13·9	19·41	35·07	—	—
807	,,	,, 23	,,	48 55	46 38	8·3	19·17	34·63	—	—
808	,,	,, 24	,,	47 45	51 25	6·7	17·57	31·77	—	·00207
809	,,	,, 26	,,	45 34	57 44	9·4	17·67	31·95	—	—
810	,,	,, 27	,,	Off Halifax		12·8	17·19	31·09	—	·00202
811	,,	,, 29	,,	40° 38′	67° 10′	19·4	17·38	31·43	—	—
812	,,	,, 30	,,	39 2	73 50	21·7	19·54	35·30	26·35	·00230
813	,,	July 5	,,	40 6	69 40	20·0	18·38	33·22	—	—
814	,,	,, 6	,,	41 30	64 25	16·7	18·00	32·54	—	—
815	,,	,, 7	,,	43 37	59 20	11·1	17·56	31·75	—	·00207
816	,,	,, 8	,,	46 6	54 0	10·0	17·63	31·88	—	—
817	,,	,, 9	,,	Off Cape Race		8·9	17·68	31·97	—	—
818	,,	,, 10	,,	48° 58′	49° 3′	9·2	18·62	33·66	—	—
819	,,	,, 11	,,	51 17	43 0	12·2	19·48	35·19	—	·00229
820	,,	,, 12	,,	52 57	36 45	10·0	19·12	34·54	—	—
821	,,	,, 13	,,	54 7	29 45	13·3	19·31	34·89	—	—
822	,,	,, 14	,,	54 58	22 25	12·8	19·46	35·15	—	—
823	,,	,, 15	,,	55 29	14 30	13·9	19·53	35·28	26·38	—
824	,,	,, 16	,,	Off L. Foyle		14·4	19·33	34·93	—	—
825	Teutonic . .	,, 2	midnight	51° 6′	14° 25′	16·1	19·57	35·36	—	·00232
826	,,	,, 3	noon . .	50 37	20 35	15·6	19·73	35·64	—	—
827	,,	,, 3	midnight	49 39	26 26	15·0	19·72	35·63	—	—
828	,,	,, 4	noon . .	48 34	31 47	15·6	19·51	35·25	—	—
829	,,	,, 4	midnight	47 0	37 20	15·6	19·74	35·66	—	—
830	,,	,, 5	noon . .	45 19	42 40	17·8	19·61	35·43	—	·00231
831	,,	,, 5	midnight	43 23	47 29	14·4	18·35	33·17	—	—
832	,,	,, 6	noon . .	42 12	52 22	15·0	18·28	33·04	—	·00216
833	,,	,, 6	midnight	41 39	57 47	18·9	18·78	33·94	—	—
834	,,	,, 7	noon . .	41 8	62 58	23·3	19·61	35·43	26·57	—
835	,,	,, 7	midnight	40 44	68 23	13·3	18·20	32·90	24·37	—
836	,,	,, 15	,,	40 8	69 46	19·4	17·99	32·53	24·19	—
837	,,	,, 16	noon . .	40 31	64 53	19·4	18·45	33·36	—	—
838	,,	,, 16	midnight	40 56	59 38	23·3	19·34	34·94	—	—
839	,,	,, 17	noon . .	41 19	54 30	22·2	19·17	34·63	—	—
840	,,	,, 17	midnight	42 4	49 32	21·1	18·67	33·75	—	·00220
841	,,	,, 18	noon . .	43 43	44 45	18·9	18·73	33·85	—	—
842	,,	,, 18	midnight	45 30	39 57	17·8	19·60	35·41	—	—
843	,,	,, 19	noon . .	47 20	35 1	16·7	19·71	35·61	26·48	—
844	,,	,, 19	midnight	48 28	29 43	14·4	19·54	35·30	—	·00230
845	,,	,, 20	noon . .	49 34	24 40	16·7	19·77	35·72	—	—
846	,,	,, 20	midnight	50 22	19 0	15·6	19·83	35·82	—	·00232
847	,,	,, 21	noon . .	51 10	13 9	16·7	19·87	35·89	—	—
848	Ethiopia . .	June 27	,,	54 46	14 3	13·9	19·63	35·47	—	—
849	,,	,, 28	,,	53 34	21 25	13·3	19·60	35·41	—	—
850	,,	,, 29	,,	52 0	28 42	12·8	19·22	34·72	—	—
851	,,	,, 30	,,	49 50	35 27	15·0	19·48	35·19	—	·00231
852	,,	July 1	,,	47 30	40 44	15·6	19·52	35·27	26·49	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
853	Ethiopia . .	July 2	noon . .	44° 35′	45° 47′	13·9	18·17	32·84	24·54	—
854	,,	,, 3	,,	42 51	51 49	12·2	18·15	32·80	—	·00214
855	,,	,, 4	,,	42 31	58 23	13·3	18·14	32·79	—	—
856	,,	,, 5	,,	41 34	64 55	15·6	18·32	33·11	—	·00217
857	,,	,, 6	,,	40 36	71 3	17·8	17·86	32·30	24·07	—
858	,,	,, 12	,,	40 44	68 19	12·8	18·28	33·04	—	—
859	,,	,, 13	,,	41 56	62 27	17·2	17·96	32·48	—	·00211
860	,,	,, 14	,,	43 42	56 29	13·3	18·06	32·64	—	—
861	,,	,, 15	,,	45 30	50 32	10·0	17·81	32·21	—	—
862	,,	,, 16	,,	48 27	44 55	10·6	18·75	33·89	—	—
863	,,	,, 17	,,	50 41	38 50	13·9	19·08	34·47	25·67	—
864	,,	,, 18	,,	52 43	31 1	11·7	19·27	34·82	—	—
865	,,	,, 19	,,	54 7	22 38	13·9	19·69	35·58	26·50	—
866	,,	,, 20	,,	55 1	14 38	3·3	19·64	35·48	—	·00231
867	Aldgate . .	Mar. 20	,,	44 0	10 10	13·3	19·86	35·88	—	—
868	,,	,, 21	,,	41 3	11 48	14·4	19·96	36·05	—	—
869	,,	,, 22	,,	38 0	14 10	15·6	20·09	36·29	27·10	—
870	,,	June 25	,,	40 33	54 3	19·4	19·67	35·54	—	·00232
871	,,	,, 25	midnight	40 38	51 40	20·0	19·83	35·82	—	—
872	,,	,, 26	noon . .	41 17	48 56	20·6	20·03	36·18	—	—
873	,,	,, 26	midnight	42 4	46 45	19·4	20·12	36·33	—	—
874	,,	,, 27	noon . .	43 4	44 19	19·4	19·91	35·97	—	—
875	,,	,, 27	midnight	43 52	42 4	18·9	19·97	36·07	26·82	—
876	,,	,, 28	noon . .	44 43	39 58	17·8	19·84	35·84	—	—
877	,,	,, 28	midnight	45 27	37 38	16·7	19·66	35·52	—	—
878	,,	,, 29	noon . .	46 14	35 3	17·8	19·76	35·70	—	·00234
879	,,	,, 29	midnight	46 57	32 26	16·7	19·81	35·79	—	—
880	,,	,, 30	noon . .	47 43	30 4	16·1	19·93	36·00	—	—
881	,,	,, 30	midnight	48 9	26 55	16·1	19·62	35·45	—	—
882	,,	July 1	noon . .	48 38	24 35	17·2	20·06	36·23	—	—
883	,,	,, 1	midnight	48 55	21 56	16·7	19·69	35·58	—	·00232
884	,,	,, 2	noon . .	49 16	19 2	17·8	19·72	35·63	—	—
885	,,	,, 2	midnight	49 30	15 50	17·2	19·75	35·68	—	—
886	,,	,, 3	noon . .	49 48	13 20	17·8	19·68	35·56	—	—
887	,,	,, 3	midnight	49 47	10 10	17·2	19·72	35·63	—	—
888	,,	,, 4	noon . .	49 50	7 22	17·2	19·72	35·61	26·49	·00234
889	,,	,, 4	midnight	50 2	4 41	15·0	19·67	35·54	—	—
890	,,	,, 5	noon . .	50 29	1 49	17·2	19·53	35·28	—	—
891	,,	,, 5	midnight	Off Du	ngeness	15·0	19·61	35·43	—	—
					E.					
892	,,	,, 6	noon . .	52° 21′	3° 3′	15·6	19·22	34·72	—	—
893	,,	,, 6	midnight	53 38	5 27	15·6	18·63	33·67	—	—
894	,,	,, 20	noon . .	51 57	2 48	17·8	19·23	34·74	—	—
					W.					
895	,,	,, 21	,,	50 16	3 14	17·8	19·65	35·50	—	·00234
896	,,	,, 21	8 P.M. .	Off the	Lizard	16·7	19·71	35·61	26·50	—
897	Loughrigg Holme	June 18	noon . .	55° 25′	8° 9′	14·7	19·35	34·96	26·13	—
898	,,	,, 19	,,	55 18	15 56	13·7	19·58	35·38	—	·00232
899	,,	,, 20	,,	54 55	18 35	12·3	19·41	35·07	26·29	—
900	,,	,, 21	,,	54 28	24 31	11·9	19·49	35·21	—	—
901	,,	,, 22	,,	53 47	30 22	11·0	19·40	35·05	—	—
902	,,	,, 23	,,	53 8	35 16	9·7	19·25	34·78	—	—
903	,,	,, 24	,,	52 15	40 8	13·9	19·39	35·03	—	—
904	,,	,, 25	,,	50 43	44 8	12·7	19·48	35·19	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
905	Loughrigg Holme	June 26	noon . .	48° 38′	48° 15′	7·2	18·85	34·07	—	—
906	,,	,, 27	,,	46 35	52 43	5·3	17·92	32·40	—	·00210
907	,,	,, 28	,,	46 24	57 24	9·6	17·73	32·06	—	—
908	,,	July 22	noon . .	46 18	55 59	12·4	17·68	31·97	23·59	—
909	,,	,, 22	midnight	46 18	53 32	8·6	17·81	32·21	—	—
910	,,	,, 23	noon . .	46 43	51 24	11·7	17·81	32·21	—	—
911	,,	,, 23	midnight	47 25	49 5	9·8	17·75	32·09	—	·00208
912	,,	,, 24	noon . .	48 4	46 55	9·3	18·20	32·90	—	—
913	,,	,, 24	midnight	48 49	43 39	12·8	18·69	33·78	—	—
914	,,	,, 25	noon . .	49 27	41 0	16·1	19·34	34·94	—	·00227
915	,,	,, 25	midnight	49 44	37 58	14·4	19·59	35·40	—	—
916	,,	,, 26	noon . .	50 15	35 8	16·1	19·52	35·27	—	—
917	,,	,, 26	midnight	50 37	32 9	14·1	19·36	34·98	—	—
918	,,	,, 27	noon . .	50 57	29 25	15·0	19·64	35·48	—	·00231
919	,,	,, 27	midnight	51 4	26 37	15·0	19·65	35·50	26·27	—
920	,,	,, 28	noon . .	51 7	23 42	15·3	19·57	35·36	—	—
921	,,	,, 28	midnight	51 8	21 1	15·1	19·77	35·72	—	—
922	,,	,, 29	noon . .	51 9	18 19	15·6	19·70	35·59	—	—
923	,,	,, 29	midnight	51 15	15 25	15·4	19·74	35·66	26·47	—
924	,,	,, 30	noon . .	51 21	12 36	16·3	19·75	35·68	—	—
925	,,	,, 30	midnight	51 23	9 25	11·7	19·47	35·17	—	·00229
926	,,	,, 31	noon . .	52 2	6 40	15·0	19·46	35·15	—	—
927	Laura . . .	,, 19	8 P.M. .	59 36	2 37	11·7	19·35	34·97	—	—
928	,,	,, 20	4 A.M. .	60 28	4 26	11·9	19·50	35·23	26·28	—
929	,,	,, 20	noon . .	61 13	6 10	11·6	19·45	35·14	—	·00233
930	,,	,, 22	8 P.M. .	62 28	7 23	9·0	19·42	35·08	—	—
931	,,	,, 23	4 A.M. .	62 35	9 55	8·0	19·14	34·58	—	—
932	,,	,, 23	noon . .	62 53	12 50	11·0	19·48	35·19	—	·00231
933	,,	,, 23	8 P.M. .	63 1	15 47	11·0	19·90	35·95	—	—
934	,,	,, 24	4 A.M. .	63 10	18 48	10·7	19·24	34·76	—	·00228
935	,,	,, 24	noon . .	63 26	20 38	11·0	19·23	34·74	—	—
936	,,	,, 24	8 P.M. .	63 59	22 59	10·7	18·11	32·73	—	·00215
937	,,	Aug. 2	noon . .	64 6	22 56	10·7	18·73	33·85	—	—
938	,,	,, 2	8 P.M. .	63 30	20 34	11·5	18·80	33·98	25·29	—
939	,,	,, 3	4 A.M. .	62 54	18 6	11·3	18·08	32·68	24·30	—
940	,,	,, 3	noon .	62 48	15 11	11·9	19·36	34·98	—	·00230
941	,,	,, 3	8 P.M. .	62 39	12 20	11·5	19·45	35·14	—	—
942	,,	,, 4	4 A.M. .	62 31	9 27	10·5	19·46	35·15	—	—
943	,,	,, 4	noon . .	62 29	7 10	10·2	19·46	35·15	—	·00231
944	,,	,, 6	4 A.M. .	61 20	6 20	11·6	19·47	35·17	—	—
945	,,	,, 6	noon . .	60 29	4 25	12·2	19·52	35·27	26·36	—
946	,,	,, 6	8 P.M. .	59 50	2 34	11·7	19·40	35·05	—	—
947	Traveller .	Apr. 8	noon . .	59 29	4 38	8·6	19·63	35·47	—	—
948	,,	,, 9	,,	59 54	5 48	8·6	19·66	35·52	26·39	·00234
949	,,	,, 10	,,	60 41	5 50	8·1	19·64	35·48	—	—
950	,,	,, 11	,,	61 4	5 56	7·2	19·62	35·45	—	—
951	,,	,, 12	,,	60 30	6 52	7·2	19·64	35·48	—	·00233
952	,,	,, 13	,,	60 5	9 26	8·3	19·65	35·50	—	—
953	,,	,, 14	,,	60 5	12 38	8·2	19·63	35·47	—	—
954	,,	,, 15	,,	60 7	15 31	8·4	19·55	35·32	—	—
955	,,	,, 16	,,	60 32	17 24	8·3	—	—	—	—
956	,,	,, 17	,,	59 56	17 41	8·4	19·61	35·43	—	—
957	,,	,, 18	,,	59 46	18 38	8·6	19·57	35·36	—	·00231
958	,,	,, 19	,,	59 27	20 28	8·9	18·97	34·28	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
959	Traveller .	Apr. 20	noon . .	59° 20′	22° 42′	8·9	19·55	35·32	—	—
960	,,	,, 21	,,	59 6	26 11	8·6	19·56	35·34	—	—
961	,,	,, 22	,,	58 51	31 1	7·9	19.54	35·30	—	—
962	,,	,, 23	,,	58 45	35 39	6·1	19·47	35·17	—	—
963	,,	,, 24	,,	58 52	37 30	5·6	19·45	35·14	—	·00230
964	,,	,, 25	,,	58 35	38 39	4·4	19·34	34·94	—	—
965	,,	,, 26	,,	57 46	38 1	6·1	19·51	35·25	—	—
966	,,	,, 27	,,	57 55	38 1	6·4	19·46	35·15	—	—
967	,,	,, 28	,,	57 38	38 33	5·7	19·42	35·08	—	—
968	,,	,, 29	,,	58 21	39 20	5·3	19·42	35·08	—	—
969	,,	,, 30	,,	58 42	40 45	3·9	19·18	34·65	25·66	—
970	,,	May 1	,,	58 19	42 4	3·6	19·20	34·69	—	—
971	,,	,, 2	,,	58 9	42 16	3·7	19·34	34·94	—	·00227
972	,,	,, 3	,,	57 46	43 17	4·2	19·29	34·86	—	—
973	,,	,, 4	,,	57 46	45 41	3·4	19·27	34·82	—	—
974	,,	,, 5	,,	57 56	47 51	2·5	19·23	34·74	—	·00229
975	,,	,, 6	,,	57 44	48 28	3·0	19·28	34·84	—	—
976	,,	,, 7	,,	57 41	48 34	3·1	19·29	34·86	—	—
977	,,	,, 8	,,	57 28	47 26	3·6	19·29	34·86	—	—
978	,,	,, 9	,,	58 1	49 48	1·4	18·82	34·01	—	—
979	,,	,, 10	,,	58 40	50 36	1·1	18·59	33·60	24·98	—
980	,,	,, 11	,,	58 59	50 45	1·9	18·95	34·24	—	·00229
981	,,	,, 12	,,	58 48	51 18	1·4	18·80	33·98	—	—
982	,,	,, 13	,,	59 3	51 2	1·7	18·87	34·10	—	·00228
983	,,	,, 14	,,	59 56	50 56	0·0	18·42	33·30	24·65	—
984	,,	,, 15	,,	60 12	51 0	0·8	18·93	34·21	—	—
985	,,	,, 16	,,	59 59	50 51	0·4	18·71	33·82	—	·00219
986	,,	,, 17	,,	60 18	51 20	0·6	18·68	33·76	—	—
987	,,	,, 18	,,	61 2	51 35	0·3	18·54	33·51	24·82	—
988	,,	,, 19	,,	61 11	51 45	0·6	18·65	33·71	—	—
989	,,	,, 20	,,	60 50	52 0	0·0	18·78	33·94	—	—
990	,,	,, 21	,,	60 46	52 10	0·0	18·78	33·94	—	·00220
991	,,	,, 22	,,	60 52	52 10	0·3	18·77	33·92	—	—
992	,,	July 3	,,	60 22	52 43	4·6	18·97	34·28	—	—
993	,,	,, 4	,,	58 30	50 53	6·1	19·05	34·42	—	—
994	,,	,, 5	,,	57 29	47 14	5·6	18·93	34·21	—	—
995	,,	,, 6	,,	57 34	44 58	6·7	19·06	34·44	—	—
996	,,	,, 7	,,	57 26	42 22	7·2	19·32	34·91	—	—
997	,,	,, 8	,,	57 27	39 27	7·2	19·29	34·86	—	—
998	,,	,, 9	,,	57 50	36 7	8·1	19·16	34·62	—	—
999	,,	,, 10	,,	58 39	36 31	8·1	19·37	35·00	—	—
1000	,,	,, 11	,,	58 42	35 52	8·3	19·50	35·23	—	—
1001	,,	,, 12	,,	58 40	34 6	8·9	19·39	35·03	—	—
1002	,,	,, 15	,,	58 12	22 3	11·9	19·56	35·34	26·25	—
1003	,,	,, 13	,,	58 21	29 39	10·0	19·48	35·19	—	·00229
1004	,,	,, 14	,,	58 21	26 7	11·7	19·52	35·27	—	—
1005	,,	,, 16	,,	58 12	17 35	12·0	19·52	35·27	—	—
1006	,,	,, 17	,,	58 0	14 43	12·8	19·52	35·27	—	—
1007	,,	,, 18	,,	58 7	12 24	12·2	19·42	35·08	—	·00232
1008	,,	,, 19	,,	58 18	8 0	13·3	19·51	35·25	—	·00231
1009	Para . . .	Apr. 10	,,	46 48	14 51	12·5	20·10	36·30	—	—
1010	,,	,, 11	,,	43 57	21 35	13·6	19·88	35·91	—	—
1011	,,	,, 12	,,	40 40	27 32	15·0	19·97	36·07	—	·00232
1012	,,	,, 13	,,	37 2	32 39	16·7	20·05	36·21	—	—
1013	,,	May 22	,,	37 48	38 5	20·0	20·24	36·55	27·09	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1014	Para . . .	May 23	noon . .	40° 36′	32° 0′	18·9	19·98	36·09	—	·00236
1015	,,	,, 24	,,	43 16	25 10	18·6	19·87	35·89	—	—
1016	,,	,, 25	,,	45 45	18 8	16·7	19·85	35·86	—	—
1017	,,	,, 26	,,	47 56	11 48	15·3	19·87	35·89	—	—
1018	,,	,, 27	,,	50 3	4 55	13·3	19·73	35·64	26·51	—
1019	,,	July 2	,,	48 47	6 58	16·1	19·93	36·00	—	—
1020	,,	,, 3	,,	45 52	14 7	18·9	20·01	36·14	—	—
1021	,,	,, 4	,,	42 52	20 55	20·6	19·92	35·98	—	·00234
1022	,,	,, 5	,,	39 56	27 25	21·7	19·63	35·47	27·37	—
1023	,,	Aug. 15	,,	41 26	29 28	25·0	19·72	35·63	26·76	—
1024	,,	,, 16	,,	44 27	22 39	20·6	20·04	36·19	—	—
1025	,,	,, 17	,,	47 3	15 8	19·4	20·09	36·29	—	·00236
1026	,,	,, 18	,,	49 15	6 57	17·5	19·86	35·88	—	—
1027	,,	,, 14	,,	37 22	34 55	25·6	—	—	—	—
1028	,,	,, 13	,,	33 21	40 18	29·4	—	—	—	—
1029	,,	,, 12	,,	29 15	45 11	32·8	—	—	—	—
1030	Wydale . .	Feb. 22	,,	49 12	6 24	11·1	19·65	35·50	—	—
1031	,,	,, 23	,,	47 3	8 20	12·3	19·78	35·73	—	—
1032	,,	,, 24	,,	44 18	10 24	12·8	19·78	35·73	—	·00235
1033	,,	,, 25	,,	41 28	12 16	13·9	19·85	35·86	—	—
1034	,,	Apr. 25	,,	40 6	57 10	18·3	20·00	36·12	—	—
1035	,,	,, 26	,,	40 48	53 50	14·4	19·78	35·73	—	·00234
1036	,,	,, 27	,,	41 44	50 4	12·8	19·64	35·48	—	—
1037	,,	,, 28	,,	43 3	47 20	8·9	19·08	34·47	—	—
1038	,,	,, 29	,,	44 12	43 20	14·2	19·83	35·82	—	—
1039	,,	,, 30	,,	45 13	39 18	14·4	19·82	35·80	—	—
1040	,,	May 1	,,	46 11	35 15	14·2	19·69	35·58	—	—
1041	,,	,, 2	,,	47 10	31 3	13·3	19·52	35·27	—	—
1042	,,	,, 3	,,	48 3	26 30	13·3	19·65	35·50	—	·00233
1043	,,	,, 4	,,	48 40	21 33	13·1	19·70	35·59	—	—
1044	,,	,, 5	,,	49 8	16 45	13·9	19·75	35·68	—	—
1045	,,	,, 6	,,	49 35	11 38	18·8	19·68	35·56	—	—
1046	,,	July 25	,,	40 51	64 0	22·2	18·01	32·56	—	·00214
1047	,,	,, 26	,,	42 22	60 17	18·3	17·92	32·40	24·10	—
1048	,,	,, 27	,,	43 23	56 31	16·7	17·67	31·95	23·71	—
1049	,,	,, 28	,,	44 26	52 19	15·6	18·02	32·58	—	—
1050	,,	,, 29	,,	45 24	48 9	10·6	17·47	31·60	23·37	—
1051	,,	,, 30	,,	46 22	44 0	12·8	18·35	33·17	—	—
1052	,,	,, 31	,,	47 21	40 45	18·9	19·88	35·91	—	—
1053	,,	Aug. 1	,,	48 20	37 20	17·2	19·61	35·43	—	—
1054	,,	,, 2	,,	48 48	33 25	16·1	19·57	35·36	—	—
1055	,,	,, 3	,,	49 20	29 3	15·6	19·23	34·74	—	—
1056	,,	,, 4	,,	49 47	23 51	17·2	19·65	35·50	—	—
1057	,,	,, 5	,,	49 54	19 14	17·2	19·74	35·66	—	—
1058	,,	,, 6	,,	49 51	14 21	16·7	19·81	35·79	26·59	—
1059	,,	,, 7	,,	49 50	10 24	17·2	19·85	35·86	—	·00234
1060	Teutonic .	July 30	midnight	51 24	14 8	15·0	19·64	35·48	—	—
1061	,,	,, 31	noon . .	51 24	20 27	15·6	19·69	35·58	—	—
1062	,,	,, 31	midnight	50 47	26 30	15·0	19·67	35·54	—	·00232
1063	,,	Aug. 1	noon . .	50 9	32 47	13·3	19·58	35·38	26·51	—
1064	,,	,, 1	midnight	48 47	38 45	16·1	19·61	35·43	26·26	—
1065	,,	,, 2	noon . .	47 28	44 33	11·7	18·37	33·20	—	—
1066	,,	,, 2	midnight	45 34	49 8	13·3	17·99	32·53	23·97	—
1067	,,	,, 3	noon . .	43 58	55 35	16·7	18·04	32·61	—	—
1068	,,	,, 3	midnight	43 1	60 39	16·7	17·98	32·51	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1069	Teutonic .	Aug. 4	noon . .	41° 38′	65° 45′	14·4	17·77	32·13	23·73	—
1070	,,	,, 4	midnight	40 16	71 44	18·9	18·20	32·90	—	—
1071	,,	,, 12	,,	40 9	69 52	23·3	18·21	32·91	—	—
1072	,,	,, 13	noon . .	41 3	65 27	20·0	18·23	32·95	—	—
1073	,,	,, 13	midnight	42 16	60 32	20·0	18·38	33·22	—	—
1074	,,	,, 14	noon . .	43 24	55 40	18·9	18·09	32·70	—	—
1075	,,	,, 14	midnight	44 52	50 48	15·6	17·86	32·30	—	·00210
1076	,,	,, 15	noon . .	46 24	45 40	15·0	18·14	32·79	24·30	—
1077	,,	,, 15	midnight	47 37	40 47	18·9	19·67	35·54	—	—
1078	,,	,, 16	noon . .	49 2	35 49	16·7	19·36	34·98	—	—
1079	,,	,, 16	midnight	49 55	30 16	16·1	19·45	35·14	—	—
1080	,,	,, 17	noon . .	50 50	24 31	16·1	19·64	35·48	—	·00230
1081	,,	,, 17	midnight	50 1	18 31	17·2	19·65	35·50	—	—
1082	,,	,, 18	noon . .	50 20	12 21	17·2	19·68	35·56	—	·00233
1083	Ethiopia . .	,, 1	,,	55 9	14 39	14·4	19·71	35·61	26·56	—
1084	,,	,, 2	,,	54 40	23 25	13·9	19·64	35·48	26·34	—
1085	,,	,, 3	,,	53 30	31 12	12·2	19·41	35·07	—	—
1086	,,	,, 4	,,	51 40	38 14	12·8	19·16	34·62	—	·00227
1087	,,	,, 5	,,	49 36	45 8	13·3	18·97	34·28	—	—
1088	,,	,, 6	,,	46 55	51 5	11·7	17·71	32·02	—	·00209
1089	,,	,, 7	,,	44 9	57 16	15·0	17·99	32·53	—	—
1090	,,	,, 8	,,	42 7	63 47	18·3	18·02	32·58	—	—
1091	,,	,, 9	,,	40 42	69 56	17·2	18·11	32·73	—	·00213
1092	,,	,, 16	,,	40 37	68 22	18·3	17·98	32·51	—	—
1093	,,	,, 17	,,	42 8	62 23	20·0	17·99	32·53	—	·00213
1094	,,	,, 18	,,	44 26	57 2	16·1	17·52	31·68	23·57	—
1095	,,	,, 19	,,	47 0	51 23	13·9	17·52	31·68	23·31	—
1096	,,	,, 20	,,	49 33	45 15	13·3	18·78	33·94	—	—
1097	,,	,, 21	,,	51 45	38 31	15·0	19·08	34·47	—	—
1098	,,	,, 22	,,	53 25	31 3	13·3	19·33	34·93	—	·00228
1099	,,	,, 23	,,	54 29	23 7	14·4	19·54	35·30	—	—
1100	,,	,, 24	,,	55 6	14 38	14·4	19·69	35·58	26·44	—
1101	Corean . .	July 26	,,	Galley	Head	17·2	19·45	35·14	—	·00229
1102	,,	,, 27	,,	51° 40′	16° 36′	16·7	19·79	35·75	26·71	—
1103	,,	,, 28	,,	51 41	22 48	15·6	19·63	35·47	—	—
1104	,,	,, 29	,,	51 52	27 28	13·9	19·29	34·86	—	—
1105	,,	,, 30	,,	51 38	34 15	14·4	19·24	34·76	—	·00226
1106	,,	,, 31	,,	50 31	41 14	13·3	18·91	34·17	25·41	—
1107	,,	Aug. 1	,,	48 46	48 2	11·1	18·77	33·92	—	—
1108	,,	,, 4	,,	45 46	55 49	13·3	17·58	31·79	—	—
1109	,,	,, 5	,,	44 31	62 10	14·4	16·94	30·64	22·58	—
1110	,,	,, 7	,,	40 48	67 25	16·7	16·88	30·54	—	·00201
1111	,,	,, 8	,,	39 3	73 26	24·4	17·95	32·46	—	—
1112	,,	,, 15	,,	39 34	71 22	25·6	17·61	31·85	—	—
1113	,,	,, 16	,,	41 5	66 29	16·1	17·87	32·31	—	·00210
1114	,,	,, 17	,,	42 47	61 48	18·9	17·90	32·37	23·91	—
1115	,,	,, 18	,,	44 34	56 36	17·8	17·81	32·21	—	—
1116	,,	,, 19	,,	46 34	52 54	15·6	17·93	32·42	—	—
1117	,,	,, 20	,,	48 12	51 5	13·9	17·43	31·52	—	—
1118	,,	,, 21	,,	50 19	45 25	12·2	18·77	33·92	—	—
1119	,,	,, 22	,,	52 27	39 3	14·4	18·92	34·19	—	—
1120	,,	,, 23	,,	53 58	31 55	13·9	19·30	34·87	—	—
1121	,,	,, 24	,,	54 48	24 19	16·7	19·51	35·25	—	—
1122	,,	,, 25	,,	55 7	16 25	13·9	19·59	35·40	—	—
1123	,,	,, 26	,,	55 10	8 58	13·9	19·53	35·28	26·27	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1124	Corean . .	Aug. 27	noon . .	off Greenock		—	—	—	—	—
1125	Longhirst .	July 7	,,	55° 28′	14° 20′	13·9	19·75	35·68	26·64	—
1126	,,	,, 8	,,	55 2	19 52	13·3	19·67	35·54	—	·00231
1127	,,	,, 9	,,	54 28	25 36	12·8	19·50	35·23	—	—
1128	,,	,, 10	,,	53 47	30 25	10·6	19·36	34·98	26·03	—
1129	,,	,, 11	,,	53 33	34 12	10·6	19·40	35·05	—	—
1130	,,	,, 12	,,	52 15	37 35	11·1	19·18	34·65	—	—
1131	,,	,, 13	,,	50 50	42 30	11·1	19·01	34·35	—	—
1132	,,	,, 14	,,	49 19	46 44	10·0	19·04	34·40	—	·00224
1133	,,	,, 15	,,	47 27	51 15	10·0	17·72	32·04	—	—
1134	,,	,, 16	,,	46 28	55 42	11·9	17·73	32·06	—	·00206
1135	,,	,, 21	,,	48 9	61 54	15·8	15·90	28·80	21·15	—
1136	,,	Aug. 15	,,	48 45	68 7	11·7	15·65	28·35	20·77	·00231
1137	,,	,, 16	,,	50 0	63 22	11·9	17·38	31·44	23·26	—
1138	,,	,, 17	,,	50 26	58 52	12·8	17·01	30·77	—	·00200
1139	,,	,, 18	,,	51 58	54 46	9·4	16·34	29·58	—	—
1140	,,	,, 19	,,	53 10	49 38	11·4	18·91	34·17	—	—
1141	,,	,, 20	,,	54 23	44 14	11·7	19·07	34·46	—	—
1142	,,	,, 21	,,	54 47	38 34	11·1	19·14	34·58	—	—
1143	,,	,, 22	,,	55 12	33 33	12·8	19·43	35·10	—	—
1144	,,	,, 23	,,	55 38	27 56	13·3	19·36	34·98	—	—
1145	,,	,, 24	,,	56 6	22 30	13·3	19·47	35·00	—	—
1146	,,	,, 25	,,	55 54	16 46	10·6	19·66	35·52	—	—
1147	,,	,, 26	,,	55 2	11 40	14·4	19·73	35·64	—	—
1148	,,	,, 27	,,	55 26	7 43	14·4	19·55	35·32	—	—
1149	,,	,, 28	,,	53 42	3 41	15·6	18·85	34·07	—	—
1150	Jamesia . .	,, 7	midnight	58 56	3 44	11·7	19·31	34·89	—	—
1151	,,	,, 8	noon . .	60 10	6 44	11·4	19·54	35·30	—	—
1152	,,	,, 8	11.30 P.M.	61 23	9 46	11·4	19·47	35·17	—	—
1153	,,	,, 9	noon . .	62 36	12 54	11·7	19·50	35·23	—	—
1154	,,	,, 9	midnight	63 40	14 58	11·4	19·15	34·60	—	—
1155	,,	,, 15	noon . .	63 23	16 34	10·8	18·97	34·28	25·61	—
1156	,,	,, 16	,,	63 28	17 34	10·3	18·99	34·32	25·48	—
1157	,,	,, 18	,,	64 0	15 14	10·6	19·43	35·10	—	—
1158	,,	,, 19	,,	63 48	13 49	11·4	19·42	35·08	—	—
1159	,,	,, 20	,,	62 34	10 10	11·7	19·49	35·21	—	—
1160	,,	,, 20	midnight	61 6	7 30	11·9	19·49	35·21	—	—
1161	,,	,, 21	noon . .	59 46	4 50	12·5	19·61	35·43	—	—
1162	,,	,, 21	10 P.M. .	59 16	4 26	11·9	19·46	35·15	—	—
1163	,,	,, 28	noon . .	59 56	4 30	10·3	19·50	35·23	—	—
1164	,,	,, 28	midnight	61 44	5 42	10·0	19·49	35·21	26·11	—
1165	,,	,, 29	noon . .	61 56	7 26	10·0	19·49	35·21	—	—
1166	,,	,, 29	midnight	62 16	8 16	9·4	19·50	35·23	—	—
1167	,,	,, 30	noon . .	62 16	8 20	9·4	19·50	35·23	—	—
1168	,,	,, 30	midnight	62 12	8 24	10·6	19·50	35·23	—	—
1169	,,	,, 31	noon . .	62 12	8 18	10·8	19·45	35·14	—	—
1170	,,	,, 31	midnight	62 12	8 24	10·3	19·52	35·27	—	—
1171	,,	Sept. 1	noon . .	62 20	8 20	10·6	19·49	35·21	—	—
1172	,,	,, 2	midnight	62 12	8 16	10·6	19·49	35·21	—	—
1173	,,	,, 3	noon . .	62 20	8 18	10·6	19·47	35·17	—	—
1174	,,	,, 3	midnight	62 12	8 20	10·3	19·45	35·14	—	—
1175	,,	,, 4	noon . .	62 22	8 16	10·0	19·48	35·19	—	—
1176	,,	,, 4	6 P.M. .	61 48	8 0	10·8	19·55	35·32	—	—
1177	,,	,, 4	midnight	60 58	6 40	11·1	19·33	34·93	26·03	—
1178	,,	,, 5	6 A.M. .	60 10	5 20	11·7	19·34	34·94	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	${}_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1179	Jamesia . .	Sept. 5	noon . .	59° 22′	4° 6′	11·7	19·39	35·03	—	—
					E.					
1180	Active . .	Apr. 16	„	62 33	0 0	8·3	19·57	35·36	—	—
1181	„	„ 17	„	65 38	1 0	4·2	19·37	35·00	—	—
1182	„	„ 18	„	68 20	2 0	5·0	19·40	35·05	—	—
1183	„	„ 19	„	70 30	2 40	4·7	19·47	35·17	26·29	—
1184	„	„ 19	8 P.M. .	71 10	2 50	3·5	19·40	35·05	—	—
1185	„	„ 20	noon . .	71 52	7 0	−1·0	19·07	34·46	—	·00225
1186	„	„ 21	„	73 56	7 0	−0·3	19·07	34·46	—	—
1187	„	„ 22	„	74 51	6 0	−0·8	19·16	34·62	25·78	—
1188	„	„ 23	„	74 50	6 0	−1·3	18·99	34·32	—	—
1189	„	„ 24	„	76 0	6 0	−1·7	19·02	34·37	—	—
1190	„	„ 25	„	77 40	5 0	1·7	19·36	34·98	—	·00229
1191	„	„ 26	„	79 0	4 30	−0·6	19·26	34·80	25·84	—
1192	„	„ 27	„	80 15	4 0	0·6	19·16	34·62	—	—
1193	„	„ 28	„	79 50	3 30	0·0	19·10	34·51	—	·00227
1194	„	„ 29	4 P.M. .	79 40	3 30	−1·4	19·15	34·60	—	—
1195	„	„ 30	noon . .	79 13	3 0	−1·4	19·03	34·39	25·50	—
1196	„	May 1	4 P.M. .	78 50	2 0	−0·6	19·39	35·03	—	—
1197	„	„ 2	„	78 40	1 0	0·0	19·35	34·96	—	—
1198	„	„ 3	noon . .	79 0	1 30	−1·7	19·02	34·37	—	—
					W.					
1199	„	„ 4	„	79 20	0 45	−1·7	18·90	34·16	25·37	—
1200	„	„ 8	„	78 20	0 15	−0·6	19·18	34·65	—	—
					E.					
1201	„	„ 10	4 P.M. .	79 30	2 30	0·0	19·14	34·58	—	·00227
1202	„	„ 11	noon . .	79 50	2 30	0·8	19·20	34·69	—	—
1203	„	„ 12	„	79 45	2 30	−0·3	19·19	34·67	—	—
1204	„	„ 13	„	79 20	1 30	−0·8	18·92	34·19	—	—
1205	„	„ 14	„	79 15	1 0	−1·1	18·85	34·07	—	—
1206	„	„ 15	„	79 25	0 0	−0·6	18·92	34·19	—	·00222
1207	„	„ 16	„	79 50	2 0	−0·3	18·96	34·26	—	—
1208	„	„ 17	„	79 35	1 30	−1·1	18·90	34·16	—	—
1209	„	„ 18	„	79 40	1 30	−1·1	18·94	34·23	—	·00223
1210	„	„ 19	„	79 30	0 0	−1·1	18·81	34·00	—	—
					W.					
1211	„	„ 20	„	79 10	1 0	−1·4	18·77	33·92	—	—
1212	„	„ 21	„	79 0	2 0	−1·1	18·51	33·46	—	·00217
1213	„	„ 22	„	78 50	2 30	−1·4	18·17	32·84	—	—
1214	„	„ 23	„	78 55	3 0	−1·4	18·24	32·97	—	—
1215	„	„ 24	„	79 0	3 10	−1·2	18·25	32·98	—	—
1216	„	„ 25	„	78 40	3 30	−1·0	18·32	33·12	—	—
1217	„	„ 26	„	78 45	3 0	−1·3	18·17	32·84	—	—
1218	„	„ 27	„	79 0	4 30	−1·4	18·10	32·72	—	·00212
1219	„	„ 28	„	78 58	3 20	−1·4	18·10	32·72	—	·00211
1220	„	„ 29	„	78 20	5 0	−1·2	18·26	33·00	24·54	—
1221	„	„ 31	„	78 26	5 0	−1·3	18·25	32·98	—	·00213
1222	„	June 1	„	78 1	6 0	−1·6	18·28	33·04	—	—
1223	„	„ 2	4 P.M. .	77 50	7 30	−1·2	18·27	33·02	—	—
1224	„	„ 4	noon . .	78 5	4 0	−1·2	18·36	33·17	24·59	·00214
1225	„	„ 5	„	78 40	2 0	−0·7	19·06	34·44	25·56	—
1226	„	„ 6	„	79 0	1 30	−1·3	18·57	33·56	—	—
1227	„	„ 7	„	78 40	0 30	0·0	19·11	34·53	—	·00224
					E.					
1228	„	„ 8	„	79 10	1 20	−0·6	18·82	34·01	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	E.					
1229	Active . .	June 10	noon . .	79° 33′	1° 28′	0·3	—	—	—	—
1230	,,	,, 11	,,	79 28	1 40	0·9	18·89	34·14	—	·00224
1231										
1232	,,	,, 13	,,	79 37	2 0	0·8	18·78	33·94	—	—
1233	,,	,, 14	,,	79 30	3 0	1·4	19·03	34·39	—	·00221
1234	,,	,, 15	,,	79 25	2 0	1·3	—	—	—	—
1235	,,	,, 17	,,	79 35	2 0	1·4	18·76	33·90	—	—
1236	,,	,, 18	,,	78 56	0 40	−0·2	18·49	33·43	24·74	—
					W.					
1237	,,	,, 19	,,	78 40	1 0	−0·6	18·51	33·46	—	—
1238	,,	,, 20	,,	78 20	1 30	−0·1	18·62	33·66	—	—
1239	,,	,, 21	,,	77 20	2 30	0·4	18·95	34·24	—	—
1240	,,	,, 22	,,	76 30	3 30	0·4	19·14	34·58	—	·00226
1241	,,	,, 23	,,	75 40	8 40	−0·3	18·59	33·60	—	·00219
1242	,,	,, 24	,,	74 43	11 30	0·8	18·83	34·03	—	·00217
1243	,,	,, 25	,,	74 0	13 0	0·0	18·31	33·10	—	—
1244	,,	,, 26	,,	73 48	13 0	0·0	18·26	33·00	24·51	—
1245	,,	,, 27	,,	73 30	13 10	0·0	18·25	32·98	—	—
1246	,,	,, 28	,,	73 20	14 0	−0·8	17·98	32·51	—	·00211
1247	,,	,, 29	,,	73 0	16 0	−0·3	17·87	32·31	—	—
1248	,,	,, 30	,,	73 0	17 30	0·1	17·93	32·42	24·02	—
1249	,,	July 1	,,	72 50	17 40	0·5	17·86	32·30	—	·00210
1250	,,	,, 2	,,	72 50	18 0	0·3	17·90	32·37	—	—
1251	,,	,, 3	,,	73 4	19 20	0·1	17·89	32·35	—	—
1252	,,	,, 4	,,	72 45	18 40	0·8	17·76	32·11	23·78	—
1253	,,	,, 5	,,	72 40	18 30	0·8	17·65	31·92	—	—
1254	,,	,, 6	,,	72 50	18 20	0·8	17·56	31·75	—	—
1255	,,	,, 7	,,	72 45	18 0	0·4	17·73	32·06	—	—
1256	,,	,, 8	,,	72 20	17 40	0·0	17·64	31·90	—	—
1257	,,	,, 9	,,	72 20	17 40	0·5	17·57	31·77	—	—
1258	,,	,, 10	,,	72 18	17 40	1·1	15·21	27·55	—	—
1259	,,	,, 10	,,	72 18	17 40	—	—	—	—	—
1260	,,	,, 11	,,	72 25	18 0	1·1	17·17	31·06	23·01	—
1261	,,	,, 12	,,	72 30	18 30	0·8	17·63	31·88	—	—
1262	,,	,, 13	,,	72 30	19 0	0·6	17·53	31·70	—	·00207
1263	,,	,, 14	,,	72 35	19 30	0·8	17·19	31·10	—	—
1264	,,	,, 15	,,	72 30	19 0	0·6	17·45	31·56	—	—
1265	,,	,, 16	,,	72 35	18 20	0·6	17·46	31·57	—	—
1266	,,	,, 17	,,	72 41	18 0	0·4	17·37	31·41	—	—
1267	,,	,, 18	,,	72 27	17 40	0·0	17·60	31·83	—	—
1268	,,	,, 19	,,	72 22	17 40	0·2	17·50	31·65	—	—
1269	,,	,, 20	,,	72 20	17 40	0·0	17·56	31·75	—	·00207
1270	,,	,, 21	,,	72 13	18 0	0·7	17·57	31·77	—	·00207
1271	,,	,, 22	,,	72 36	18 30	2·2	17·45	31·56	—	·00202
1272	,,	,, 23	,,	72 10	18 0	1·0	17·24	31·18	—	·00203
1273	,,	,, 24	,,	72 12	19 10	1·7	16·16	29·25	—	—
1274	,,	,, 25	,,	72 35	17 50	0·9	17·22	31·14	—	—
1275	,,	,, 26	,,	72 35	17 40	−0·1	17·41	31·49	23·41	—
1276	,,	,, 27	,,	72 30	17 30	0·8	17·45	31·56	—	—
1277	,,	,, 28	,,	72 40	17 10	0·0	17·09	30·91	—	—
1278	,,	,, 29	,,	72 40	17 0	0·7	17·29	31·27	—	—
1279	,,	,, 30	,,	72 55	16 40	0·9	17·18	31·07	—	—
1280	,,	,, 31	,,	73 0	16 30	0·6	17·28	31·25	—	—
1281	,,	Aug. 1	,,	72 50	16 0	1·1	17·18	31·07	22·97	—
1282	,,	,, 2	,,	72 55	16 30	0·4	17·14	31·00	-	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1283	Active . .	Aug. 3	noon . .	73° 10′	16° 5′	0·9	16·92	30·60	22·56	·00199
1284	„	„ 4	„	73 5	16 55	1·1	16·43	29·74	—	—
1285	„	„ 5	„	73 10	17 50	1·4	17·12	30·97	—	—
1286	„	„ 6	„	73 10	17 50	1·2	17·22	31·14	—	—
1287	„	„ 7	„	72 50	19 0	1·6	16·77	30·34	—	·00198
1288	„	„ 8	„	72 24	18 40	0·8	16·89	30·55	—	·00198
1289	„	„ 10	„	72 0	18 0	1·1	16·77	30·34	—	—
1290	„	„ 11	„	71 30	18 20	1·1	16·88	30·54	—	—
1291	„	„ 12	„	71 10	20 0	1·9	17·07	30·87	—	—
1292	„	„ 13	„	70 20	21 25	1·9	15·35	27·81	—	·00181
1293	„	„ 22	„	69 0	19 30	0·6	16·99	30·73	22·69	—
1294	„	„ 23	„	68 10	17 0	3·6	17·96	32·48	—	—
1295	„	„ 24	„	66 54	13 30	5·6	18·53	33·49	—	—
1296	„	„ 25	„	65 15	10 30	6·9	18·42	33·30	—	—
1297	„	„ 26	„	62 10	7 40	9·9	19·49	35·21	—	·00231
1298	„	„ 27	„	60 40	4 30	11·1	19·52	35·27	—	—
1299	„	„ 28	„	59 30	1 45	11·7	19·46	35·15	—	—
					E.					
1300	Otaria . .	July 30	„	71 8	27 20	9·5	19·08	34·47	—	—
1301	„	Aug. 1	„	71 40	38 10	6·2	19·29	34·86	—	—
1302	„	„ 1	10 P.M. .	72 1	41 38	6·9	19·29	34·86	—	—
1303	„	„ 2	noon . .	71 58	45 57	6·2	19·31	34·89	25·97	—
1304	„	„ 2	10 P.M. .	72 7	47 55	5·9	19·08	34·47	—	·00222
1305	„	„ 12	noon . .	72 22	51 28	5·1	17·24	31·18	23·02	·00203
1306	„	„ 12	10 P.M. .	72 19	48 54	5·6	18·69	33·78	—	·00218
1307	„	„ 13	noon . .	72 22	44 25	6·2	19·33	34·93	—	—
1308	„	„ 13	10 P.M. .	72 16	41 40	6·7	19·35	34·96	—	—
1309	„	„ 14	noon . .	72 24	38 7	5·3	19·33	34·93	—	—
1310	„	„ 14	10 P.M. .	72 8	35 34	6·8	19·37	35·00	—	—
1311	„	„ 15	noon . .	71 49	30 50	8·9	19·17	34·63	—	—
1312	„	„ 15	10 P.M. .	71 22	28 26	9·2	19·21	34·71	—	—
1313	„	„ 16	noon . .	71 5	27 10	8·8	18·84	34·05	—	—
1314	„	„ 16	10 P.M. .	71 56	26 0	9·4	18·60	33·62	—	—
1315	„	„ 26	„	68 55	16 48	12·1	17·20	31·10	—	—
1316	„	„ 27	noon . .	67 46	14 13	13·3	17·42	31·51	—	·00207
1317	„	„ 28	„	65 11	11 52	12·0	18·06	32·64	—	—
1318	„	„ 29	„	63 45	7 39	11·7	17·58	31·79	—	—
1319	„	Sept. 1	„	63 15	7 29	13·1	18·67	33·75	—	—
1320	„	„ 2	„	62 47	4 49	14·8	18·68	33·76	—	—
1321	„	„ 2	10 P.M. .	62 18	4 36	14·0	18·27	33·02	24·42	·00213
1322	„	„ 3	noon . .	61 31	2 9	13·2	19·55	35·32	—	·00229
1323	„	„ 3	10 P.M. .	61 3	1 9	13·6	19·34	34·94	—	—
					W.					
1324	„	„ 7	0.30 P.M.	60 $1\frac{1}{2}$	1 $8\frac{1}{3}$	12·3	19·51	35·25	—	—
1325	„	„ 7	10 P.M. .	59 18	1 17	12·2	19·52	35·27	26·26	—
1326	„	„ 8	noon . .	58 26	1 23	12·3	19·46	35·15	—	—
1327	„	„ 8	10 P.M. .	57 48	1 34	12·2	19·38	35·01	—	—
1328	„	„ 9	10 A.M. .	Near Bell Rock		13·1	18·87	34·10	—	—
1329	„									
1330	Laura . .	Aug. 24	8 P.M. .	60° 8′	3° 37′	11·5	19·56	35·34	—	—
1331	„	„ 25	4 A.M. .	60 53	5 20	11·0	19·56	35·34	—	—
1332	„	„ 25	noon . .	61 26	6 24	10·7	19·07	34·46	—	—
1333	„	„ 26	4 A.M. .	61 42	6 30	9·9	19·51	35·25	26 25	—
1334	„	„ 27	noon . .	62 8	6 26	10·2	19·46	35·15	—	—
1335	„	„ 28	4 A.M. .	62 27	7 8	10·0	19·46	35·15	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1336	Laura . .	Aug. 28	noon . .	62° 35′	9° 36′	10·5	19·51	25·25	—	—
1337	,,	,, 28	8 P.M. .	62 48	12 22	8·9	19·50	35·23	26·21	·00228
1338	,,	,, 29	4 A.M. .	62 52	15 38	10·0	19·44	35·12	—	—
1339	,,	,, 29	noon .	63 16	18 48	10·5	19·12	34·54	—	—
1340	,,	,, 29	8 P.M. .	63 30	20 50	9·5	19·17	34·63	—	—
1341	,,	,, 30	4 A.M. .	64 14	22 51	9·2	19·05	34·42	25·57	—
1342	,,	Sept. 4	8 P.M. .	64 10	22 48	10·1	18·31	33·10	—	—
1343	,,	,, 5	4 A.M. .	63 30	21 20	10·0	19·30	34·87	—	—
1344	,,	,, 5	noon .	63 6	18 56	10·0	19·10	34·51	—	—
1345	,,	,, 5	8 P.M. .	63 0	16 18	10·2	19·46	35·15	—	—
1346	,,	,, 6	4 A.M. .	62 52	12 34	10·1	19·51	35·25	—	—
1347	,,	,, 6	noon .	62 35	10 24	10·5	19·53	35·28	—	·00230
1348	,,	,, 6	8 P.M. .	62 29	7 33	9·4	19·54	35·30	—	·00229
1349	,,	,, 7	,,	61 54	6 30	9·5	19·46	35·15	26·18	—
1350	,,	,, 8	4 A.M. .	61 21	6 20	10·5	19·53	35·28	—	—
1351	,,	,, 8	noon .	60 41	5 4	11·5	19·48	35·19	—	·00230
1352	,,	,, 8	8 P.M. .	59 45	3 10	11·7	19·53	35·28	—	—
1353	Teutonic .	Aug. 27	midnight	51 24	14 26	14·4	19·73	35·64	26·64	·00231
1354	,,	,, 28	noon .	51 24	20 42	15·6	19·77	35·72	—	—
1355	,,	,, 28	midnight	50 46	26 36	16·1	19·49	35·21	—	—
1356	,,	,, 29	noon .	50 9	32 42	17·2	19·23	34·74	—	—
1357	,,	,, 29	midnight	48 56	38 38	17·8	19·40	35·05	26·15	·00229
1358	,,	,, 30	noon .	47 32	44 24	13·9	18·20	32·90	—	—
1359	,,	,, 30	midnight	45 56	49 56	11·1	17·83	32·24	—	—
1360	,,	,, 31	noon .	44 21	55 10	18·3	17·96	32·48	24·02	—
1361	,,	,, 31	midnight	43 5	60 10	16·7	17·70	32·01	23·75	·00208
1362	,,	Sept. 1	noon .	41 40	65 19	17·8	18·06	32·64	—	—
1363	,,	,, 1	midnight	40 26	69 54	15·6	18·04	32·61	—	—
1364	,,	,, 9	,,	40 11	70 2	17·8	18·66	33·73	25·19	—
1365	,,	,, 10	noon	40 57	66 12	23·3	18·30	33·08	—	—
1366	,,	,, 10	midnight	41 49	61 31	18·9	18·23	32·95	—	·00213
1367	,,	,, 11	noon .	43 4	56 39	21·7	18·62	33·66	—	—
1368	,,	,, 11	midnight	44 17	52 5	18·9	17·85	32·28	23·90	—
1369	,,	,, 12	noon .	45 45	47 32	14·4	17·59	31·81	23·54	—
1370	,,	,, 12	midnight	47 3	42 51	15·0	18·20	32·90	—	—
1371	,,	,, 13	noon .	48 35	37 43	17·8	19·53	35·28	—	—
1372	,,	,, 13	midnight	49 30	32 14	15·6	19·34	34·94	25·89	—
1373	,,	,, 14	noon .	50 33	26 35	16·7	19·51	35·25	—	—
1374	,,	,, 14	midnight	50 50	20 1	14·4	19·59	35·40	—	—
1375	,,	,, 15	noon .	51 22	15 2	16·1	19·71	35·61	26·55	—
1376	Loughrigg Holme .	Aug. 16	midnight	55 36	8 45	14·3	19·57	35·36	—	—
1377	,,	,, 17	noon .	55 57	12 4	14·7	19·55	35·32	—	—
1378	,,	,, 17	midnight	56 3	15 0	14·2	19·56	35·34	—	—
1379	,,	,, 18	noon . .	56 11	17 53	13·9	19·55	35·32	—	—
1380	,,	,, 18	midnight	56 14	20 48	13·9	19·58	35·38	—	—
1381	,,	,, 19	noon . .	56 16	23 44	13·7	19·52	35·27	—	—
1382	,,	,, 19	midnight	56 19	26 12	13·9	19·49	35·21	—	—
1383	,,	,, 20	noon . .	56 22	28 57	12·2	19·33	34·93	—	—
1384	,,	,, 20	midnight	56 11	32 10	12·1	19·35	34·96	—	—
1385	,,	,, 21	noon . .	56 7	35 22	12·1	19·26	34·80	—	—
1386	,,	,, 21	midnight	55 41	37 26	10·9	19·20	34·69	—	—
1387	,,	,, 22	noon . .	55 14	40 14	10·8	19·16	34·62	—	—
1388	,,	,, 22	midnight	54 44	43 23	10·5	19·16	34·62	—	—
1389	,,	,, 23	noon . .	54 13	46 39	11·4	19·03	34·39	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1390	Loughrigg Holme	Aug. 23	midnight	53° 29′	49° 42′	11·7	19·02	34·37	—	—
1391	,,	,, 24	noon . .	52 46	52 28	7·2	17·62	31·86	—	—
1392	,,	,, 24	midnight	52 10	54 35	10·0	16·32	29·54	—	—
1393	,,	Sept. 12	,,	52 0	54 40	9·4	17·08	30·88	—	—
1394	,,	,, 13	noon . .	52 28	51 46	6·1	17·85	32·28	—	—
1395	,,	,, 13	midnight	52 57	49 5	10·6	19·06	34·44	—	—
1396	,,	,, 14	noon . .	53 12	46 17	11·6	19·14	34·58	—	—
1397	,,	,, 14	midnight	53 39	43 23	12·2	19·15	34·60	—	—
1398	,,	,, 15	noon . .	54 5	40 24	10·2	19·04	34·40	—	—
1399	,,	,, 15	midnight	54 42	37 33	11·0	19·20	34·69	—	—
1400	,,	,, 16	noon . .	55 13	34 37	10·7	19·40	35·05	—	—
1401	,,	,, 17	,,	55 42	28 1	12·3	19·30	34·87	—	—
1402	,,	,, 17	midnight	55 49	24 42	12·8	19·44	35·12	—	—
1403	,,	,, 18	noon . .	55 57	21 21	13·5	19·45	35·14	—	—
1404	,,	,, 18	midnight	55 53	18 4	12·8	19·59	35·40	—	—
1405	,,	,, 19	noon . .	55 48	14 48	13·1	19·52	35·27	—	—
1406	Ethiopia .	,, 5	,,	55 16	14 21	15·0	19·20	34·69	—	—
1407	,,	,, 6	,,	54 27	22 59	15·6	19·46	35·15	—	—
1408	,,	,, 7	,,	53 18	31 1	13·3	19·28	34·84	—	—
1409	,,	,, 8	,,	51 39	38 19	15·6	19·10	34·51	—	—
1410	,,	,, 9	,,	49 42	43 54	15·0	18·95	34·24	—	—
1411	,,	,, 10	,,	47 23	50 24	14·4	17·51	31·66	23·52	—
1412	,,	,, 11	,,	44 51	56 13	17·8	17·80	32·19	23·87	—
1413	,,	,, 12	,,	42 27	61 42	18·3	17·44	31·54	—	—
1414	,,	,, 13	,,	40 55	67 46	16·7	17·97	32·49	—	—
1415	,,	,, 20	,,	40 45	68 28	16·1	17·99	32·53	—	—
1416	,,	,, 21	,,	42 23	62 44	16·1	17·73	32·06	—	—
1417	,,	,, 22	,,	44 25	56 54	16·1	17·65	31·92	—	—
1418	,,	,, 23	,,	46 59	51 16	14·4	17·41	31·49	23·30	—
1419	,,	,, 24	,,	49 29	45 29	12·2	18·61	33·64	—	—
1420	,,	,, 25	,,	51 22	38 53	13·3	19·07	34·46	—	—
1421	,,	,, 26	,,	53 3	31 59	11·7	19·20	34·69	25·87	—
1422	,,	,, 27	,,	54 11	24 26	12·8	19·33	34·93	—	—
1423	,,	,, 28	,,	54 55	16 27	12·8	19·56	35·34	—	—
1424	,,	,, 29	,,	55 35	8 29	13·3	19·51	35·25	—	—
1425	Corean . .	,, 6	,,	Off Fastnet		15·6	19·50	35·23	—	—
1426	,,	,, 7	,,	51° 43′	16° 42′	15·0	19·57	35·36	—	—
1427	,,	,, 8	,,	51 52	23 28	16·7	19·63	35·47	—	—
1428	,,	,, 9	,,	51 38	30 25	16·7	19·46	35·15	26·32	—
1429	,,	,, 10	,,	51 5	36 30	14·4	18·95	34·24	—	—
1430	,,	,, 11	,,	50 16	41 45	16·7	18·78	33·94	—	—
1431	,,	,, 12	,,	48 50	47 59	18·3	18·45	33·36	—	—
1432	,,	,, 13	,,	6′ E. of St. John's		13·9	17·19	31·09	23·08	—
1433	,,	,, 15	,,	45° 42′	57° 0′	16·1	17·55	31·73	—	—
1434	,,	,, 16	,,	8′ S. of Halifax		15·6	16·49	29·84	—	—
1435	,,	,, 17	,,	43° 42′	64° 12′	17·2	17·32	31·32	—	—
1436	,,	,, 18	,,	40 22	68 58	17·2	17·96	32·48	—	—
1437	,,	,, 19	,,	38 53	74 40	20·0	17·79	32·17	—	—
1438	,,	,, 26	,,	39 30	71 38	17·8	18·81	34·00	—	—
1439	,,	,, 27	,,	41 6	66 30	15·6	17·85	32·28	—	—
1440	,,	,, 28	,,	42 49	61 20	17·8	17·68	31·97	23·67	—
1441	,,	,, 29	,,	44 45	56 13	14·4	—	—	—	—
1442	,,	,, 30	,,	10′ E. of St. John's		11·1	17·20	31·11	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1443	Corean . .	Oct. 1	noon . .	49° 33′	47° 30′	11·7	18·78	33·94	—	—
1444	,,	,, 2	,,	51 40	40 55	14·4	19·04	34·40	25·55	—
1445	,,	,, 3	,,	53 2	33 54	11·7	19·27	34·82	—	—
1446	,,	,, 4	,,	53 35	27 5	12·8	19·31	34·89	—	—
1447	,,	,, 5	,,	54 49	20 6	12·2	19·66	35·52	—	—
1448	,,	,, 6	,,	56 24	12 40	11·7	19·66	35·52	26·46	—
1449	,,	,, 7	,,	Off Holy Isle		12·2	18·79	33·96	—	—
1450	Thorwaldsen	June 2	8 A.M. .	59° 55′	3° 4′	9·0	19·38	35·01	—	—
1451	,,	,, 2	noon . .	59 57	4 25	9·7	19·58	35·38	—	—
1452	,,	,, 2	4 P.M. .	59 56	5 41	10·2	19·58	35·38	—	—
1453	,,	,, 3	8 A.M. .	59 46	10 41	9·8	19·56	35·34	26·42	—
1454	,,	,, 3	noon . .	59 38	12 5	9·8	19·59	35·40	—	—
1455	,,	,, 3	4 P.M. .	59 28	13 15	10·0	19·59	35·40	—	—
1456	,,	,, 4	8 A.M. .	58 50	17 20	9·6	19·57	35·36	—	—
1457	,,	,, 4	noon . .	58 40	18 19	9·8	19·56	35·34	26·27	—
1458	,,	,, 4	4 P.M. .	58 36	18 58	10·0	19·56	35·34	—	—
1459	,,	,, 5	8 A.M. .	58 12	22 24	10·5	19·51	35·25	—	—
1460	,,	,, 5	noon . .	58 1	23 50	10·1	19·55	35·32	—	—
1461	,,	,, 5	4 P.M. .	57 56	24 57	10·5	19·50	35·23	—	—
1462	,,	,, 6	8 A.M. .	57 40	28 27	10·0	19·45	35·14	—	—
1463	,,	,, 6	noon . .	57 37	28 50	9·5	19·45	35·14	—	—
1464	,,	,, 6	4 P.M. .	57 32	29 0	10·6	19·40	35·05	—	—
1465	,,	,, 7	8 A.M. .	57 17	28 58	9·5	19·50	35·23	26·10	—
1466	,,	,, 7	noon . .	57 9	28 53	9·5	19·40	35·05	—	—
1467	,,	,, 7	4 P.M. .	57 10	29 7	9·8	19·44	35·12	—	—
1468	,,	,, 8	8 A.M. .	57 9	29 34	9·5	19·46	35·15	—	—
1469	,,	,, 8	noon . .	57 15	29 59	9·0	19·44	35·12	—	—
1470	,,	,, 8	4 P.M. .	57 15	29 59	9·5	19·46	35·15	26·05	—
1471	,,	,, 9	8 A.M. .	57 7	34 22	8·4	19·43	35·10	—	—
1472	,,	,, 9	noon . .	57 6	35 42	8·0	19·43	35·10	—	—
1473	,,	,, 9	4 P.M. .	57 7	36 46	7·6	19·37	35·00	—	—
1474	,,	,, 10	8 A.M. .	57 2	39 21	6·5	19·30	34·87	—	—
1475	,,	,, 10	noon . .	57 0	40 10	6·5	19·40	35·05	—	—
1476	,,	,, 10	4 P.M. .	57 1	40 15	6·2	19·34	34·94	—	—
1477	,,	,, 11	8 A.M. .	56 54	42 10	5·0	19·32	34·91	25·92	—
1478	,,	,, 11	noon . .	56 53	43 2	5·2	19·30	34·87	—	—
1479	,,	,, 11	4 P.M. .	56 56	43 31	5·2	19·18	34·65	—	—
1480	,,	Sept. 15	noon . .	56 42	45 29	8·0	19·11	34·53	—	—
1481	,,	,, 15	4 P.M. .	56 45	44 31	8·0	19·11	34·53	—	—
1482	,,	,, 16	noon . .	57 0	40 21	8·0	19·15	34·60	—	—
1483	,,	,, 16	4 P.M. .	57 3	39 59	9·2	19·21	34·71	25·88	—
1484	,,	,, 17	8 A.M. .	57 2	36 4	9·5	19·37	35·00	—	—
1485	,,	,, 17	noon . .	57 4	35 14	10·0	19·31	34·89	26·00	—
1486	,,	,, 17	4 P.M. .	57 4	34 19	10·5	19·40	35·05	—	—
1487	,,	,, 18	8 A.M. .	57 4	30 51	10·5	19·37	35·00	—	—
1488	,,	,, 18	noon . .	57 5	29 56	11·0	19·39	35·03	—	—
1489	,,	,, 18	4 P.M. .	57 9	29 1	11·5	19·46	35·15	—	—
1490	,,	,, 19	8 A.M. .	57 25	25 48	10·5	19·43	35·10	—	—
1491	,,	,, 19	noon . .	57 27	25 25	12·0	19·46	35·15	26·14	—
1492	,,	,, 19	4 P.M. .	57 29	24 56	13·0	19·49	35·21	—	—
1493	,,	,, 20	8 A.M. .	57 35	24 22	11·2	19·46	35·15	—	—
1494	,,	,, 20	noon . .	57 45	24 3	11·7	19·50	35·23	—	—
1495	,,	,, 20	4 P.M. .	57 54	23 37	12·2	19·53	35·28	—	—
1496	,,	,, 21	8 A.M. .	57 52	23 20	12·0	19·55	35·32	—	—
1497	,,	,, 21	noon . .	58 1	23 10	12·5	19·53	35·28	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1498	Thorwaldsen	Sept. 22	noon . .	57° 51′	23° 15′	12·0	19·50	35·23	—	—
1499	,,	,, 23	8 A.M. .	58 10	20 26	11·5	19·54	35·30	26·22	—
1500	,,	,, 23	noon . .	58 15	19 30	12·0	19·50	35·23	—	—
1501	,,	,, 23	4 P.M. .	58 20	18 40	11·6	19·49	35·21	—	—
1502	,,	,, 24	8 A.M. .	58 43	15 21	11·5	19·53	35·28	—	—
1503	,,	,, 24	noon . .	58 47	14 38	10·8	19·55	35·32	—	—
1504	,,	,, 25	,,	59 5	11 26	12·0	19·58	35·38	—	—
1505	,,	,, 26	,,	59 37	9 18	11·5	19·52	35·27	—	—
1506	,,	,, 27	,,	59 37	7 7	11·5	19·55	35·32	—	—
1507	,,	June 12	4 P.M. .	58 13	47 14	5·2	18·97	34·28	25·50	—
1508	,,	,, 12	noon . .	57 54	46 9	5·5	19·05	34·42	—	—
1509	,,	,, 12	8 A.M. .	57 37	45 25	4·5	19·01	34·35	—	—
1510	Teutonic .	Sept. 25	noon . .	51 23	10 7	15·0	19·92	35·98	—	—
1511	,,	,, 25	midnight	51 23	15 51	14·4	19·68	35·56	—	—
1512	,,	,, 26	noon . .	51 23	20 50	15·0	19·64	35·48	—	—
1513	,,	,, 26	midnight	50 53	26 45	14·4	19·79	35·75	26·69	—
1514	,,	,, 27	noon . .	50 16	32 32	14·4	19·60	35·41	—	—
1515	,,	,, 27	midnight	48 55	38 12	14·4	19·20	34·69	—	—
1516	,,	,, 28	noon . .	47 29	43 55	14·4	18·51	33·46	—	—
1517	,,	,, 28	midnight	46 4	49 30	13·3	17·73	32·06	23·75	—
1518	,,	,, 29	noon . .	44 26	54 42	15·6	18·40	33·26	—	—
1519	,,	,, 29	midnight	43 34	58 21	16·1	17·96	32·48	—	—
1520	,,	,, 30	noon . .	41 30	65 43	16·7	17·75	32·09	—	—
1521	,,	,, 30	midnight	40 40	70 31	15·9	18·05	33·63	—	—
1522	,,	Oct. 7	,,	40 48	66 49	20·0	19·49	35·21	—	—
1523	,,	,, 8	noon . .	41 10	64 59	21·7	19·75	35·68	—	—
1524	,,	,, 8	midnight	42 7	60 58	17·2	17·97	32·49	—	—
1525	,,	,, 9	noon . .	43 23	56 9	16·7	18·47	33·39	24·79	—
1526	,,	,, 9	midnight	44 43	50 59	15·0	17·96	32·48	—	—
1527	,,	,, 10	noon . .	46 10	46 10	15.6	18·37	33·20	—	—
1528	,,	,, 10	midnight	47 39	41 9	16·7	19·70	35·59	—	—
1529	,,	,, 11	noon . .	49 7	36 7	16·7	19·68	35·56	26·37	—
1530	,,	,, 11	midnight	49 49	30 50	14·4	19·47	35·17	26·16	—
1531	,,	,, 12	noon . .	50 43	25 11	14·4	19·61	35·43	—	—
1532	,,	,, 12	midnight	50 57	19 22	13·9	19·74	35·66	—	—
1533	,,	,, 13	noon . .	51 23	13 31	13·3	19·91	35·97	—	—
1534	Granuaile .	June 14	,,	55 48	10 40	13·5	19·60	35·41	—	·00230
1535	,,	,, 14	4 P.M. .	56 17	11 25	12·8	19·57	35·36	—	—
1536	,,	,, 14	8 P.M. .	56 44	12 6	12·8	19·62	35·45	26·49	—
1537	,,	,, 14	midnight	57 10	12 50	11·7	19·60	35·41	—	·00230
1538	,,	,, 15	4 A.M. .	57 39	13 36	10·7	19·53	35·28	26·27	—
1539	,,	,, 15	11.30 A.M.	57 35	13 44	10·4	19·63	35·47	—	—
1540	,,	,, 15	4 P.M. .	57 23	13 27	11·1	19·58	35·38	—	—
1541	,,	,, 15	8 P.M. .	57 35	13 44	10·8	19·53	35·28	—	·00230
1542	,,	,, 15	midnight	57 32	13 48	10·8	19·63	35·47	—	—
1543	,,	,, 16	4 A.M. .	57 35	13 43	10·4	19·56	35·34	26·25	—
1544	,,	,, 16	8 A.M. .	57 36	13 40	10·6	19·59	35·40	—	—
1545	,,	,, 16	4.15 P.M.	57 36	12 0	11·5	19·60	35·41	—	·00230
1546	,,	,, 16	8.30 P.M.	57 36	10 50	11·7	19·63	35·47	—	—
1547	,,	,, 16	midnight	57 46	9 50	12·2	19·60	35·41	—	—
1548	,,	,, 17	4 A.M. .	57 48	8 42	12·1	19·54	35·30	—	—
1549	,,	,, 17	4 P.M. .	57 22	8 16	12·8	19·44	35·12	26·17	·00229
1550	China . .	Aug. 5	11 P.M. .	63 34	16 31	9·7	18·97	34·28	—	—
1551	,,	,, 6	noon . .	63 34	16 31	10·0	19·07	34·46	—	—
1552	,,	,, 6	midnight	63 37	15 12	11·7	19·22	34·72	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1553	China . .	Aug. 7	noon . .	63° 37′	15° 12′	11·7	19·25	34·78	25·90	—
1554	,,	,, 8	,,	65 10	14 22	7·2	18·50	33·44	—	—
1555	,,	,, 8	midnight	66 23	14 34	8·3	18·21	32·91	—	—
1556	,,	,, 9	9 A.M. .	66 31	18 4	8·3	18·50	33·44	—	—
1557	,,	,, 9	11.30 P.M.	66 27	20 21	7·2	18·74	33·87	—	—
1558	,,	,, 10	noon . .	66 27	20 16	6·7	18·72	33·83	—	—
1559	,,	,, 11	midnight	66 27	20 16	6·7	18·56	33·55	—	—
1560	,,	,, 12	11 A.M. .	66 33	20 10	7·2	17·89	32·35	—	—
1561	,,	,, 13	9 P.M. .	63 35	18 10	7·2	18·48	33·41	24·81	—
1562	,,	,, 15	11 A.M. .	63 28	18 40	10·6	19·17	34·63	—	—
					E.					
1563	,,	,, 27	1 A.M. .	57 38	14 50	12·8	19·56	35·34	—	—
1564	,,	,, 27	2 P.M. .	57 38	14 50	12·2	19·53	35·28	—	—
1565	,,	Sept. 12	noon . .	56 56	14 20	13·3	19·51	35·25	26·24	—
1566	,,	,, 12	11 P.M. .	56 56	14 20	12·2	19·57	35·36	—	—
1567	,,	,, 11	,,	56 56	14 20	13·3	19·58	35·38	—	—
1568	,,	,, 28	,,	62 10	6 20	13·3	19·45	35·14	—	—
1569	,,	,, 29	noon . .	62 10	6 20	13·3	19·45	35·14	26·08	—
1570	,,	Oct. 14	11 P.M. .	62 12	6 15	5·1	19·46	35·15	—	—
1571	,,	,, 15	noon . .	62 12	6 14	6·1	19·50	35·23	—	—
1572	,,	,, 16	11 P.M. .	62 5	6 10	6·1	19·25	34·78	—	—
1573	,,	,, 17	noon . .	62 5	6 10	6·7	19·28	34·84	25·94	—
1574	,,	,, 18	11 P.M. .	62 3	6 12	6·7	19·25	34·78	—	—
1575	,,	,, 19	noon . .	62 3	6 12	7·2	19·27	34·82	—	—
1576	,,	,, 20	11 P.M. .	62 1	6 2	7·2	19·29	34·86	—	—
1577	,,	,, 21	noon . .	62 1	6 2	7·2	19·28	34·84	—	—
1578	,,	,, 22	11 P.M. .	62 15	6 15	6·1	19·28	34·84	—	—
1579	,,	,, 23	noon . .	62 16	6 16	6·1	19·28	34·84	—	—
					W.					
1580	Laura . .	Sept. 27	8 P.M. .	59 46	3 13	10·7	19·51	35·25	—	—
1581	,,	,, 28	4 A.M. .	60 45	5 2	10·5	19·57	35·36	—	—
1582	,,	,, 28	noon . .	61 5	5 47	9·5	19·50	35·23	—	—
1583	,,	,, 29	8 P.M. .	61 39	6 34	9·0	19·48	35·19	26·23	—
1584	,,	Oct. 2	,,	62 14	8 2	8·5	19·32	34·91	—	—
1585	,,	,, 3	4 A.M. .	62 24	10 24	9·0	19·46	35·15	—	—
1586	,,	,, 3	noon . .	62 30	13 11	9·5	19·50	35·23	—	—
1587	,,	,, 3	8 P.M. .	62 44	16 13	9·5	19·48	35·19	—	—
1588	,,	,, 4	4 A.M. .	62 51	18 2	8·5	19·45	35·14	—	—
1589	,,	,, 4	noon . .	63 29	21 11	7·8	18·77	33·92	25·25	—
1590	,,	,, 4	8 P.M. .	63 49	22 54	6·5	19·66	35·52	—	—
1591	,,	,, 5	4 A.M. .	64 12	22 20	5·2	19·09	34·49	—	—
1592	,,	,, 10	8 P.M. .	64 19	22 35	6·5	19·32	34·91	—	—
1593	,,	,, 11	4 A.M. .	65 5	24 16	6·5	19·33	34·93	—	—
1594	,,	,, 11	8 P.M. .	65 10	23 28	6·5	19·26	34·80	—	—
1595	,,	,, 15	8 A.M. .	66 9	23 50	5·2	19·14	34·58	25·56	—
1596	,,	,, 18	8 P.M. .	65 41	24 57	5·6	19·16	34·62	—	—
1597	,,	,, 19	4 A.M. .	64 40	24 5	6·0	19·35	34·96	—	—
1598	,,	,, 22	noon . .	63 50	22 59	6·1	19·20	34·69	—	—
1599	,,	,, 22	8 P.M. .	63 34	20 33	6·0	18·97	34·28	—	—
1600	,,	,, 23	4 A.M. .	63 24	20 0	6·2	19·31	34·89	—	—
1601	,,	,, 23	noon . .	62 55	17 23	8·7	19·49	35·21	—	—
1602	,,	,, 24	4 A.M. .	62 53	14 59	7·0	19·22	34·72	—	—
1603	,,	,, 24	noon . .	62 58	13 23	6·9	19·99	36·11	—	—
1604	,,	,, 24	8 P.M. .	62 14	13 0	7·0	19·64	35·48	—	—
1605	,,	,, 25	4 A.M. .	62 0	11 28	8·0	19·52	35·27	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1606	Laura . .	Oct. 25	noon . .	61° 45′	9° 29′	8·5	19·52	35·27	—	—
1607	,,	,, 25	8 P.M. .	61 40	8 4	8·2	19·53	35·28	—	—
1608	,,	,, 28	,,	60 38	4 8	8·0	19·57	35·36	—	—
1609	,,	,, 29	4 A.M. .	59 30	2 50	8·0	19·59	35·40	—	—
1610	Thyra . .	May 13	noon . .	60 7	5 3	10·0	19·60	35·41	—	—
1611	,,	,, 13	8 P.M. .	61 5	5 51	9·2	19·57	35·36	—	—
1612	,,	,, 14	noon . .	61 49	6 39	7·5	19·48	35·19	—	—
1613	,,	,, 16	4 A.M. .	63 45	10 3	8·0	19·50	35·23	26·26	—
1614	,,	,, 16	noon . .	64 31	11 48	2·0	18·94	34·23	—	—
1615	,,	,, 20	8 A.M. .	63 59	15 33	8·0	19·44	35·12	—	—
1616	,,	,, 20	noon . .	63 44	16 35	7·5	19·36	34·98	—	—
1617	,,	,, 20	8 P.M. .	63 21	18 51	7·0	19·38	35·01	26·04	—
1618	,,	,, 21	4 A.M. .	63 40	21 26	8·3	17·93	32·42	24·00	—
1619	,,	June 14	8 P.M. .	64 58	12 37	3·0	18·77	33·92	—	—
1620	,,	,, 15	4 A.M. .	64 11	10 33	5·0	19·11	34·53	—	—
1621	,,	,, 15	noon . .	63 22	8 39	8·5	19·46	35·15	—	—
1622	,,	,, 15	8 P.M. .	62 30	6 51	8·5	19·38	35·01	—	—
1623	,,	,, 17	noon . .	61 31	6 40	9·0	19·49	35·21	—	—
1624	,,	,, 17	8 P.M. .	60 43	4 50	10·5	19·51	35·25	—	—
1625	,,	,, 18	8 A.M. .	59 44	2 25	10·5	19·54	35·30	—	—
1626	,,	July 10	8 P.M. .	59 42	2 53	12·0	19·42	35·08	—	—
1627	,,	,, 11	8 A.M. .	60 52	4 57	12·6	19·57	35·36	—	—
1628	,,	,, 11	noon . .	61 21	6 2	12·0	19·52	35·27	—	—
1629	,,	,, 13	8 P.M. .	63 0	8 3	10·5	19·43	35·10	—	—
1630	,,	,, 14	4 A.M. .	63 56	9 56	9·8	19·38	35·01	—	—
1631	,,	Aug. 12	8 P.M. .	61 14	5 20	12·0	19·51	35·25	—	—
1632	,,	Sept. 21	noon . .	60 13	3 42	10·9	19·54	35·30	—	—
1633	,,	,, 21	8 P.M. .	61 5	5 3	9·5	19·44	35·12	—	—
1634	,,	,, 23	4 A.M. .	62 21	8 20	8·3	19·46	35·15	—	—
1635	,,	,, 23	noon . .	63 6	10 4	8·5	19·25	34·78	—	—
1636	,,	,, 23	8 P.M. .	63 57	11 43	6·5	19·01	34·35	—	—
1637	,,	,, 24	4 A.M. .	64 51	13 30	5·0	18·62	33·66	24·95	—
1638	,,	Oct. 31	noon . .	63 7	8 35	6·3	19·34	34·94	—	—
1639	,,	Nov. 2	,,	59 53	3 5	8·8	19·51	35·25	—	—
1640	America . .	Aug. 6	11.30 A.M.	—	—	12·9	19·49	35·21	—	—
1641	,,	,, 7	noon . .	—	—	12·9	19·40	35·05	—	—
1642	,,	,, 9	11.30 A.M.	—	—	13·9	19·97	36·07	—	—
1643	,,	,, 11	10.45 A.M.	57 40	8 20	12·8	19·51	35·25	26·33	—
1644	,,	,, 18	noon . .	56 30	14 0	14·4	19·97	36·07	—	—
1645	,,	,, 20	,,	56 30	14 10	13·9	19·52	35·27	—	—
1646	,,	,, 22	,,	57 0	11 45	13·9	19·54	35·30	—	—
1647	,,	Sept. 3	11.30 A.M.	58 10	8 56	12·8	19·46	35·15	26·15	—
1648	,,	,, 4	noon . .	57 30	11 5	12·8	19·55	35·32	—	—
1649	,,	,, 5	11.30 A.M.	56 36	14 22	13·3	19·60	35·41	—	—
1650	,,	,, 6	noon . .	56 40	14 27	13·9	19·54	35·30	—	—
1651	,,	,, 7	,,	57 0	14 20	13·9	19·49	35·21	26·21	—
1652	,,	,, 8	11.30 A.M.	56 30	14 42	12·8	19·52	35·27	—	—
1653	,,	,, 9	,,	56 30	14 36	13·3	19·54	35·30	—	—
1654	,,	,, 10	,,	57 0	14 25	13·3	19·32	34·91	—	—
1655	,,	,, 11	,,	58 0	8 30	12·8	19·29	34·86	—	—
1656	,,	,, 12	noon . .	59 0	6 25	12·8	19·25	34·78	—	—
1657	,,	,, 13	,,	56 0	9 5	12·8	19·29	34·86	—	—
1658	,,	,, 14	,,	55 30	9 10	12·8	19·31	34·89	—	—
1659	,,	,, 15	,,	56 39	8 52	12·8	19·52	35·25	—	—
1660	,,	,, 16	,,	56 30	8 48	12·8	19·47	35·17	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1661	America . .	Sept. 17	noon . .	56° 4′	8° 57′	13·3	19·46	35·15	—	—
1662	,,	,, 18	,,	57 0	8 54	13·9	19·55	35·32	—	—
1663	,,	Oct. 9	,,	62 0	9 20	11·7	19·54	35·30	26·22	—
1664	,,	,, 11	,,	62 25	11 7	12·8	19·54	35·30	—	—
1665	,,	,, 15	,,	63 10	12 52	12·8	19·54	35·30	—	—
1666	,,	,, 17	,,	63 0	14 45	12·2	19·53	35·28	—	—
1667	Teutonic . .	,, 22	midnight	51 24	13 47	12·2	19·83	35·82	—	—
1668	,,	,, 23	noon . .	51 24	19 57	13·3	19·59	35·40	—	—
1669	,,	,, 23	midnight	50 54	26 18	13·3	19·63	35·47	—	—
1670	,,	,, 24	noon . .	50 11	32 31	14·4	19·29	34·86	—	—
1671	,,	,, 24	midnight	48 54	38 24	16·7	19·44	35·12	—	—
1672	,,	,, 25	noon . .	47 38	44 32	13·3	18·41	33·28	—	—
1673	,,	,, 25	midnight	46 0	49 46	11·7	17·65	31·92	23·66	—
1674	,,	,, 26	noon . .	44 20	54 52	15·6	18·44	33·34	24·78	—
1675	,,	,, 26	midnight	43 3	60 1	14·4	18·61	33·64	—	—
1676	,,	,, 27	noon . .	41 39	65 23	12·2	18·12	32·75	—	—
1677	,,	,, 27	midnight	40 31	69 51	13·3	18·09	32·70	—	—
1678	,,	Nov. 4	,,	40 12	70 21	12·8	18·12	32·75	—	—
1679	,,	,, 5	noon . .	41 8	65 36	12·2	18·06	32·64	—	—
1680	,,	,, 5	midnight	42 16	60 55	18·9	18·82	34·01	—	—
1681	,,	,, 6	noon . .	43 21	56 15	14·4	18·83	34·03	—	—
1682	,,	,, 6	midnight	44 38	51 35	12·2	17·83	32·25	23·83	—
1683	,,	,, 7	noon . .	45 54	46 57	12·8	18·49	33·43	—	—
1684	,,	,, 7	midnight	47 2	42 16	13·3	18·66	33·73	—	—
1685	,,	,, 8	noon . .	48 30	37 8	17·2	19·76	35·70	—	—
1686	,,	,, 8	midnight	49 33	31 52	14·4	19·16	34·62	—	—
1687	,,	,, 9	noon . .	50 40	26 14	13·3	19·53	35·28	—	—
1688	,,	,, 9	midnight	50 59	20 22	12·8	19·62	35·45	—	—
1689	,,	,, 10	noon . .	51 10	14 9	12·2	19·63	35·47	—	—
1690	Eclipse . .	Apr. 9	,,	59 2	4 3	8·3	19·42	35·08	—	—
1691	,,	,, 10	,,	60 26	5 30	8·3	19·57	35·36	—	—
1692	,,	,, 11	,,	60 39	6 5	6·7	19·48	35·19	—	—
1693	,,	,, 12	,,	59 48	8 50	8·3	19·58	35·38	26·45	—
1694	,,	,, 13	,,	59 20	10 48	8·8	19·55	35·32	—	—
1695	,,	,, 14	,,	59 40	15 56	8·9	19·53	35·28	—	—
1696	,,	,, 15	,,	59 33	20 43	8·9	19·50	35·23	—	—
1697	,,	,, 16	,,	60 22	25 8	8·3	19·50	35·23	—	—
1698	,,	,, 17	,,	59 0	25 19	8·9	19·56	35·34	—	—
1699	,,	,, 18	,,	59 28	30 19	7·8	19·48	35·19	—	—
1700	,,	,, 19	,,	60 25	32 42	7·2	19·55	35·32	—	—
1701	,,	,, 20	,,	60 13	35 34	5·1	19·44	35·12	—	—
1702	,,	,, 21	,,	58 45	42 6	3·2	19·02	34·37	—	—
1703	,,	,, 22	,,	58 3	45 23	2·8	19·17	34·63	—	—
1704	,,	,, 23	,,	59 3	48 23	2·8	18·96	34·26	—	—
1705	,,	,, 24	,,	59 50	50 23	1·7	18·98	34·30	25·53	—
1706	,,	,, 25	,,	59 21	50 12	2·5	19·21	34·71	—	—
1707	,,	,, 26	,,	59 2	50 36	3·9	19·28	34·84	—	—
1708	,,	,, 27	,,	60 30	53 5	1·7	19·02	34·37	—	—
1709	,,	,, 28	,,	62 18	55 20	−0·6	18·78	33·94	25·17	—
1710	,,	,, 29	,,	63 54	52 32	−0·6	18·74	33·87	—	—
1711	,,	,, 30	,,	64 5	52 40	−1·1	18·54	33·51	24·79	—
1712	,,	May 1	,,	65 25	53 30	1·1	18·90	34·16	—	—
1713	,,	,, 2	,,	65 55	53 24	1·1	18·93	34·21	—	—
1714	,,	,, 3	,,	66 8	54 30	−0·6	18·95	34·24	—	—
1715	,,	,, 4	,,	68 25	55 30	−2·7	18·95	34·24	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1716	Eclipse .	May 5	noon . .	68° 40′	54° 23′	−1·7	18·60	33·62	—	—
1717	,,	,, 6	,,	68 53	55 19	−1·7	18·61	33·64	—	—
1718	,,	,, 7	,,	69 15	54 12	−1·1	18·58	33·58	—	—
1719	,,	,, 8	,,	69 0	55 21	−1·1	18·61	33·64	—	—
1720	,,	,, 9	,,	—	—	−1·1	18·62	33·66	—	—
1721	,,	,, 10	,,	68 45	55 13	−0·6	18·62	33·66	—	—
1722	,,	,, 11	,,	68 30	54 36	−1·1	18·54	33·51	—	—
1723	,,	,, 12	,,	68 12	55 42	−1·1	18·63	33·67	—	—
1724	,,	,, 13	,,	69 18	56 12	−1·1	18·66	33·73	—	—
1725	,,	,, 14	,,	69 9	53 25	−1·1	17·53	31·70	—	—
1726	,,	,, 15	,,	69 9	53 25	−1·0	17·53	31·70	—	—
1727	,,	,, 16	,,	69 9	53 25	−1·1	18·09	32·70	—	—
1728	,,	,, 17	,,	69 27	54 56	−1·1	18·67	33·75	—	—
1729	,,	,, 18	5 P.M. .	70 25	55 0	−1·6	18·51	33·46	—	—
1730	,,	,, 19	noon . .	70 25	55 0	−0·8	18·56	33·55	—	—
1731	,,	,, 20	,,	70 36	55 12	−1·0	18·60	33·62	—	—
1732	,,	,, 21	,,	70 20	55 0	−1·1	18·64	33·69	—	—
1733	,,	,, 22	,,	70 25	55 0	−1·1	18·55	33·53	—	—
1734	,,	,, 23	,,	70 25	55 0	−0·6	18·58	33·58	—	—
1735	,,	,, 24	,,	70 26	54 53	−0·6	18·60	33·62	—	—
1736	,,	,, 25	,,	70 29	54 53	0·6	18·61	33·64	—	—
1737	,,	,, 26	,,	70 40	54 30	−0·7	18·60	33·62	—	—
1738	,,	,, 27	,,	70 40	54 30	−1·0	18·54	33·51	—	—
1739	,,	,, 28	,,	72 46	56 10	−0·2	18·62	33·66	—	—
1740	,,	,, 29	,,	72 57	56 15	0·4	18·72	33·83	—	—
1741	,,	,, 30	,,	73 28	57 0	−1·6	18·20	32·90	—	—
1742	,,	June 1	,,	73 38	57 3	−0·9	18·49	33·43	—	—
1743	,,	,, 2	,,	73 55	58 0	−1·2	18·49	33·43	—	—
1744	,,	,, 3	,,	74 3	57 55	−0·7	18·57	33·56	—	—
1745	,,	,, 4	,,	74 13	58 20	−0·9	18·46	33·37	24·77	—
1746	,,	,, 5	,,	74 13	58 20	−1·1	18·48	33·41	—	—
1747	,,	,, 6	,,	74 13	58 20	−0·2	18·47	33·39	—	—
1748	,,	,, 7	,,	75 10	59 40	−0·2	18·48	33·41	—	—
1749	,,	,, 8	,,	75 10	59 40	−0·1	18·48	33·41	—	—
1750	,,	,, 9	,,	75 10	61 47	−0·3	18·52	33·48	—	—
1751	,,	,, 10	,,	75 10	61 47	−0·1	18·55	33·53	—	—
1752	,,	,, 11	,,	75 10	61 47	0·4	18·61	33·64	—	—
1753	,,	,, 12	,,	—	—	−0·4	18·53	33·49	—	—
1754	,,	,, 13	,,	—	—	−0·2	18·50	33·44	—	—
1755	,,	,, 14	,,	—	—	−0·4	18·52	33·48	—	—
1756	,,	,, 15	,,	—	—	−0·6	18·55	33·53	—	—
1757	,,	,, 16	,,	—	—	−0·2	18·55	33·53	24·89	—
1758	,,	,, 17	,,	—	—	0·1	18·36	33·19	—	—
1759	,,	,, 18	,,	—	—	0·3	18·28	33·04	—	—
1760	,,	,, 19	,,	—	—	−0·2	18·52	33·48	—	—
1761	,,	,, 20	,,	—	—	−0·2	18·51	33·46	—	—
1762	,,	,, 21	,,	75 29	67 18	−0·6	18·51	33·46	—	—
1763	,,	,, 22	,,	75 51	—	−0·8	18·53	33·49	—	—
1764	,,	,, 23	,,	76 15	68 46	0·0	18·24	32·97	—	—
1765	,,	,, 24	,,	76 28	70 4	−0·6	18·12	32·75	—	—
1766	,,	,, 25	,,	74 47	76 12	3·6	18·37	33·20	—	—
1767	,,	,, 26	,,	—	—	3·3	17·84	32·26	—	—
1768	,,	,, 27	,,	—	—	3·1	17·93	32·42	—	—
1769	,,	,, 28	,,	74 3	71 52	3·6	17·61	31·85	—	—
1770	,,	,, 29	,,	—	—	2·8	17·34	31·36	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1771	Eclipse . .	June 30	noon . .	73° 45′	72° 57′	6·4	17·40	31·47	—	—
1772	,,	July 1	,,	73 51	—	2·5	17·23	31·17	—	—
1773	,,	,, 2	,,	73 0	69 30	0·0	17·31	31·31	—	—
1774	,,	,, 3	,,	72 51	—	0·3	17·92	32·40	—	—
1775	,,	,, 4	,,	72 45	76 5	1·2	15·96	28·90	21·33	—
1776	,,	,, 5	,,	72 45	76 5	0·6	3·31	6·04	3·66	—
1777	,,	,, 6	,,	72 45	76 5	1·1	3·05	5·57	3·34	—
1778	,,	,, 7	,,	72 45	76 5	0·9	1·62	2·93	1·31	—
1779	,,	,, 8	,,	—	—	—	1·20	2·18	—	—
1780	,,	,, 9	,,	71 30	70 30	4·4	17·74	32·07	—	—
1781	,,	,, 10	,,	71 45	72 40	1·4	16·00	28·97	—	—
1782	,,	,, 11	,,	—	—	2·2	16·32	29·54	—	—
1783	,,	,, 12	,,	—	—	1·1	16·50	29·87	—	—
1784	,,	,, 13	,,	—	—	1·7	16·37	29·63	—	—
1785	,,	,, 14	,,	72 8	69 30	3·6	16·19	29·31	—	—
1786	,,	,, 15	,,	—	—	3·1	16·70	30·21	—	—
1787	,,	,, 16	,,	—	—	1·7	16·78	30·37	22·34	·00198
1788	,,	,, 17	,,	71 33	71 0	1·7	16·47	29·81	—	·00197
1789	,,	,, 18	,,	—	—	2·6	13·15	23·85	—	·00156
1790	,,	,, 19	,,	70 36	66 30	1·6	16·28	29·48	21·83	·00193
1791	,,	,, 20	,,	70 34	67 55	1·4	8·41	15·31	10·85	·00097
1792	,,	,, 21	,,	70 34	67 55	0·3	9·09	16·54	11·75	—
1793	,,	,, 22	,,	—	—	−0·1	5·36	9·78	6·50	—
1794	,,	,, 23	,,	—	—	0·1	5·52	10·06	6·79	·00065
1795	,,	,, 24	,,	—	—	0·3	15·48	28·04	20·60	·00183
1796	,,	,, 25	,,	69 45	67 30	0·2	5·76	10·49	7·06	·00069
1797	,,	,, 26	,,	69 45	67 30	0·5	4·26	7·78	4·99	·00051
1798	,,	,, 27	,,	69 45	67 30	1·1	6·86	12·50	8·86	·00082
1799	,,	,, 28	,,	69 45	67 30	0·4	4·92	8·97	5·94	·00058
1800	,,	,, 29	,,	69 45	67 30	0·5	5·49	10·01	6·74	·00065
1801	,,	,, 30	,,	69 45	67 30	0·6	8·74	15·90	11·18	·00104
1802	,,	Aug. 1	,,	69 45	67 30	0·8	8·32	15·14	—	·00097
1803	,,	,, 2	,,	69 45	67 30	0·3	4·28	7·82	5·12	·00049
1804	,,	,, 3	,,	69 45	67 30	0·5	6·04	11·01	—	·00070
1805	,,	,, 4	,,	69 45	67 30	0·4	6·22	11·34	7·74	—
1806	,,	,, 5	,,	69 45	67 30	1·1	4·36	7·96	—	·00050
1807	,,	,, 6	,,	—	—	—	6·29	11·46	—	—
1808	,,	,, 7	,,	69 43	67 20	0·4	16·59	30·02	—	—
1809	,,	,, 8	,,	70 18	68 8	1·1	15·09	27·34	20·13	—
1810	,,	,, 9	,,	70 18	68 8	0·2	12·88	23·36	—	—
1811	,,	,, 10	,,	70 17	69 20	3·9	12·95	23·49	—	—
1812	,,	,, 11	,,	70 17	69 20	4·4	13·21	23·96	—	—
1813	,,	,, 12	,,	70 17	69 20	4·3	13·32	24·15	—	—
1814	,,	,, 13	,,	70 17	69 20	4·3	—	—	—	—
1815	,,	,, 14	,,	70 10	69 12	4·6	13·31	24·14	—	—
1816	,,	,, 15	,,	—	—	4·4	13·82	25·05	—	—
1817	,,	,, 16	,,	70 15	69 5	1·1	15·15	27·45	20·06	·00179
1818	,,	,, 17	,,	70 28	68 45	1·7	15·00	27·18	—	—
1819	,,	,, 18	,,	70 28	68 45	1·7	14·14	25·63	—	—
1820	,,	,, 19	,,	70 28	68 45	1·6	15·22	27·57	—	—
1821	,,	,, 20	,,	70 28	68 45	2·2	14·88	26·96	—	·00174
1822	,,	,, 21	,,	70 28	68 45	1·8	14·38	26·07	—	—
1823	,,	,, 22	,,	—	—	2·9	13·52	24·52	—	—
1824	,,	,, 23	,,	—	—	4·4	13·79	25·00	—	—
1825	,,	,, 24	,,	—	—	2·2	14·48	26·25	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1826	Eclipse . .	Aug. 25	noon . .	70° 34′	68° 18′	1·4	15·03	27·24	—	—
1827	,,	,, 26	,,	70 57	70 34	1·7	14·15	25·65	—	—
1828	,,	,, 27	,,	70 57	70 34	0·6	13·22	23·98	—	—
1829	,,	,, 28	,,	70 57	70 34	1·7	13·22	23·98	—	—
1830	,,	,, ?	,,	—	—	3·1	13·51	24·50	17·97	—
1831	,,	,, ?	,,	70 57	70 34	2·5	13·48	24·44	—	—
1832	,,	Sept. 1	,,	70 54	70 0	2·8	2·60	4·74	2·74	—
1833	,,	,, 2	,,	70 40	69 50	2·1	16·45	29·76	21·93	—
1834	,,	,, 3	,,	70 54	70 0	2·9	6·98	12·72	8·66	—
1835	,,									
1836	,,									
1837	,,									
1838	,,	,, 7	,,	70 54	70 0	3·8	10·44	18·97	—	—
1839	,,	,, 8	,,	70 54	70 0	3·2	8·22	14·96	—	—
1840	,,	,, 9	,,	70 54	70 0	2·5	2·74	4·99	2·76	—
1841	,,	,, 10	,,	70 54	70 0	2·2	7·64	13·92	9·73	—
1842	,,	,, 11	,,	71 8	70 25	2·3	16·67	30·16	—	—
1843	,,	,, 12	,,	71 44	73 40	2·2	16·95	30·67	—	—
1844	,,	,, 13	,,	71 44	73 40	1·8	16·62	30·08	—	—
1845	,,									
1846	,,	,, 15	,,	71 50	73 10	1·7	17·68	31·97	—	—
1847	,,	,, 16	,,	72 2	74 40	1·4	17·20	31·12	23·03	—
1848	,,	,, 17	,,	72 2	74 40	1·1	17·20	31·11	—	—
1849	,,	,, 18	,,	72 15	74 35	1·4	17·32	31·32	—	—
1850	,,	,, 19	,,	72 45	76 10	0·8	17·90	32·37	—	—
1851	,,	,, 20	,,	72 35	76 12	1·0	17·37	31·40	23·24	—
1852	,,									
1853	,,	,, 22	,,	72 44	78 10	1·2	16·58	30·01	—	—
1854	,,	,, 23	,,	—	—	—	17·23	31·17	—	—
1855	,,	,, 24	,,	72 10	73 51	1·1	17·51	31·66	—	—
1856	,,	,, 25	,,	71 52	73 14	1·1	17·53	31·70	—	—
1857	,,	,, 26	,,	70 40	69 50	0·8	16·84	30·46	—	—
1858	,,	,, 27	,,	70 40	69 50	1·4	17·08	30·89	—	—
1859	,,	,, 28	,,	70 40	69 50	0·8	17·19	31·08	23·00	—
1860	,,	,, 29	,,	—	—	—	17·10	30·93	—	—
1861	,,	,, 30	,,	70 40	69 50	1·4	17·14	31·00	—	—
1862	,,	Oct. 1	,,	70 54	69 25	0·8	19·51	35·25	—	—
1863	,,	,, 2	,,	70 5	67 12	0·3	17·29	31·27	—	—
1864	,,	,, 3	,,	69 30	66 30	−0·6	17·44	31·54	—	—
1865	,,	,, 4	,,	—	—	0·0	16·37	29·63	—	—
1866	,,	,, 5	,,	69 30	66 30	0·0	17·24	31·18	—	—
1867	,,	,, 6	,,	69 30	66 30	0·3	17·31	31·31	—	—
1868	,,	,,	,,							
1869	,,	,, 8	,,	69 34	66 58	0·0	17·16	31·04	—	—
1870	,,	,, 9	,,	69 43	67 25	0·1	16·82	30·43	—	—
1871	,,	,, 10	,,	70 6	67 0	0·0	17·43	31·52	—	—
1872	,,	,, 11	,,	70 17	67 34	0·3	17·23	31·17	—	—
1873	,,	,, 12	,,	70 47	70 0	−0·1	17·29	31·27	—	—
1874	,,	,, 13	,,	70 47	70 0	−0·2	17·25	31·19	—	—
1875	,,	,, 14	,,	70 47	70 0	−0·3	17·37	31·42	—	—
1876	,,	,, 15	,,	70 49	69 20	0·0	17·43	31·52	—	—
1877	,,	,, 16	,,	70 17	68 10	0·1	17·23	31·17	—	—
1878	,,	,, 17	,,	70 4	67 25	−0·4	17·30	31·29	—	—
1879	,,	,, 18	,,	69 32	67 53	−0·8	17·32	31·32	—	—
1880	,,	,, 19	,,	69 32	67 53	−0·6	17·40	31·46	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	${}_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1881	Eclipse . .	Oct. 20	noon . .	69° 13′	66° 30′	−0·6	17·56	31·75	—	—
1882	,,	,, 21	,,	67 52	63 40	−1·1	17·69	31·99	—	—
1883	,,	,, 22	,,	66 28	61 53	−1·4	17·97	32·49	—	—
1884	,,	,, 23	,,	66 12	60 30	−0·8	17·95	32·46	—	—
1885	,,	,, 24	,,	64 50	59 39	0·0	18·09	32·70	—	—
1886	,,	,, 25	,,	63 7	57 54	1·7	17·89	32·35	—	—
1887	,,	,, 26	,,	62 2	60 45	2·2	18·23	32·95	—	—
1888	,,	,, 27	,,	61 22	58 53	2·8	18·52	33·48	—	—
1889	,,	,, 28	,,	60 13	54 26	4·4	18·90	34·16	—	—
1890	,,	,, 29	,,	59 50	52 46	4·7	18·66	33·73	—	—
1891	,,	,, 30	,,	59 93	50 22	5·0	18·98	34·30	—	—
1892	,,	Nov. 1	,,	58 41	44 52	5·0	18·94	34·23	—	—
1893	,,	,, 2	,,	58 34	40 45	6·7	19·22	34·72	—	—
1894	,,	,, 3	,,	58 21	35 59	7·5	19·37	35·00	—	—
1895	,,	,, 4	,,	58 2	30 45	8·8	19·46	35·15	—	—
1896	,,	,, 5	,,	58 6	26 27	10·6	18·61	33·64	—	—
1897	,,	,, 6	,,	58 7	22 46	10·6	18·74	33·87	—	—
1898	,,	,, 7	,,	58 21	17 40	9·4	18·48	33·41	—	—
1899	,,	,, 8	,,	58 44	12 7	9·7	19·57	35·34	—	—
1900	,,	,, 9	,,	58 40	6 12	9·9	19·64	35·48	—	—
1901	Corean . .	Oct. 18	,,	Off Kinsale		10·0	19·67	35·54	—	—
1902	,,	,, 20	,,	52° 20′	16° 22′	11·1	19·75	35·68	—	—
1903	,,	,, 21	,,	52 12	22 35	12·2	19·58	35·38	—	—
1904	,,	,, 22	,,	51 52	29 45	12·8	19·62	35·45	26·29	—
1905	,,	,, 23	,,	50 58	37 10	12·2	19·17	34·63	—	—
1906	,,	,, 24	,,	50 3	43 50	14·4	19·23	34·74	—	—
1907	,,	,, 25	,,	48 3	49 50	8·3	17·22	31·14	—	—
1908	,,	,, 27	,,	46 5	55 24	10·0	17·60	31·83	23·57	—
1909	,,	,, 28	,,	44 48	61 51	12·2	17·12	30·97	22·85	—
1910	,,	,, 30	,,	42 0	66 10	11·7	17·79	32·17	—	—
1911	,,	,, 31	,,	39 30	71 15	10·6	18·94	34·23	—	—
1912	,,	Nov. 7	,,	39 28	71 55	10·6	19·14	34·58	—	—
1913	,,	,, 8	,,	41 5	67 12	10·0	18·03	32·59	—	—
1914	,,	,, 9	,,	42 39	61 46	13·3	18·29	33·06	—	—
1915	,,	,, 10	,,	44 6	57 5	12·8	18·48	33·41	—	—
1916	,,	,, 11	,,	25′ S. of St. John's.		7·8	17·42	31·52	—	—
1917	,,	,, 12	,,	48° 3′	51° 36′	6·7	17·53	31·70	—	—
1918	,,	,, 13	,,	50 1	45 55	10·6	19·15	34·60	—	—
1919	,,	,, 14	,,	51 54	39 45	11·7	19·16	34·62	—	—
1920	,,	,, 15	,,	53 23	33 3	10·6	19·22	34·72	—	—
1921	,,	,, 16	,,	54 52	26 10	11·1	19·45	35·14	—	—
1922	,,	,, 17	,,	55 24	18 50	11·1	19·69	35·58	—	—
1923	,,	,, 18	,,	55 24	11 16	10·0	19·67	35·54	—	—
1924	Loughrigg Holme	Oct. 9	,,	50 32	7 57	12·6	19·55	35·32	—	—
1925	,,	,, 9	midnight	51 3	10 48	11·7	19·55	35·32	—	—
1926	,,	,, 10	noon . .	51 33	13 17	13·1	19·66	35·52	—	—
1927	,,	,, 10	midnight	52 5	16 1	12·3	19·55	35·32	26·42	—
1928	,,	,, 11	noon . .	52 37	18 55	13·1	19·64	35·48	—	—
1929	,,	,, 11	midnight	52 52	21 45	12·8	19·47	35·17	—	—
1930	,,	,, 12	noon . .	53 28	25 4	11·8	19·39	35·03	—	—
1931	,,	,, 12	midnight	53 44	28 2	11·1	19·21	34·71	—	—
1932	,,	,, 13	noon . .	53 58	30 28	10·3	19·24	34·76	—	—
1933	,,	,, 13	midnight	54 5	33 50	10·1	19·34	34·94	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1934	Loughrigg Holme	Oct. 14	noon . .	54° 11′	37° 0′	9·6	19·18	34·65	—	—
1935	,,	,, 14	midnight	53 58	40 7	9·4	19·04	34·40	—	—
1936	,,	,, 15	noon . .	53 45	43 4	10·2	19·04	34·40	—	—
1937	,,	,, 15	midnight	53 27	46 16	9·0	19·07	34·46	—	—
1938	,,	,, 16	noon . .	53 10	49 37	9·4	18·88	34·12	—	—
1939	,,	,, 16	midnight	52 29	52 26	5·6	17·94	32·44	24·01	—
1940	,,	,, 17	noon . .	51 48	55 14	3·9	17·41	31·49	—	—
1941	,,	Nov. 5	,,	46 10	57 18	10·1	17·63	31·88	—	—
1942	,,	,, 5	midnight	46 22	54 31	10·6	17·85	32·28	—	—
1943	,,	,, 6	noon . .	46 48	51 58	8·5	17·37	31·41	23·23	—
1944	,,	,, 6	midnight	47 25	49 30	9·8	17·75	32·09	—	—
1945	,,	,, 7	noon . .	48 1	47 3	7·3	17·38	31·43	—	—
1946	,,	,, 7	midnight	48 30	44 38	9·8	17·32	31·32	—	—
1947	,,	,, 8	noon . .	49 1	42 2	17·8	19·67	35·54	26·44	—
1948	,,	,, 8	midnight	49 19	39 26	15·9	19·52	35·27	—	—
1949	,,	,, 9	noon . .	49 37	36 42	15·4	19·46	35·15	—	—
1950	,,	,, 9	midnight	49 55	34 18	15·6	19·54	35·30	—	—
1951	,,	,, 10	noon . .	50 13	31 35	13·6	19·19	34·67	—	—
1952	,,	,, 10	midnight	50 26	28 51	13·8	19·39	35·03	—	—
1953	,,	,, 11	noon . .	50 38	25 57	12·7	19·36	54·98	—	—
1954										
1955										
1956										
1957										
1958										
1959										
					E.					
1960	California .	May 16	,,	37 16	3 2	17·8	20·46	36·94	—	—
1961	,,	,, 17	,,	37 47	7 29	17·8	20·43	36·89	—	—
1962	,,	,, 18	,,	36 51	12 18	17·2	20·54	37·08	—	—
1963	,,	,, 21	,,	43 8	15 31	16·7	21·27	38·39	28·77	—
					W.					
1964	,,	June 28	,,	37 13	10 29	18·3	20·08	36·27	—	—
1965	,,	,, 28	midnight	37 53	12 46	18·3	20·10	36·30	—	—
1966	,,	,, 29	noon . .	38 28	15 8	18·3	20·04	36·19	—	—
1967	,,	,, 29	midnight	39 6	17 41	18·3	19·97	36·07	26·78	—
1968	,,	,, 30	noon . .	39 45	20 26	18·3	19·99	36·11	—	—
1969	,,	,, 30	midnight	40 18	22 50	18·3	20·02	36·16	—	—
1970	,,	July 1	noon . .	40 50	26 0	18·3	19·97	36·07	—	—
1971	,,	,, 1	midnight	41 10	28 45	17·8	19·94	36·02	—	—
1972	,,	,, 2	noon . .	41 30	31 29	18·3	19·92	35·98	—	—
1973	,,	,, 2	midnight	41 38	34 6	20·6	19·97	36·07	—	—
1974	,,	,, 3	noon . .	41 46	36 48	21·1	19·97	56·07	—	—
1975	,,	,, 3	midnight	41 51	39 25	20·0	20·02	36·16	—	—
1976	,,	,, 4	noon . .	41 57	42 2	20·6	19·89	35·93	—	—
1977	,,	,, 4	midnight	42 5	44 37	20·6	20·07	36·25	—	—
1978	,,	,, 5	noon . .	42 12	47 12	21·1	19·98	36·09	—	—
1979	,,	,, 5	midnight	42 16	49 34	13·3	18·14	32·79	24·28	—
1980	,,	,, 6	noon . .	42 20	51 57	18·9	18·58	33·58	—	—
1981	,,	,, 6	midnight	42 14	54 20	15·0	18·52	33·48	—	—
1982	,,	,, 7	noon . .	42 8	56 43	14·4	18·22	32·93	—	—
1983	,,	,, 7	midnight	41 57	59 7	17·2	18·15	32·80	24·22	—
1984	,,	,, 8	noon . .	41 40	61 31	16·7	17·89	32·35	—	·
1985	,,	,, 8	midnight	41 17	63 47	14·4	17·91	32·39	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
1986	California .	July 9	noon . .	40° 53′	66° 4′	16·1	19·61	35·43	—	—
1987	,,	,, 9	midnight	40 41	68 40	16·7	18·19	32·88	—	—
1988	,,	,, 10	noon . .	40 28	71 17	16·7	17·98	32·51	—	—
1989	,,	,, 19	,,	40 17	70 16	18·3	18·09	32·70	24·29	—
1990	,,	,, 19	midnight	40 22	67 48	18·9	19·06	34·44	—	—
1991	,,	,, 20	noon . .	40 27	65 20	21·1	18·88	34·12	—	—
1992	,,	,, 20	midnight	40 38	62 30	24·4	19·68	35·56	26·41	—
1993	,,	,, 21	noon . .	40 50	59 39	26·1	19·45	35·14	—	—
1994	,,	,, 21	midnight	40 56	56 51	25·6	19·32	34·91	—	—
1995	,,	,, 22	noon . .	41 3	54 2	25·6	19·26	34·80	—	—
1996	,,	,, 22	midnight	41 6	51 16	24·4	19·66	35·52	—	—
1997	,,	,, 23	noon . .	41 8	48 50	24·4	19·77	35·72	—	—
1998	,,	,, 23	midnight	41 19	46 26	24·4	19·68	35·56	—	—
1999	,,	,, 24	noon . .	41 29	44 3	24·4	19·75	35·68	—	—
2000	,,	,, 24	midnight	41 37	41 34	23·9	19·82	35·80	—	—
2001	,,	,, 25	noon . .	41 45	39 6	23·3	19·90	35·95	—	—
2002	,,	,, 25	midnight	41 42	36 24	22·8	19·97	36·07	—	—
2003	,,	,, 26	noon . .	41 39	33 43	22·8	19·95	36·04	—	—
2004	,,	,, 26	midnight	41 19	31 4	22·8	19·90	35·95	—	—
2005	,,	,, 27	noon . .	41 0	28 26	22·2	19·88	35·91	—	—
2006	,,	,, 27	midnight	40 32	25 56	22·2	20·03	36·18	—	—
2007	,,	,, 28	noon . .	40 4	23 26	21·7	20·03	36·18	—	—
2008	,,	,, 28	midnight	39 35	20 57	21·1	20·01	36·14	26·89	—
2009	,,	,, 29	noon . .	39 5	18 27	20·6	20·12	36·33	—	—
2010	,,	,, 29	midnight	38 32	16 8	20·6	20·11	36·31	—	—
2011	,,	,, 30	noon . .	38 0	13 50	20·0	20·15	36·39	—	—
2012	,,	,, 30	midnight	37 24	11 43	19·4	20·16	36·40	27·24	—
2013	,,	,, 31	noon . .	36 48	9 36	19·4	20·20	36·48	—	—
2014	,,	,, 31	midnight	36 20	7 15	20·0	20·15	36·39	—	—
2015	,,	Aug. 1	noon . .	36 10	4 44	20·0	20·12	36·33	—	—
2016	,,	,, 1	midnight	36 36	2 4	21·1	20·26	36·58	—	—
2017	,,	,, 2	noon . .	37 36	0 36	22·8	20·40	36·84	—	—
2018	,,	,, 2	midnight	38 37	E. 1 14	22·8	20·38	36·80	—	—
2019	,,	Sept. 3	,,	36 30	W. 7 29	21·1	20·22	36·51	—	—
2020	,,	,, 4	noon . .	37 6	9 46	21·1	20·10	36·30	—	—
2021	,,	,, 4	midnight	37 47	12 1	20·6	20·23	36·53	—	—
2022	,,	,, 5	noon . .	38 28	14 22	20·0	20·17	36·42	—	—
2023	,,	,, 5	midnight	39 5	16 36	20·0	20·11	36·31	27·21	—
2024	,,	,, 6	noon . .	39 43	18 51	20·0	20·19	36·46	—	—
2025	,,	,, 6	midnight	40 13	21 1	20·0	19·97	36·07	—	—
2026	,,	,, 7	noon . .	40 35	22 59	20·0	19·99	36·11	—	—
2027	,,	,, 7	midnight	41 2	25 13	20·0	20·10	36·30	—	—
2028	,,	,, 8	noon . .	41 26	27 34	20·0	20·01	36·14	—	—
2029	,,	,, 8	midnight	41 51	30 3	20·0	19·97	36·07	—	—
2030	,,	,, 9	noon . .	42 17	32 32	20·6	19·95	36·04	26·83	—
2031	,,	,, 9	midnight	42 28	34 30	21·1	19·83	35·82	—	—
2032	,,	,, 10	noon . .	42 39	36 28	21·7	19·84	35·84	—	—
2033	,,	,, 10	midnight	42 49	38 39	21·7	19·90	35·95	—	—
2034	,,	,, 11	noon . .	42 59	40 50	22·2	19·97	36·07	—	—
2035	,,	,, 11	midnight	43 16	43 3	22·8	19·94	36·02	—	—
2036	,, .	,, 12	noon . .	43 32	45 16	23·3	19·75	35·68	—	—
2037	,,	,, 12	midnight	43 32	47 47	20·0	18·13	32·77	—	—
2038	,,	,, 13	noon . .	43 32	50 17	16·1	17·76	32·11	23·83	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2039	California .	Sept. 13	midnight	43° 16′	53° 3′	20·0	17·99	32·53	—	—
2040	,,	,, 14	noon . .	43 1	55 50	21·1	17·97	32·49	—	—
2041	,,	,, 14	midnight	42 40	58 23	20·0	18·55	33·53	—	—
2042	,,	,, 15	noon . .	42 19	60 57	19·4	17·70	32·01	—	—
2043	,,	,, 15	midnight	41 50	63 30	17·8	17·54	31·71	—	—
2044	,,	,, 16	noon . .	41 22	66 6	17·8	17·65	31·92	23·64	—
2045	,,	,, 16	midnight	40 58	68 41	15·6	18·32	33·11	—	—
2046	,,	,, 17	noon . .	40 34	71 16	15·6	18·03	32·59	—	—
2047	,,	,, 26	midnight	40 24	72 37	18·9	17·86	32·30	—	—
2048	,,	,, 27	noon . .	40 23	70 12	16·7	17·87	32·31	—	—
2049	,,	,, 27	midnight	40 33	67 51	16·7	18·01	32·56	—	—
2050	,,	,, 28	noon . .	40 43	65 29	21·1	19·55	35·32	—	—
2051	,,	,, 28	midnight	40 54	63 9	22·2	19·48	35·19	—	—
2052	,,	,, 29	noon . .	41 6	60 49	22·2	19·91	35·97	—	—
2053	,,	,, 29	midnight	41 27	58 24	22·2	20·04	36·19	—	—
2054	,,	,, 30	noon . .	41 48	56 0	22.2	19·20	34·69	25·96	—
2055	,,	,, 30	midnight	42 6	53 39	21·7	19·67	35·54	—	—
2056	,,	Oct. 1	noon . .	42 24	51 18	20·0	17·92	32·40	24·00	—
2057	,,	,, 1	midnight	42 34	48 56	20·0	19·17	34·63	—	—
2058	,,	,, 2	noon . .	42 43	46 34	20·0	19·76	35·70	—	—
2059	,,	,, 2	midnight	42 45	44 10	23·3	19·86	35·88	—	—
2060	,,	,, 3	noon . .	42 47	41 47	23·3	19·87	35·89	—	—
2061	,,	,, 3	midnight	42 36	39 17	22·2	19·84	35·84	—	—
2062	,,	,, 4	noon . .	42 25	36 45	22·2	19·91	35·97	—	—
2063	,,	,, 4	midnight	42 10	34 11	22·2	19·92	35·98	—	—
2064	,,	,, 5	noon . .	41 56	31 36	22·2	19·91	35·97	—	—
2065	,,	,, 5	midnight	41 31	29 4	21·1	19·93	36·00	—	—
2066	,,	,, 6	noon . .	41 6	26 32	20·6	19·94	36·02	26·82	—
2067	,,	,, 6	midnight	40 41	24 2	21·1	19·94	36·02	—	—
2068	,,	,, 7	noon . .	40 16	21 33	21·1	20·14	36·37	—	—
2069	,,	,, 7	midnight	39 40	19 11	21·1	20·27	36·60	—	—
2070	,,	,, 8	noon . .	39 3	16 50	21·1	20·15	36·39	—	—
2071	,,	,, 8	midnight	38 23	14 33	20·6	20·26	36·58	27·26	—
2072	,,	,, 9	noon . .	37 44	12 16	20·6	20·14	36·37	—	—
2073	,,	,, 9	midnight	37 7	10 1	20·6	20·44	36·91	—	—
2074	,,	,, 10	noon . .	36 31	7 46	20·0	20·18	36·44	—	—
2075	,,	,, 10	midnight	36 0	5 50	20·0	20·12	36·33	—	—
2076	Anchoria .	Nov. 7	noon . .	55 18	14 9	10·3	19·64	35·48	—	—
2077	,,	,, 8	,,	54 39	23 5	11·4	19·70	35·59	—	—
2078	,,	,, 9	,,	53 20	31 29	11·4	19·17	34·63	—	—
2079	,,	,, 10	,,	51 47	38 46	13·9	19·42	35·08	—	—
2080	,,	,, 11	,,	49 47	44 27	14·4	19·19	34·67	25·90	—
2081	,,	,, 12	,,	47 22	50 46	8·6	17·55	31·73	—	—
2082	,,	,, 13	,,	44 41	56 28	11·9	18·21	32·91	—	—
2083	,,	,, 14	,,	42 13	63 27	11·7	18·25	32·98	24·50	—
2084	,,	,, 15	,,	40 36	69 40	11·1	17·92	32·40	—	—
2085	,,	,, 16	,,	40 33	71 3	12·2	18·12	32·75	—	—
2086	,,	,, 17	,,	40 33	71 3	12·2	18·02	32·58	—	—
2087	,,	,, 18	,,	40 34	72 34	12·2	18·02	32·58	—	—
2088	,,	,, 24	,,	40 48	68 40	11·7	17·93	32·42	—	—
2089	,,	,, 25	,,	42 8	62 11	11·7	19·17	34·63	—	—
2090	,,	,, 26	,,	44 20	56 31	10·3	18·43	33·32	—	—
2091	,,	,, 27	,,	47 6	51 11	0·0	17·63	31·88	23·57	—
2092	,,	,, 28	,,	49 16	45 16	5·8	18·78	33·94	—	—
2093	,,	,, 29	,,	51 11	39 17	10·8	19·22	34·72	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2094	Anchoria .	Nov. 30	noon . .	52° 57′	32° 20′	9·7	19·23	34·74	—	—
2095	,,	Dec. 1	,,	54 2	25 34	12·2	19·34	34·94	25·91	—
2096	,,	,, 2	,,	55 1	17 30	10·3	19·54	35·30	—	—
2097	,,	,, 3	,,	55 22	9 24	9·7	19·56	35·34	—	—
2098	Teutonic. .	Nov. 19	midnight	51 24	13 37	11·1	19·60	35·41	—	—
2099	,,	,, 20	noon . .	51 18	18 59	12·2	19·63	35·47	—	—
2100	,,	,, 20	midnight	51 6	24 26	15·0	19·68	35·56	—	—
2101	,,	,, 21	noon . .	50 30	30 9	12·2	19·42	35·08	26·25	—
2102	,,	,, 21	midnight	49 26	35 41	10·0	19·52	35·27	—	—
2103	,,	,, 22	noon . .	48 19	41 30	11·1	19·94	36·02	—	—
2104	,,	,, 22	midnight	46 50	46 38	11·1	18·59	33·60	—	—
2105	,,	,, 23	noon . .	45 24	50 58	6·1	17·82	32·22	23·93	—
2106	,,	,, 23	midnight	44 10	56 2	5·6	18·16	32·82	—	—
2107	,,	,, 24	noon . .	42 39	61 17	12·2	18·57	33·56	—	—
2108	,,	,, 24	midnight	41 25	66 24	10·6	18·08	32·68	—	—
2109	,,	,, 25	noon . .	40 28	71 20	10·6	17·98	32·51	24·13	—
2110	,,	Dec. 2	midnight	40 10	70 7	8·9	18·09	32·70	—	—
2111	,,	,, 3	noon . .	41 1	65 43	8·9	18·03	32·59	—	—
2112	,,	,, 3	midnight	42 3	60 8	13·9	19·48	35·19	—	—
2113	,,	,, 4	noon . .	42 55	56 37	7·2	18·05	32·63	—	—
2114	,,	,, 4	midnight	44 11	51 56	6·1	18·69	33·78	—	—
2115	,,	,, 5	noon . .	45 48	47 6	4·4	18·67	33·75	—	—
2116	,,	,, 5	midnight	47 19	42 11	7·8	18·78	33·94	—	—
2117	,,	,, 6	noon . .	48 45	36 59	12·8	19·64	35·48	—	—
2118	,,	,, 6	midnight	49 39	31 37	12·2	19·46	35·15	—	—
2119	,,	,, 7	noon . .	50 22	26 15	11·1	19·57	35·36	—	—
2120	,,	,, 7	midnight	50 49	20 36	10·0	19·59	35·40	—	—
2121	,,	,, 8	noon . .	51 16	14 43	11·7	19·55	35·32	—	—
2122	Laura. . .	Nov. 18	,,	59 54	3 1	9·5	19·30	34·87	—	—
2123	,,	,, 18	8 P.M. .	60 40	4 38	8·5	19·32	34·91	—	—
2124	,,	,, 19	4 A.M. .	61 27	6 16	8·2	19·32	34·91	—	—
2125	,,	,, 24	8 P.M. .	62 28	8 12	7·5	19·29	34·86	—	—
2126	,,	,, 25	4 A.M. .	62 31	10 40	7·5	19·40	35·05	—	—
2127	,,	,, 25	noon . .	63 1	13 0	7·4	19·39	35·03	—	—
2128	,,	,, 25	8 P.M. .	63 8	15 50	7·2	19·29	34·86	—	—
2129	,,	,, 26	4 A.M. .	63 9	18 46	7·2	19·32	34·91	25·99	—
2130	,,	,, 26	noon . .	63 20	20 16	6·5	19·04	34·40	—	—
2131	,,	,, 26	8 P.M. .	63 48	22 50	7·2	19·33	34·93	—	—
2132	,,	,, 27	4 A.M. .	64 14	22 14	5·5	19·10	34·51	—	—
2133	,,	Dec. 3	noon . .	63 48	22 48	5·7	18·85	34·07	25·20	—
2134	,,	,, 3	8 P.M. .	62 58	21 0	7·0	19·41	35·07	—	—
2135	,,	,, 4	4 A.M. .	62 47	18 15	7·2	19·42	35·08	—	—
2136	,,	,, 4	noon . .	62 39	15 57	7·2	19·41	35·07	—	—
2137	,,	,, 4	8 P.M. .	62 32	13 8	7·5	19·49	35·21	—	—
2138	,,	,, 5	4 A.M. .	62 25	10 17	7·0	19·48	35·19	—	—
2139	,,	,, 5	noon . .	62 20	7 54	7·5	19·47	35·17	—	—
2140	,,	,, 9	,,	61 20	6 20	8·0	19·38	35·01	—	—
2141	,,	,, 9	8 P.M. .	60 28	4 27	9·0	19·58	35·38	26·18	—
2142	,,	,, 10	4 A.M. .	59 58	2 50	8·5	19·46	35·15	—	—
2143	Longhirst .	Nov. 19	noon . .	51 20	7 11	11·1	19·99	35·93	—	—
2144	,,	,, 20	,,	50 29	11 20	11·7	19·96	36·05	—	—
2145	,,	,, 21	,,	48 47	15 18	10·6	19·85	35·86	—	—
2146	,,	,, 22	,,	48 40	20 0	12·8	19·84	35·84	26·75	—
2147	,,	,, 23	,,	48 29	25 1	13·9	19·72	35·63	—	—
2148	,,	,, 24	,,	48 36	30 0	14·4	19·77	35·72	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2149	Longhirst .	Nov. 25	noon . .	48° 34′	34° 52′	14·4	19·73	35·64	—	—
2150	,,	,, 26	,,	48 24	39 15	10·0	19·81	35·79	—	—
2151	,,	,, 27	,,	47 23	42 0	11·1	19·93	36·00	—	—
2152	,,	,, 28	,,	46 13	46 25	7·2	18·90	34·16	—	—
2153	,,	,, 29	,,	45 41	51 45	7·8	18·03	32·59	—	—
2154	,,	,, 30	,,	45 5	55 53	7·8	17·98	32·51	24·02	—
2155	,,	Dec. 1	,,	44 28	61 35	6·7	17·23	31·16	23·06	—
2156	,,	,, 2	,,	41 54	65 45	7·8	17·72	32·04	—	—
2157	,,	,, 3	,,	39 55	70 37	11·7	18·52	33·48	—	—
2158	,,	,, 11	,,	37 48	70 20	20·6	19·93	36·00	—	—
2159	,,	,, 12	,,	38 35	66 54	11·7	18·69	33·78	—	—
2160	,,	,, 13	,,	39 36	62 58	21·7	20·16	36·40	26·99	—
2161	,,	,, 14	,,	40 15	58 20	21·1	20·00	36·12	—	—
2162	,,	,, 15	,,	41 38	54 13	15·6	19·59	35·40	—	—
2163	,,	,, 16	,,	43 3	50 34	2·8	18·33	33·13	—	—
2164	,,	,, 17	,,	45 4	47 5	10·0	18·70	33·80	—	—
2165	,,	,, 18	,,	46 54	43 26	7·2	19·19	34·67	—	—
2166	,,	,, 19	,,	48 21	40 7	12·8	19·75	35·68	—	—
2167	,,	,, 20	,,	49 14	38 15	12·8	19·70	35·59	—	—
2168	,,	,, 21	,,	50 32	34 14	11·7	19·78	35·73	—	—
2169	,,	,, 22	,,	52 15	28 51	11·1	19·53	35·28	—	—
2170	,,	,, 23	,,	53 27	23 38	11·1	19·47	35·17	—	—
2171	,,	,, 24	,,	54 27	18 2	11·1	19·61	35·43	—	—
2172	,,	,, 25	,,	54 44	13 17	10·0	19·63	35·47	—	—
2173	California .	Nov. 20	,,	36 31	8 28	15·6	20·20	36·48	—	—
2174	,,	,, 20	midnight	37 20	10 55	15·6	20·14	36·37	—	—
2175	,,	,, 21	noon . .	38 9	13 22	15·6	20·22	36·51	—	—
2176	,,	,, 21	midnight	38 53	15 57	15·0	20·22	36·51	—	—
2177	,,	,, 22	noon . .	39 37	18 32	15·0	20·05	36·21	—	—
2178	,,	,, 22	midnight	40 19	21 8	15·6	20·13	36·35	—	—
2179	,,	,, 23	noon . .	41 2	23 45	15·6	20·01	36·14	—	—
2180	,,	,, 23	midnight	41 27	26 26	15·6	19·98	36·09	—	—
2181	,,	,, 24	noon . .	41 52	29 7	15·6	19·89	35·93	26·80	—
2182	,,	,, 24	midnight	42 13	31 46	15·6	19·89	35·93	—	—
2183	,,	,, 25	noon . .	42 18	32 39	15·6	19·95	36·04	—	—
2184	,,	,, 25	midnight	42 4	33 31	15·6	19·95	36·04	—	—
2185	,,	,, 27	noon . .	41 50	34 27	15·6	20·01	36·14	—	—
2186	,,	,, 27	midnight	41 48	36 14	16·1	19·99	36·11	—	—
2187	,,	,, 28	noon . .	41 45	38 1	16·1	19·97	36·07	—	—
2188	,,	,, 28	midnight	41 54	*40 25*	16·1	20·01	36·14	—	—
2189	,,	,, 29	noon . .	42 4	42 49	16·1	20·11	36·31	—	—
2190	,,	,, 29	midnight	42 33	44 52	16·1	20·15	36·39	27·05	—
2191	,,	,, 30	noon . .	42 53	46 52	16·1	19·47	35·17	—	—
2192	,,	,, 30	midnight	43 3	49 36	8·9	18·55	33·53	—	—
2193	,,	Dec. 1	noon . .	43 13	52 20	5·6	18·94	34·23	—	—
2194	,,	,, 1	midnight	42 59	54 53	12·2	19·05	34·42	—	—
2195	,,	,, 2	noon . .	42 44	57 26	12·2	18·65	33·71	24·98	—
2196	,,	,, 2	midnight	42 26	59 58	12·2	19·72	35·63	—	—
2197	,,	,, 3	noon . .	42 8	62 30	13·3	20·02	36·16	—	—
2198	,,	,, 3	midnight	41 40	65 13	8·9	18·16	32·82	—	—
2199	,,	,, 4	noon . .	41 4	68 6	7·8	18·01	32·56	24·07	—
2200	,,	,, 4	midnight	40 34	70 53	7·8	17·90	32·37	—	—
2201	,,	,, 5	noon . .	40 28	73 40	8·9	17·75	32·09	23·77	—
2202	Corean . .	Nov. 29	,,	off Queenstown		10·0	19·82	35·80	—	—
2203	,,	,, 30	,,	51° 48′	13° 51′	10·0	19·75	35·68	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	${}_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2204	Corean . .	Dec. 1	noon . .	51° 53′	20° 4′	12·2	19·68	35·56	—	—
2205	,,	,, 2	,,	51 42	26 16	14·4	19·61	35·43	—	—
2206	,,	,, 3	,,	51 32	31 6	10·0	19·60	35·41	—	—
2207	,,	,, 4	,,	51 18	35 8	11·1	19·68	35·56	—	—
2208	,,	,, 5	,,	50 50	39 18	8·3	19·26	34·80	—	—
2209	,,	,, 6	,,	50 15	41 45	12·2	19·90	35·95	26·91	—
2210	,,	,, 7	,,	49 56	43 28	7·2	19·30	34·87	—	—
2211	,,	,, 8	,,	48 15	48 56	0·6	18·73	33·85	—	—
2212	,,	,, 11	,,	46 0	56 10	3·3	17·77	32·13	—	—
2213	,,	,, 12	,,	44 33	62 0	4·4	17·30	31·28	23·03	—
2214	,,	,, 13	,,	43 48	64 4	5·0	17·18	31·07	—	—
2215	,,	,, 14	,,	40 33	68 15	8·3	18·02	32·58	—	—
2216	,,	,, 15	,,	39 4	73 15	10·6	18·58	33·58	—	—
2217	,,	,, 16	,,	38 56	73 27	11·1	18·76	33·90	—	—
2218	,,	,, 23	,,	39 30	71 12	8·3	18·49	33·43	—	—
2219	,,	,, 24	,,	39 58	66 54	12·2	19·49	35·21	—	—
2220	,,	,, 26	,,	43 57	57 52	3·3	17·85	32·28	—	—
2221	,,	,, 27	,,	off C.	Race	0·6	17·73	32·06	23·90	—
2222	,,	,, 28	,,	48° 7′	50° 50′	−2·2	18·07	32·66	—	—
2223	,,	,, 29	,,	50 4	45 24	10·0	19·61	35·43	—	—
2224	,,	,, 30	,,	51 50	39 6	5·6	19·27	34·82	—	—
2225	,,	,, 31	,,	53 25	32 10	5·6	19·42	35·08	26·03	—
		1897.								
2226	,,	Jan. 1	,,	54 58	25 22	9·4	19·58	35·38	—	—
2227	,,	,, 2	,,	56 0	19 35	8·9	19·56	35·34	—	—
2228	,,	,, 3	,,	55 45	12 20	8·9	19·68	35·56	—	—
		1896.								
2229	California .	Dec. 17	,,	40 5	71 36	7·8	18·08	32·68	—	—
2230	,,	,, 17	midnight	40 23	69 52	7·8	18·00	32·54	—	—
2231	,,	,, 18	noon . .	40 42	68 9	7·8	17·97	32·49	—	—
2232	,,	,, 18	midnight	41 2	65 54	7·8	18·33	33·13	—	—
2233	,,	,, 19	noon . .	41 23	63 40	10·0	18·41	33·28	—	—
2234	,,	,, 19	midnight	41 46	61 0	15·6	19·96	36·05	26·99	—
2235	,,	,, 20	noon . .	42 10	58 20	15·6	19·82	35·80	—	—
2236	,,	,, 20	midnight	42 36	55 37	13·9	19·25	34·78	—	—
2237	,,	,, 21	noon . .	42 52	53 5	13·3	18·91	34·17	—	—
2238	,,	,, 21	midnight	43 1	50 25	3·3	18·19	32·88	—	—
2239	,,	,, 22	noon . .	43 10	47 45	8·9	18·48	33·41	—	—
2240	,,	,, 22	midnight	43 10	45 1	14·4	18·45	33·39	24·77	—
2241	,,	,, 23	noon . .	43 10	42 17	14·4	19·68	35·56	26·53	—
2242	,,	,, 23	midnight	43 6	39 53	14·4	19·94	36·02	26·81	—
2243	,,	,, 24	noon . .	43 2	37 29	14·4	19·99	36·11	—	—
2244	,,	,, 24	midnight	42 45	34 50	15·6	19·84	35·84	—	—
2245	,,	,, 25	noon . .	42 28	32 11	15·6	19·51	35·25	—	—
2246	,,	,, 25	midnight	42 1	29 32	15·6	19·93	36·00	26·91	—
2247	,,	,, 26	noon . .	41 35	26 53	15·0	19·85	35·86	—	—
2248	,,	,, 26	midnight	41 4	24 11	15·0	19·79	35·75	—	—
2249	,,	,, 27	noon . .	40 33	21 29	15·0	19·89	35·93	—	—
2250	,,	,, 27	midnight	39 48	18 56	15·0	19·92	35·98	—	—
2251	,,	,, 28	noon . .	39 3	16 24	15·0	19·98	36·09	—	—
2252	,,	,, 28	midnight	38 18	14 2	15·0	19·99	36·11	—	—
2253	,,	,, 29	noon . .	37 33	11 40	15·0	20·11	36·31	—	—
2254	,,	,, 29	midnight	36 50	9 14	15·0	19·98	36·09	—	—
2255	,,	,, 30	noon . .	36 8	6 50	15·0	20·01	36·14	—	—
2256	,,	,, 30	midnight	off Tari	fa, St. Gi	braltar	20·01	36·14	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2257	Teutonic. .	Dec. 17	midnight	51° 22′	13° 27′	10·0	19·69	35·58	—	—
2258	,,	,, 18	noon . .	51 26	19 23	11·7	19·68	35·56	—	—
2259	,,	,, 18	midnight	50 52	25 42	12·2	19·61	35·43	—	—
2260	,,	,, 19	noon . .	50 21	31 38	12·2	19·59	35·40	—	—
2261	,,	,, 19	midnight	49 6	36 57	11·7	19·73	35·64	—	—
2262	,,	,, 20	noon . .	48 2	42 1	12·8	19·86	35·88	26·77	—
2263	,,	,, 20	midnight	46 37	47 16	4·4	18·70	33·80	—	—
2264	,,	,, 21	noon . .	45 17	52 8	5·0	17·12	30·97	22·85	—
2265	,,	,, 21	midnight	43 56	57 10	6·1	18·11	32·73	—	—
2266	,,	,, 22	noon . .	42 29	62 40	5·6	17·80	32·19	—	—
2267	,, .	,, 22	midnight	41 10	67 35	6·7	18·02	32·58	—	—
2268	,,	,, 23	noon . .	40 29	73 7	5·0	17·77	32·13	23·70	—
2269	,,	,, 30	midnight	40 9	70 7	8·3	18·04	32·61	—	—
2270	,,	,, 31	noon . .	41 8	65 8	10·0	18·61	33·64	—	—
2271	,,	,, 31	midnight	42 17	60 22	11·7	19·64	35·48	—	—
		1897.								
2272	,,	Jan. 1	noon . .	43 29	55 40	6·7	18·46	33·37	24·67	—
2273	,,	,, 1	midnight	44 52	50 53	3·3	17·95	32·46	—	—
2274	,,	,, 2	noon . .	46 6	46 16	−0·6	18·39	33·24	—	—
2275	,,	,, 2	midnight	47 29	41 16	6·7	18·83	34·03	—	—
2276	,,	,, 3	noon . .	48 44	36 35	12·2	19·74	35·66	26·49	—
2277	,,	,, 3	midnight	49 43	31 24	10·0	19·44	35·12	—	—
2278	,,	,, 4	noon . .	50 46	25 24	11·1	19·63	35·47	—	—
2279	,,	,, 4	midnight	51 6	19 28	11·1	19·66	35·52	—	—
2280	,,	,, 5	noon . .	51 35	13 45	11·1	19·73	35·64	—	—
		1896.			E.					
2281	Monarch. .	June 20	noon . .	53 16	1 0	14·4	19·01	34·35	—	—
					W.					
2282	,,	,, 21	,,	56 49	1 39	13·3	19·06	34·44	—	—
2283	,,	,, 22	,,	Sinclair	B. Wick	10·6	19·22	34·72	—	—
2284	,,	,, 23	,,	58° 36′	2° 43½′	11·1	19·38	35·01	—	—
2285	,,	,, 24	,,	Sincla	ir Bay	11·1	19·36	34·98	—	—
2286	,,	,, 26	,,	56° 5¾′	5° 41¾′	12·2	19·11	34·53	25·75	—
2287	,,	,, 27	,,	52 10	5 25	13·3	19·45	35·14	—	—
2288	,,	,, 28	,,	Morte tol	B., Bris- Ch.	16·1	19·52	35·27	—	—
2289	,,	,, 29	,,	,,	,,	16·7	19·48	35·19	—	—
2290	,,	,, 30	,,	S. E. B dy	ay, Lun- Id.	15·6	19·68	35·56	—	—
2291	,,	July 1	,,	Croyde	Bay	15·6	19·75	35·68	—	—
2292	,,	,, 2	,,	,,	,,	15·6	19·44	35·12	—	—
2293	,,	,, 3	,,	,,	,,	16·1	19·46	35·15	—	—
2294	,,	,, 4	,,	Ilfraco	mbe	16·1	19·30	34·87	—	—
2295	,,	,, 5	,,	,,		16·1	12·50	35·23	—	—
2296	,,	,, 7	,,	Croyde	Bay	16·7	19·34	34·94	26·04	—
2297	,,	,, 8	,,	Lundy	Id.	16·1	19·67	35·54	—	—
2298	,,	,, 9	,,	50° 30′	2° 15′	16·7	19·66	35·52	—	—
					E.					
2299	,,	Sept. 13	,,	50 48	0 38	17·2	19·66	35·52	—	—
					W.					
2300	,,	,, 14	,,	50 29	2 24	17·2	19·62	35·45	—	—
2301	,,	,, 15	,,	51 21	5 19	16·1	19·75	35·68	—	—
2302	,,	,, 16	,,	Milford	Haven	15·6	19·20	34·69	25·81	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2303	Monarch. .	Sept. 30	noon . .	51° 49′	5° 22′	15·0	19·56	35·34	—	—
2304	„	Oct. 1	„	51 50	5 15	13·9	19·65	35·50	26·55	—
2305	„	„ 3	„	51 48	5 24	14·4	19·64	35·48	—	—
2306	„	„ 4	„	55 40	5 59	12·8	19·13	34·56	—	—
2307	„	„ 5	„	Staosunaig		11·7	19·24	34·76	—	—
2308	„	„ 6	„	off Colonsay E. side.		11·7	19·21	34·71	—	—
2309	„	„ 7	„	N. end Iona Sd.		12·2	19·25	34·78	—	—
2310	„	„ 8	„	Tobermory Hrb.		12·2	18·86	34·08	—	—
2311	Para . . .	Sept. 10	„	48° 12′	6° 8′	17·2	19·83	35·82	—	—
2312	„	„ 11	„	45 31	11 29	17·8	20·00	36·12	—	—
2313	„	„ 12	„	40 9	22 40	22·2	20·21	36·49	27·33	—
2314	„	Oct. 24	„	38 39	33 10	19·7	20·06	36·23	27·00	·00237
2315	„	„ 25	„	41 20	28 4	18·9	20·07	36·25	—	—
2316	„	„ 26	„	43 57	21 20	17·2	20·06	36·23	—	—
2317	„	„ 27	„	46 32	14 20	13·3	20·01	36·14	—	—
2318	„	Nov. 19	„	48 19	6 16	11·1	19·80	35·77	—	·00235
2319	„	„ 20	„	45 13	12 56	12·8	20·00	36·12	—	—
2320	„	„ 21	„	41 39	19 34	16·7	20·23	36·53	—	—
2321	„	„ 22	„	38 8	25 23	18·3	20·25	36·57	—	—
		1897.								
2322	„	Jan. 2	„	39 5	32 24	17·2	20·28	36·62	27·23	—
2323	„	„ 3	„	42 14	26 18	13·9	20·01	36·14	—	—
2324	„	„ 4	„	44 42	19 10	12·2	19·89	35·93	—	—
2325	„	„ 5	„	47 37	11 30	11·7	19·85	35·86	—	—
2326	„	„ 6	„	Dodman Pt. N.W. 10′		10·6	19·84	35·84	—	·00235
					W.					
2327	„	„ 1	„	35° 20′	38° 2′	17·5	20·21	36·49	—	—
		1896.								
2328	„	Dec. 31	„	31 35	42 43	20·0	20·29	36·64	—	—
2329	„	Nov. 23	„	34 52	30 39	19·4	20·14	36·37	—	—
2330	„	Oct. 23	„	35 0	36 20	20·0	20·03	36·18	26·89	—
2331	„	„ 22	„	31 34	40 18	23·1	20·35	36·75	—	—
2332	„	Sept. 23	„	11 32	69 18	29·4	19·64	35·48	—	—
2333	„	„ 22	„	14 21	63 36	29·4	19·26	34·80	—	—
2334	„	„ 20	„	15 18	57 5	28·9	19·70	35·59	—	—
2335	„	„ 19	„	18 38	52 41	27·2	19·24	34·76	—	—
2336	„	„ 18	„	22 1	47 58	26·7	20·50	37·01	—	—
2337	„	„ 17	„	25 41	43 10	26·1	20·34	37·08	—	·00242
2338	„	„ 16	„	29 24	38 34	25·6	20·58	37·15	27·74	·00243
2339	„	„ 15	„	33 11	33 15	24·4	20·30	36·66	—	—
2340	„	„ 14	„	37 2	28 8	23·3	20·33	36·71	—	—
2341	Anchoria .	Dec. 12	„	55 27	10 30	9·27	19·60	35·41	—	—
2342	„	„ 13	„	55 7	16 20	10·0	19·57	35·36	—	—
2343	„	„ 14	„	54 36	23 17	11·7	19·40	35·05	—	—
2344	„	„ 15	„	53 46	29 30	8·3	19·28	34·84	26·06	—
2345	„	„ 16	„	52 32	35 44	7·8	19·21	34·71	—	—
2346	„	„ 17	„	50 51	41 32	7·5	19·08	34·47	—	—
2347	„	„ 18	„	48 40	47 30	4·4	19·91	35·97	—	—
2348	„	„ 19	„	46 22	52 28	1·7	17·75	32·09	23·80	—
2349	„	„ 20	„	44 27	57 10	4·4	18·82	34·01	—	—
2350	„	„ 21	„	42 47	61 24	6·1	18·20	32·90	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1896.		N.	W.					
2351	Anchoria .	Dec. 22	noon . .	40° 48′	67° 42′	7·2	17·96	32·48	24·14	—
2352	,,	,, 27	,,	40 49	68 47	6·7	18·03	32·59	—	—
2353	,,	,, 28	,,	41 55	63 14	7·8	18·56	33·55	—	—
2354	,,	,, 29	,,	43 53	57 56	5·6	18·07	32·66	—	—
2355	,,	,, 30	,,	46 17	52 49	0·6	17·78	32·15	—	—
2356	,,	,, 31	,,	48 43	47 17	2·5	18·96	34·26	25·42	—
		1897.								
2357	,,	Jan. 1	,,	50 47	40 59	12·8	19·75	35·68	—	—
2358	,,	,, 2	,,	51 47	34 55	8·9	19·35	34·96	—	—
2359	,,	,, 3	,,	53 26	28 10	7·8	19·30	34·87	—	—
2360	,,	,, 4	,,	54 16	21 4	10·3	19·56	35·34	26·40	—
2361	,,	,, 5	,,	54 54	14 5	10·0	19·65	35·50	—	—
2362	,,	,, 6	,,	55 19	9 3	9·4	19·60	35·41	—	—
		1896.								
2363	Loughrigg Holme	Nov. 11	midnight	50 41	22 55	13·5	19·68	35·56	—	—
2364	,,	,, 12	noon . .	50 45	20 3	12·4	19·57	35·37	—	—
2365	,,	,, 12	midnight	50 43	18 4	11·7	19·64	35·48	—	—
2366	,,	,, 13	noon . .	50 41	14 5	11·9	19·64	35·48	—	—
2367	,,	,, 13	midnight	50 24	11 8	12·1	19·68	35·56	—	—
2368	,,	,, 14	noon . .	50 7	8 14	11·1	19·61	35·43	—	—
2369	,,	Dec. 3	,,	49 31	6 7	11·4	19·67	35·54	—	—
2370	,,	,, 3	midnight	48 6	6 52	11·8	19·74	35·66	—	—
2371	,,	,, 4	noon . .	47 38	7 5	11·9	19·79	35·75	—	—
2372	,,	,, 4	midnight	47 41	7 10	11·7	19·76	35·70	—	—
2373	,,	,, 5	noon . .	46 16	7 53	11·9	19·69	35·58	—	—
2374	,,	,, 5	midnight	45 24	7 27	12·2	19·75	35·68	—	—
2375	,,	,, 6	noon . .	45 18	8 42	12·2	19·76	35·70	—	—
2376	,,	,, 6	midnight	43 48	9 39	12·8	19·79	35·75	—	—
2377	,,	,, 7	noon . .	42 3	9 39	13·4	19·88	35·91	—	—
2378	,,	,, 7	midnight	40 18	9 39	14·6	19·95	36·04	26·94	—
2379	,,	,, 8	noon . .	39 26	9 40	14·8	19·94	36·02	—	—
		1897.								
2380	,,	Jan. 1	,,	40 20	9 32	13·2	19·55	35·32	—	—
2381	,,	,, 1	midnight	42 13	9 23	12·8	19·64	35·48	—	—
2382	,,	,, 2	noon . .	43 59	9 8	12·8	19·82	35·80	26·73	—
2383	,,	,, 2	midnight	45 50	8 26	11·4	19·68	35·56	—	—
2384	,,	,, 3	noon . .	47 41	7 45	11·7	19·82	35·80	26·77	—
2385	,,	,, 3	midnight	49 29	6 50	10·4	19·68	35·56	—	—
2386	,,	,, 4	noon . .	51 19	5 56	9·4	19·68	35·56	26·47	—
$2387_{(1)}$	Teutonic .	,, 14	midnight	51 22	13 5	10·0	19·71	35·61	—	—
$2387_{(2)}$	,,	,, 15	noon . .	51 24	20 30	11·1	—	—	—	—
$2387_{(3)}$	,,	,, 15	midnight	50 37	26 37	10·0	—	—	—	—
2388	,,	,, 16	noon . .	50 8	32 43	10·0	19·65	35·50	—	—
2389	,,	,, 16	midnight	48 52	38 52	13·3	19·88	35·91	26·79	—
2390	,,	,, 17	noon . .	47 44	43 20	7·8	18·02	32·58	24·12	—
$2391_{(1)}$	,,	,, 17	midnight	46 19	48 42	−0·6	16·50	29·87	—	—
$2391_{(2)}$	,,	,, 18	noon . .	44 35	54 2	5·6	—	—	—	—
$2391_{(3)}$	,,	,, 18	midnight	43 17	59 14	8·3	—	—	—	—
2392	,,	,, 19	noon . .	41 50	63 42	0·0	18·22	32·93	—	—
2393	,,	,, 19	midnight	41 1	67 24	−2·2	18·24	32·97	—	—
2394	,,	,, 26	,,	40 8	69 40	5·0	18·20	32·90	24·34	—

Table I (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2395	Teutonic . .	Jan. 27	noon . .	40° 30′	64° 43′	15·6	19·98	36·09	—	—
2396	„	„ 27	midnight	40 54	59 44	14·4	19·96	36·05	—	—
2397	„	„ 28	noon . .	41 17	54 46	15·0	19·95	36·04	—	—
2398	„	„ 28	midnight	41 56	50 33	15·0	19·43	35·10	26·03	—
2399	„	„ 29	noon . .	43 12	45 52	15·6	20·09	36·29	—	—
2400	„	„ 29	midnight	44 57	40 59	15·0	19·71	35·61	—	—
2401	„	„ 30	noon . .	46 45	36 37	13·9	19·70	35·59	—	—
2402	„	„ 30	midnight	47 53	31 21	11·7	19·77	35·72	—	—
2403	„	„ 31	noon . .	49 22	25 56	12·2	19·65	35·50	—	—
2404	„	„ 31	midnight	50 16	20 18	11·1	19·65	35·50	—	—
2405	„	Feb. 1	noon . .	50 54	14 11	10·6	19·71	35·61	—	—
2406	Laura . .	Jan. 22	8 P.M. .	60 25	4 5	7·0	19·60	35·41	26·36	—
2407	„	„ 23	4 A.M. .	60 45	4 54	7·0	19·45	35·14	—	—
2408	„	„ 23	noon . .	61 30	6 42	6·6	19·45	35·14	—	—
2409	„	„ 26	„	62 7	6 30	5·7	19·40	35·05	—	—
2410	„	„ 29	„	62 29	7 58	7·0	19·51	35·25	—	—
2411	„	„ 29	8 P.M. .	62 47	10 49	7·0	19·52	35·27	—	—
2412	„	„ 30	4 A.M. .	63 0	13 38	7·0	19·49	35·21	—	—
2413	„	„ 30	noon . .	63 9	16 58	7·3	19·53	35·28	—	—
2414	„	„ 30	8 P.M. .	63 26	20 5	5·5	19·29	34·86	—	—
2415	„	„ 31	4 A.M. .	63 44	21 48	5·0	19·44	35·12	—	—
2416	„	Feb. 6	noon . .	64 5	22 57	4·0	19·27	34·82	25·80	—
2417	„	„ 6	8 P.M. .	63 8	21 35	6·2	19·50	35·23	—	—
2418	„	„ 7	4 A.M. .	62 41	19 4	6·5	19·46	35·15	—	—
2419	„	„ 7	noon . .	62 42	16 9	6·5	19·46	35·15	—	—
2420	„	„ 7	8 P.M. .	62 35	13 7	7·2	19·45	35·14	—	—
2421	„	„ 8	4 A.M. .	62 30	10 2	7·2	19·55	35·32	26·22	—
2422	„	„ 8	noon . .	62 23	7 10	5·5	19·49	35·21	—	—
2423	„	„ 9	„	62 8	6 30	5·4	19·45	35·14	26·16	—
2424	„	„ 10	4 A.M. .	61 57	6 36	5·6	19·43	35·10	—	—
2425	„	„ 10	noon . .	61 27	5 36	6·0	19·45	35·12	—	—
2426	„	„ 10	8 P.M. .	60 28	3 40	6·5	19·54	35·30	—	—
2427	Anchoria .	Jan. 16	noon . .	54 43	15 25	9·4	19·57	35·36	—	—
2428	„	„ 17	„	53 9	22 56	10·6	19·55	35·33	26·40	—
2429	„	„ 18	„	52 0	28 23	9·4	19·55	35·32	—	—
2430	„	„ 19	„	50 53	31 56	10·8	19·65	35·51	26·44	—
2431	„	„ 20	„	48 33	38 41	12·2	19·67	35·54	—	—
2432	„	„ 21	„	45 59	43 32	3·9	18·81	34·00	—	—
2433	„	„ 22	„	43 48	48 14	6·7	18·82	34·01	—	—
2434	„	„ 23	„	43 12	54 37	6·7	18·63	33·67	—	—
2435	„	„ 24	„	42 32	60 5	3·9	18·34	33·15	—	—
2436	„	„ 25	„	41 21	64 56	2·2	18·02	32·58	—	—
2437	„	„ 26	„	40 49	67 17	4·4	18·22	32·93	—	—
2438	„	„ 27	„	40 31	71 19	4·7	18·02	32·58	—	—
2439	„	Feb. 1	„	40 20	67 25	5·6	18·28	33·04	—	—
2440	„	„ 2	„	40 59	61 1	15·6	19·95	36·04	26·74	—
2441	„	„ 3	„	41 35	54 31	13·9	19·90	35·95	—	—
2442	„	„ 4	„	42 46	48 36	8·9	19·10	34·51	—	—
2443	„	„ 5	„	45 3	44 23	11·7	19·44	35·12	—	—
2444	„	„ 6	„	46 49	40 43	8·3	19·07	34·46	25·62	—
2445	„	„ 7	„	47 36	39 3	12·8	19·83	35·82	—	—
2446	„	„ 8	„	47 54	38 14	12·8	19·76	35·70	—	—
2447	„	„ 9	„	47 9	37 48	13·3	19·75	35·68	—	—
2448	„	„ 10	„	49 11	36 0	12·2	19·68	35·56	—	—
2449	„	„ 11	„	50 56	31 1	10·3	19·47	35·17	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2450	Anchoria.	Feb. 12	noon .	52° 32′	25° 10′	11·4	19·57	35·36	—	—
2451	,,	,, 13	,,	53 47	18 58	10·6	19·63	35·47	—	—
2452	,,	,, 14	,,	54 52	12 3	9·4	19·68	35·56	—	—
2453	Laura.	Mar. 8	4 A.M.	59 53	3 23	7·2	19·47	35·17	—	—
2454	,,	,, 8	noon .	60 27	4 19	7·5	19·35	34·96	—	—
2455	,,	,, 8	8 P.M.	61 22	6 12	6·5	19·36	34·98	—	—
2456	,,	,, 9	4 A.M.	61 35	6 44	6·2	19·45	35·14	—	—
2457	,,	,, 10	,,	61 38	6 40	5·5	19·32	34·91	—	—
2458	,,	,, 13	noon .	62 8	6 30	5·8	19·37	35·00	—	—
2459	,,	,, 14	4 A.M.	62 30	6 49	5·5	19·11	34·53	—	—
2460	,,	,, 14	noon .	62 32	8 10	7·0	19·47	35·17	—	—
2461	,,	,, 14	8 P.M.	62 39	11 8	7·0	19·48	35·19	—	—
2462	,,	,, 15	4 A.M.	62 52	14 6	7·0	19·49	35·21	—	—
2463	,,	,, 15	noon .	62 58	17 39	7·5	19·48	35·19	—	—
2464	,,	,, 15	8 P.M.	63 19	20 10	6·0	19·43	35·10	26·27	—
2465	,,	,, 16	4 A.M.	63 41	22 40	5·0	19·34	34·94	—	—
2466	,,	,, 20	8 P.M.	63 38	22 23	5·5	19·45	35·14	—	—
2467	,,	,, 21	4 A.M.	63 32	21 22	5·7	19·48	35·19	—	—
2468	,,	,, 21	noon .	63 29	20 24	5·7	19·43	35·10	—	—
2469	,,	,, 22	4 A.M.	63 10	19 50	5·5	19·50	35·23	—	—
2470	,,	,, 22	noon .	62 56	18 4	7·0	19·48	35·19	—	—
2471	,,	,, 22	8 P.M.	62 48	15 38	7·7	19·56	35·34	—	—
2472	,,	,, 23	4 A.M.	62 38	13 2	7·5	19·49	35·21	—	—
2473	,,	,, 23	noon .	62 39	10 22	7·7	19·46	35·15	—	—
2474	,,	,, 23	8 P.M.	62 28	7 38	7·2	19·48	35·19	—	—
2475	,,	,, 26	noon .	61 28	6 28	6·5	19·44	35·12	—	—
2476	,,	,, 26	8 P.M.	61 0	5 17	7·0	19·44	35·12	26·30	—
2477	,,	,, 27	4 A.M.	60 28	4 20	7·2	19·50	35·23	—	—
2478	,,	,, 27	noon .	59 31	3 5	7·5	19·45	35·14	—	—
2479	Teutonic.	,, 11	midnight	51 5	14 20	7·2	19·76	35·70	—	—
2480	,,	,, 12	noon .	50 39	20 42	9·4	19·76	35·70	—	—
2481	,,	,, 12	midnight	49 28	26 40	10·0	19·69	35·58	—	—
2482	,,	,, 13	noon .	48 33	32 4	8·9	19·89	35·93	—	—
2483	,,	,, 13	midnight	47 5	37 4	8·9	19·94	36·02	27·02	—
2484	,,	,, 14	noon .	45 31	41 29	13·3	19·81	35·79	—	—
2485	,,	,, 14	midnight	44 16	45 19	4·4	19·70	35·59	—	—
2486	,,	,, 15	noon .	42 30	49 31	9·4	19·29	34·86	—	—
2487	,,	,, 15	midnight	41 57	53 50	5·6	19·40	35·05	—	—
2488	,,	,, 16	noon .	41 40	56 27	9·4	19·70	35·59	—	—
2489	,,	,, 16	midnight	41 21	60 25	12·2	20·14	36·37	27·26	—
2490	,,	,, 17	noon .	40 56	64 21	7·8	19·87	35·89	—	—
2491	,,	,, 17	midnight	40 41	68 43	3·3	18·23	32·95	24·50	—
2492	,,	,, 24	,,	40 12	70 32	5·6	18·03	32·59	24·30	—
2493	,,	,, 25	noon .	40 34	65 13	13·3	19·57	35·36	—	—
2494	,,	,, 25	midnight	40 54	60 17	13·3	19·80	35·77	—	—
2495	,,	,, 26	noon .	41 12	55 23	13·3	19·80	35·77	—	—
2496	,,	,, 26	midnight	41 51	50 33	12·2	19·69	35·58	—	—
2497	,,	,, 27	noon .	43 21	46 0	16·7	20·06	36·23	27·06	—
2498	,,	,, 27	midnight	45 3	41 18	13·3	19·63	35·47	—	—
2499	,,	,, 28	noon .	46 51	36 15	12·2	19·73	35·64	—	—
2500	,,	,, 28	midnight	48 8	30 49	11·1	19·73	35·64	—	—
3501	,,	,, 29	noon .	49 21	25 42	11·1	19·70	35·59	—	—
2502	,,	,, 29	midnight	50 7	20 7	11·1	19·66	35·52	—	—
2503	,,	,, 30	noon .	50 54	14 44	11·7	19·68	35·56	—	—
2504	Corean	,, 10	,,	51 41	7 54	7·8	19·67	35·54	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2505	Corean . .	Mar. 11	noon . .	50° 58′	14° 6′	9·4	19·82	35·80	—	—
2506	,,	,, 12	,,	50 14	20 11	10·6	19·78	35·73	—	—
2507	,,	,, 13	,,	49 30	25 58	10·0	19·89	35·93	—	—
2508	,,	,, 14	,,	49 3	28 20	10·6	19·70	35·59	—	—
2509	,,	,, 15	,,	48 14	31 52	12·2	19·74	35·66	—	—
2510	,,	,, 16	,,	47 27	35 17	10·0	19·76	35·70	—	—
2511	,,	,, 17	,,	47 37	35 45	8·9	19·55	35·32	—	—
2512	,,	,, 18	,,	45 53	39 37	11·7	19·93	36·00	—	—
2513	,,	,, 19	,,	43 36	44 37	15·0	20·36	36·77	27·45	—
2514	,,	,, 20	,,	42 36	49 0	5·6	19·16	34·62	—	—
2515	,,	,, 21	,,	42 49	55 36	3·9	18·73	33·85	—	—
2516	,,	,, 22	,,	43 47	62 6	0·6	17·72	32·04	—	—
2517	,,	,, 24	,,	43 54	63 55	0·0	17·50	31·65	23·34	—
2518	,,	,, 25	,,	40 36	67 22	2·8	18·21	32·91	—	—
2519	,,	,, 26	,,	39 49	69 36	6·1	18·81	34·00	—	—
2520	,,	,, 27	,,	off Dela	ware R.	5·0	16·51	29·87	21·97	—
2521	,,	Apr. 2	,,	39° 6′	70° 18′	11·1	19·61	35·43	—	—
2522	,,	,, 3	,,	39 58	64 38	14·4	20·21	36·49	—	—
2523	,,	,, 4	,,	40 43	59 35	17·2	20·18	36·44	27·10	—
2524	,,	,, 5	,,	41 19	53 41	13·9	19·89	35·93	—	—
2525	,,	,, 6	,,	42 13	47 49	10·0	19·03	34·39	—	—
2526	,,	,, 7	,,	44 58	42 17	16·1	20·15	36·39	27·06	—
2527	,,	,, 8	,,	47 44	37 12	12·8	19·89	35·93	—	—
2528	,,	,, 9	,,	50 12	31 32	8·9	19·63	35·47	—	—
2529	,,	,, 10	,,	52 25	25 40	9·4	19·62	35·45	—	—
2530	,,	,, 11	,,	54 4	18 47	9·4	19·67	35·54	—	—
2531	,,	,, 12	,,	55 14	11 17	10·0	19·75	35·68	—	—
2532	Loughrigg Holme	Jan. 20	,,	51 20	5 54	9·1	19·77	35·72	—	—
2533	,,	,, 20	midnight	49 34	6 36	8·8	19·49	35·21	—	—
2534	,,	,, 21	noon . .	47 50	7 21	10·4	19·68	35·56	—	—
2535	,,	,, 21	midnight	46 11	8 3	10·8	19·65	35·50	—	—
2536	,,	,, 22	noon . .	44 25	8 28	12·1	19·81	35·79	—	—
2537	,,	,, 22	midnight	42 40	9 29	11·7	19·45	35·14	26·73	—
2538	,,	,, 23	noon . .	40 50	9 30	13·3	19·84	35·84	—	—
2539	,,	,, 23	8 P.M. .	39 39	9 33	12·9	19·90	35·95	27·21	—
2540	,,	Mar. 7	noon . .	41 19	9 49	13·8	19·87	35·89	27·27	—
2541	,,	,, 7	midnight	42 50	9 39	12·8	19·82	35·80	—	—
2542	,,	,, 8	noon . .	44 17	9 11	11·9	19·75	35·68	—	—
2543	,,	,, 8	midnight	45 45	8 33	10·8	19·72	35·63	—	—
2544	,,	,, 9	noon . .	47 17	8 1	11·3	19·77	35·72	—	—
2545	,,	,, 9	midnight	48 45	7 23	10·0	19·70	35·59	—	—
2546	,,	,, 10	noon . .	50 8	6 50	9·1	19·64	35·48	—	—
2547	,,	,, 10	midnight	51 33	5 55	7·8	19·57	35·36	—	—
2548	,,	,, 22	,,	48 40	5 48	10·3	19·76	35·70	—	—
2549	,,	,, 23	noon . .	47 0	5 0	11·4	19·69	35·58	—	—
2550	,,	,, 23	midnight	45 12	4 0	12·3	19·75	35·68	—	—
2551	,,	,, 24	noon . .	43 28	2 59	13·2	19·45	35·14	26·52	—
2552	,,	Apr. 6	midnight	44 15	3 33	12·1	19·77	35·72	—	—
2553	,,	,, 7	noon . .	45 24	4 15	11·7	19·75	35·68	—	—
2554	,,	,, 7	midnight	46 21	4 46	11·3	19·77	35·72	—	—
2555	,,	,, 8	noon . .	46 54	5 8	11·3	19·77	35·72	—	—
2556	,,	,, 8	midnight	48 22	5 59	11·1	19·75	35·68	—	—
2557	Anchoria .	Mar. 20	noon . .	54 50	12 41	11·1	17·59	31·81	—	—
2558	,,	,, 21	,,	53 46	19 44	10·6	19·63	35·47	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2559	Anchoria .	Mar. 22	noon . .	52° 30′	26° 26′	9·7	17·54	31·71	—	—
2560	,,	,, 23	,,	50 31	32 47	10·0	19·59	35·40	—	—
2561	,,	,, 24	,,	48 13	39 11	11·1	19·60	35·41	—	—
2562	,,	,, 25	,,	45 19	45 2	13·3	19·68	35·56	—	—
2563	,,	,, 26	,,	42 25	50 20	−1·1	18·08	32·68	—	—
2564	,,	,, 27	,,	42 53	57 14	4·4	18·82	34·01	—	—
2565	,,	,, 28	,,	41 53	63 36	1·7	18·14	32·79	24·25	—
2566	,,	,, 29	,,	40 35	70 8	4·4	18·12	32·75	—	—
2567	,,	Apr. 4	,,	40 27	68 31	5·0	18·16	32·82	—	—
2568	,,	,, 5	,,	40 41	62 7	20·0	19·96	36·05	—	—
2569	,,	,, 6	,,	41 18	55 41	14·4	19·93	36·00	26·78	—
2570	,,	,, 7	,,	41 50	48 52	17·2	20·19	36·46	27·07	—
2571	,,	,, 8	,,	44 45	43 8	14·4	19·90	35·95	—	—
2572	,,	,, 9	,,	47 34	37 26	13·3	19·80	35·77	—	—
2573	,,	,, 10	,,	49 56	30 45	10·3	19·63	35·47	—	—
2574	,,	,, 11	,,	52 4	24 5	8·9	19·62	35·45	—	—
2575	,,	,, 12	,,	54 44	16 43	10·6	19·75	35·68	—	—
2576	,,	,, 13	,,	55 6	9 29	8·9	19·69	35·58	—	—
2577	Teutonic. .	,, 8	midnight	51 1	14 54	11·1	19·81	35·79	—	—
2578	,,	,, 9	noon . .	50 36	20 46	10·0	19·83	35·82	—	—
2579	,,	,, 9	midnight	49 33	26 39	12·2	19·81	35·79	—	—
2580	,,	,, 10	noon . .	48 36	31 55	7·8	19·75	35·68	—	—
2581	,,	,, 10	midnight	47 30	35 40	6·7	19·78	35·73	—	—
2582	,,	,, 11	noon . .	46 7	40 11	14·4	19·95	36·04	—	—
2583	,,	,, 11	midnight	44 33	43 59	13·9	19·67	35·54	—	—
2584	,,	,, 12	noon . .	42 59	48 24	14·4	19·72	35·63	—	—
2585	,,	,, 12	midnight	42 23	52 33	1·7	18·47	33·39	—	—
2586	,,	,, 13	noon . .	41 49	58 15	5·0	19·47	35·17	—	—
2587	,,	,, 13	midnight	41 16	63 56	10·6	20·11	36·31	—	—
2588	,,	,, 14	noon . .	40 40	69 19	10·0	18·27	33·02	24·56	—
2589	,,	,, 21	midnight	40 10	69 39	11·1	18·06	32·64	—	—
2590	,,	,, 22	noon . .	40 10	64 50	10·0	19·62	35·45	—	—
2591	,,	,, 22	midnight	40 10	59 56	14·4	20·04	36·19	—	—
2592	,,	,, 23	noon . .	40 10	54 53	14·4	20·13	36·35	—	—
2593	,,	,, 23	midnight	40 25	48 52	15·6	20·26	36·58	—	—
2594	,,	,, 24	noon . .	41 58	45 33	13·9	20·20	36·47	27·32	—
2595	,,	,, 24	midnight	44 9	40 44	11·1	20·05	36·21	—	—
2596	,,	,, 25	noon . .	45 55	36 2	9·4	19·83	35·82	—	—
2597	,,	,, 25	midnight	47 24	31 7	10·6	19·83	35·82	—	—
2598	,,	,, 26	noon . .	48 46	25 56	10·0	19·79	35·75	—	—
2599	,,	,, 26	midnight	50 0	20 51	12·2	19·90	35·95	—	—
2600	,,	,, 27	noon . .	50 51	15 29	11·7	19·84	35·84	—	—
2601	California .	Feb. 21	,,	36 31	7 52	13·9	20·11	36·31	—	—
2602	,,	,, 21	midnight	37 16	10 16	13·9	20·05	36·21	—	—
2603	,,	,, 22	noon . .	38 1	12 41	13·3	20·02	36·16	—	—
2604	,,	,, 22	midnight	38 44	15 14	13·3	19·98	36·09	—	—
2605	,,	,, 23	noon . .	39 28	17 47	13·3	19·93	36·00	—	—
2606	,,	,, 23	midnight	40 4	20 10	13·3	19·97	36·07	—	—
2607	,,	,, 24	noon . .	40 41	22 47	13·3	19·90	35·95	—	—
2608	,,	,, 24	midnight	41 13	25 14	13·3	19·22	35·98	—	—
2609	,,	,, 25	noon . .	41 44	27 41	13·3	19·87	35·89	—	—
2610	,,	,, 25	midnight	41 58	29 28	13·3	19·93	36·00	—	—
2611	,,	,, 26	noon . .	42 12	31 15	13·3	19·94	36·02	—	—
2612	,,	,, 26	midnight	42 28	33 18	13·9	19·99	36·11	—	—
2613	,,	,, 27	noon . .	42 44	35 22	14·4	19·85	35·86	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3
		1897.		N.	W.					
2614	California .	Feb. 27	midnight	43° 2′	37° 38′	14·4	19·88	35·91	—	—
2615	,,	,, 28	noon . .	43 20	39 54	14·4	19·86	35·88	—	—
2616	,,	,, 28	midnight	43 16	42 3	13·3	19·84	35·84	—	—
2617	,,	Mar. 1	noon . .	43 11	44 12	13·3	20·12	36·33	27·15	—
2618	,,	,, 1	midnight	43 12	44 52	13·3	19·97	36·07	—	—
2619	,,	,, 2	noon . .	43 14	46 20	13·3	19·85	35·86	—	—
2620	,,	,, 2	midnight	43 22	48 24	6·7	18·88	34·12	—	—
2621	,,	,, 3	noon . .	43 30	50 29	0·0	17·96	32·48	—	—
2622	,,	,, 3	midnight	43 12	53 3	1·11	18·29	33·06	—	—
2623	,,	,, 4	noon . .	42 54	55 40	5·6	18·44	33·34	—	—
2624	,,	,, 4	midnight	42 38	56 40	2·8	18·38	33·22	24·72	—
2625	,,	,, 5	noon . .	42 17	57 41	7·8	19·41	35·07	—	—
2626	,,	,, 5	midnight	42 10	59 30	11·1	19·46	35·15	—	—
2627	,,	,, 6	noon . .	42 1	61 42	11·1	18·57	33·56	—	—
2628	,,	,, 6	midnight	41 33	63 45	3·3	17·88	32·33	23·97	—
2629	,,	,, 7	noon . .	41 11	66 0	4·4	19·62	35·45	—	—
2630	,,	,, 7	midnight	40 50	68 30	4·4	18·09	32·70	—	—
2631	,,	,, 17	,,	40 27	71 4	4·4	18·13	32·77	—	—
2632	,,	,, 18	noon . .	40 27	68 41	4·4	18·09	32·70	24·40	—
2633	,,	,, 18	midnight	40 45	66 20	5·6	18·71	33·82	25·16	—
2634	,,	,, 19	noon . .	41 5	63 58	13·3	19·56	35·34	—	—
2635	,,	,, 19	midnight	41 17	61 43	13·3	20·02	36·16	—	—
2636	,,	,, 20	noon . .	41 30	59 28	14·4	20·15	36·39	27·19	—
2637	,,	,, 20	midnight	41 39	57 45	9·4	19·42	35·08	—	—
2638	,,	,, 21	noon . .	41 48	56 1	11·1	19·65	35·50	—	—
2639	,,	,, 21	midnight	42 0	53 49	8·9	19·49	35·21	—	—
2640	,,	,, 22	noon . .	42 13	51 37	4·4	19·68	35·56	—	—
2641	,,	,, 22	midnight	42 21	49 19	5·6	18·85	34·07	25·39	—
2642	,,	,, 23	noon . .	42 29	47 1	13·3	19·82	35·80	—	—
2643	,,	,, 23	midnight	42 29	45 1	15·6	20·09	36·29	—	—
2644	,,	,, 24	noon . .	42 30	42 31	15·6	19·97	36·07	—	—
2645	,,	,, 24	midnight	42 27	40 0	13·3	19·99	36·11	—	—
2646	,,	,, 25	noon . .	42 24	37 29	14·4	20·07	36·25	—	—
2647	,,	,, 25	midnight	42 24	35 4	14·4	20·04	36·19	—	—
2648	,,	,, 26	noon . .	42 29	32 39	14·4	20·03	36·18	—	—
2649	,,	,, 26	midnight	42 19	30 22	13·9	19·94	36·02	—	—
2650	,,	,, 27	noon . .	42 8	27 54	14·4	19·90	35·95	—	—
2651	,,	,, 27	midnight	41 34	25 23	14·4	19·99	36·11	—	—
2652	,,	,, 28	noon . .	41 1	22 51	14·4	19·95	36·04	—	—
2653	,,	,, 28	midnight	40 10	20 31	14·4	19·50	35·23	—	—
2654	,,	,, 29	noon . .	39 38	18 12	15·0	20·10	36·30	—	—
2655	,,	,, 29	midnight	38 54	15 56	14·4	20·05	36·21	—	—
2656	,,	,, 30	noon . .	38 10	13 41	14·4	20·11	36·31	—	—
2657	,,	,, 30	midnight	37 32	11 33	14·4	20·20	36·48	27·10	—
2658	,,	,, 31	noon . .	36 56	9 25	14·4	20·01	36·14	—	—
2659	,,	,, 31	midnight	36 18	7 0	14·4	20·16	36·40	—	—
2660	Laura . . .	Apr. 26	noon . .	59 56	3 18	8·0	19·56	35·34	—	—
2661	,,	,, 26	8 P.M. .	60 50	5 8	7·2	19·52	35·27	—	—
2662	,,	,, 27	4 A.M. .	61 55	6 32	7·0	19·43	35·10	—	—
2663	,,	,, 27	noon . .	62 1	7 40	7·3	19·45	35·14	—	—
2664	,,	,, 27	8 P.M. .	62 20	10 22	8·0	19·50	35·23	—	—
2665	,,	,, 28	4 A.M. .	62 22	13 14	8·2	19·49	35·21	—	—
2666	,,	,, 28	noon . .	62 28	15 46	8·5	19·50	35·23	—	—
2667	,,	,, 28	8 P.M. .	62 55	17 54	7·3	19·51	35·25	—	—
2668		,, 29	4 A.M. .	63 10	19 14	7·3	19·51	35·25	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2669	Laura . .	Apr. 29	noon . .	63° 30′	21° 41′	7·3	18·96	34·26	—	—
2670	,,	May 5	8 P.M. .	64 55	24 16	4·5	19·30	34·87	—	—
2671	,,	,, 7	4 A.M. .	65 24	23 0	4·0	19·24	34·76	—	—
2672	,,	,, 7	noon . .	65 26	24 30	4·5	19·30	34·87	—	—
2673	,,	,, 7	8 P.M. .	65 57	23 55	3·5	19·04	34·40	—	—
2674	,,	,, 8	noon . .	65 59	23 59	3·0	18·91	34·17	25·54	—
2675	,,	,, 9	,,	66 15	23 27	2·8	19·15	34·60	—	—
2676	,,	,, 10	,,	65 39	24 36	2·9	19·15	34·60	—	—
2677	,,	,, 10	8 P.M. .	65 0	24 29	4·9	19·42	35·08	—	—
2678	,,	,, 11	4 A.M. .	64 19	22 24	5·3	19·09	34·49	25·81	—
2679	,,	,, 13	,,	64 7	23 0	5·2	19·27	34·82	—	—
2680	,,	,, 13	noon . .	63 30	21 19	6·5	19·44	35·12	—	—
2681	,,	,, 13	8 P.M. .	63 0	18 25	7·5	19·51	35·25	—	—
2682	,,	,, 14	4 A.M. .	62 49	15 34	8·0	19·50	35·23	26·31	—
2683	,,	,, 14	noon . .	62 40	12 27	8·2	19·51	35·25	—	—
2684	,,	,, 14	8 P.M. .	62 30	9 43	8·2	19·49	35·21	—	—
2685	,,	,, 15	4 A.M. .	62 25	7 15	8·2	19·52	35·27	—	—
2686	,,	,, 16	8 P.M. .	60 57	5 17	8·5	19·58	35·38	26·47	—
2687	,,	,, 17	4 A.M. .	59 57	3 18	9·3	—	—	—	—
2688	Anchoria .	Apr. 18	noon . .	55 12	10 9	9·4	19·71	35·61	—	—
2689	,,	,, 19	,,	54 2	17 33	10·0	19·70	35·59	—	—
2690	,,	,, 20	,,	52 33	24 33	10·0	19·61	35·43	—	—
2691	,,	,, 21	,,	50 22	31 18	10·0	19·65	35·50	—	—
2692	,,	,, 22	,,	47 47	37 22	9·7	19·64	35·48	—	—
2693	,,	,, 23	,,	44 36	42 40	14·4	20·18	36·44	—	—
2694	,,	,, 24	,,	42 33	48 13	8·9	19·15	34·60	—	—
2695	,,	,, 25	,,	42 0	54 55	11·7	19·26	34·80	—	—
2696	,,	,, 26	,,	41 39	61 33	7·2	17·85	32·26	—	—
2697	,,	,, 27	,,	40 49	67 14	6·1	17·90	32·37	24·04	—
2698	,,	,, 28	,,	40 27	73 30	6·7	17·45	31·56	23·42	—
2699	,,	May 9	,,	40 28	70 23	7·8	18·06	32·64	—	—
2700	,,	,, 10	,,	40 30	64 30	18·9	19·88	35·91	—	—
2701	,,	,, 11	,,	40 43	58 42	17·2	19·68	35·56	—	—
2702	,,	,, 12	,,	40 33	52 45	20·6	20·08	36·27	26·94	—
2703	,,	,, 13	,,	41 28	46 42	18·3	20·07	36·25	27·05	—
2704	,,	,, 14	,,	43 32	41 27	16·1	19·90	35·95	—	—
2705	,,	,, 15	,,	46 19	36 50	15·0	19·99	36·11	—	—
2706	,,	,, 16	,,	48 48	31 29	11·1	19·65	35·50	—	—
2707	,,	,, 17	,,	50 52	25 55	12·2	19·69	35·58	—	—
2708	,,	,, 18	,,	52 39	20 3	11·7	19·63	35·47	—	—
2709	,,	,, 19	,,	54 12	13 50	11·1	19·67	35·54	—	—
2710	Teutonic . .	,, 6	midnight	50 11	14 18	11·7	19·83	35·82	—	—
2711	,,	,, 7	noon . .	50 11	20 40	12·8	19·63	35·47	—	—
2712	,,	,, 7	midnight	48 59	26 37	13·3	19·73	35·64	—	—
2713	,,	,, 8	noon . .	47 35	32 25	16·1	19·81	35·79	—	—
2714	,,	,, 8	midnight	45 49	37 39	16·7	19·98	36·09	—	—
2715	,,	,, 9	noon . .	44 11	42 41	16·7	20·12	36·33	—	—
2716	,,	,, 9	midnight	42 9	46 59	11·1	20·12	36·33	—	—
2717	,,	,, 10	noon . .	41 0	51 48	10·6	19·92	35·98	—	—
2718	,,	,, 10	midnight	40 47	57 4	15·0	20·21	36·49	—	—
2719	,,	,, 11	noon . .	40 49	62 1	18·3	19·64	35·48	—	—
2720	,,	,, 11	midnight	40 41	67 8	8·9	17·77	32·13	23·91	—
2721	,,	,, 12	noon . .	40 32	72 5	10·6	17·82	32·22	—	—
2722	,,	,, 19	midnight	40 8	69 41	10·0	17·88	32·33	23·97	—
2723	,,	,, 20	noon . .	40 12	64 40	16·1	19·81	35·79	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2724	Teutonic .	May 20	midnight	40° 12′	59° 44′	19·4	19·20	34·69	—	—
2725	,,	,, 21	noon . .	40 12	54 54	20·0	19·58	35·38	—	—
2726	,,	,, 21	midnight	40 26	50 1	20·0	19·52	35·27	—	—
2727	,,	,, 22	noon . .	42 13	45 27	20·6	20·12	36·33	—	—
2728	,,	,, 22	midnight	44 8	40 49	17·8	19·95	36·04	—	—
2729	,,	,, 23	noon . .	45 55	35 55	18·3	19·92	35·98	—	—
2730	,,	,, 23	midnight	48 25	30 46	12·8	19·79	35·75	—	—
2731	,,	,, 24	noon . .	48 53	25 18	13·9	19·80	35·77	—	—
2732	,,	,, 24	midnight	50 8	19 31	10·6	19·72	35·63	—	—
2733	,,	,, 25	noon . .	50 59	13 36	12·2	19·76	35·70	—	—
2734	Loughrigg Holme	,, 31	noon . .	47 43	46 12	5·6	18·57	33·56	25·03	—
2735	,,	,, 31	midnight	48 3	44 15	7·1	19·02	34·37	25·65	—
2736	,,	June 1	noon . .	48 24	42 5	13·2	19·62	35·45	—	—
2737	,,	,, 1	midnight	48 49	39 22	13·4	19·56	35·34	—	—
2738	,,	,, 2	noon . .	49 14	36 37	13·3	19·75	35·68	26·63	—
2739	,,	,, 2	midnight	49 36	33 58	12·8	19·75	35·68	26·63	—
2740	,,	,, 3	noon . .	49 52	31 18	12·6	19·68	35·56	—	—
2741	,,	,, 3	midnight	50 7	28 56	11·7	19·63	35·47	—	—
2742	,,	,, 4	noon . .	50 16	26 36	11·7	19·60	35·41	—	—
2743	,,	,, 4	midnight	50 22	25 18	11·7	19·63	35·47	—	—
2744	,,	,, 5	noon . .	50 27	22 54	12·5	19·67	35·54	—	—
2745	,,	,, 5	midnight	50 30	20 28	12·8	19·69	35·58	26·60	—
2746	,,	,, 6	noon . .	50 33	18 3	12·5	19·63	35·47	—	—
2747	,,	,, 6	midnight	50 22	16 2	13·1	19·61	35·43	—	—
2748	,,	,, 7	noon . .	50 9	13 45	13·1	19·64	35·48	—	—
2749	,,	,, 7	midnight	50 4	10 34	13·9	19·66	35·52	—	—
2750	,,	,, 8	noon . .	49 59	7 24	15·1	19·62	35·45	—	—
2751	,,	Apr. 25	midnight	55 24	7 50	8·1	19·35	34·96	—	—
2752	,,	,, 26	noon . .	55 29	11 2	10·2	19·65	35·50	—	—
2753	,,	,, 26	midnight	55 19	14 13	10·3	19·62	35·45	—	—
2754	,,	,, 27	noon . .	55 9	17 22	10·4	19·63	35·47	26·46	—
2755	,,	,, 27	midnight	54 54	20 30	9·9	19·64	35·48	—	—
2756	,,	,, 28	noon . .	54 40	23 11	10·1	19·57	35·36	—	—
2757	,,	,, 28	midnight	54 17	25 55	9·8	19·54	35·30	—	—
2758	,,	,, 29	noon . .	53 56	28 17	9·3	19·49	35·21	—	—
2759	,,	,, 29	midnight	53 23	30 47	8·3	19·46	35·15	—	—
2760	,,	,, 30	noon . .	52 48	33 17	7·9	19·36	34·98	—	—
2761	,,	,, 30	midnight	52 2	36 1	8·2	19·36	34·98	—	—
2762	,,	May 1	noon . .	51 17	38 46	9·3	19·50	35·23	—	—
2763	,,	,, 1	midnight	50 26	41 34	10·1	19·59	35·40	—	—
2764	,,	,, 2	noon . .	49 38	44 10	6·8	19·11	34·53	—	—
2765	,,	,, 2	midnight	48 56	46 16	4·7	19·16	34·62	—	—
2766	,,	,, 3	noon . .	48 21	47 32	0·3	17·81	32·21	23·95	—
2767	,,	,, 3	midnight	48 0	47 55	0·0	17·98	32·51	—	—
2768	,,	,, 4	noon . .	47 34	49 28	1·1	17·98	32·51	—	—
2769	,,	,, 4	midnight	46 57	51 17	0·0	18·17	32·84	—	—
2770	,,	,, 5	noon . .	46 20	53 15	1·8	18·01	32·56	—	—
2771	,,	,, 6	2 A.M. .	46 17	56 14	2·2	17·87	32·31	—	—
2772	,,	,, 6	noon . .	46 53	58 4	2·2	17·30	31·29	—	—
2773	,,	,, 27	,,	46 43	57 27	4·9	17·06	30·86	—	—
2774	,,	,, 27	midnight	46 17	55 24	4·3	17·83	32·24	—	—
2775	,,	,, 28	noon . .	46 17	53 25	4·6	17·98	32·51	—	—
2776	,,	,, 28	midnight	46 22	52 24	4·5	17·99	32·53	—	—
2777	,,	,, 29	noon . .	46 40	50 56	4·3	18·09	32·70	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2778	Loughrigg Holme	May 29	midnight	47° 5′	49° 2′	4·2	18·03	32·59	—	—
2779	„	„ 30	noon . .	47 21	47 52	3·7	17·93	32·42	—	—
2780	„	„ 30	midnight	47 30	47 10	3·2	17·98	32·51	—	—
2781	Anchoria .	„ 29	noon . .	54 24	14 7	11·1	19·63	35·47	—	—
2782	„	„ 30	„	52 48	20 44	10·6	19·59	35·40	—	—
2783	„	„ 31	„	51 22	27 15	12·2	19·68	35·56	—	—
2784	„	June 1	„	49 7	34 35	12·8	19·64	35·48	—	—
2785	„	„ 2	„	46 9	41 11	12·8	18·69	33·78	—	—
2786	„	„ 3	„	43 28	46 8	17·2	19·68	35·56	—	—
2787	„	„ 4	„	41 0	50 58	15·0	18·81	34·00	—	—
2788	„	„ 5	„	41 37	56 58	17·8	19·70	35·59	26·59	—
2789	„	„ 6	„	41 30	63 50	18·3	19·50	35·23	—	—
2790	„	„ 7	„	40 31	70 39	11·7	17·86	32·30	24·00	—
2791	„	„ 13	„	40 39	61 32	11·1	18·03	32·59	24·21	—
2792	„	„ 14	„	42 7	62 52	10·6	17·68	31·97	23·78	—
2793	„	„ 15	„	44 13	57 22	9·4	18·12	32·75	—	—
2794	„	„ 16	„	46 55	51 37	4·4	18·07	32·66	—	—
2795	„	„ 17	„	49 28	45 29	8·3	18·77	33·92	—	—
2796	„	„ 18	„	51 34	38 24	12·2	19·38	35·01	—	—
2797	„	„ 19	„	53 3	30 43	12·2	19·35	34·96	—	—
2798	„	„ 20	„	54 13	22 44	12·2	19·57	35·36	—	—
2799	„	„ 21	„	54 51	14 5	12·2	19·59	35·40	—	—
2800	Teutonic. .	„ 3	midnight	50 53	14 49	13·3	19·77	35·72	—	—
2801	„	„ 4	noon . .	50 25	21 27	11·1	19·68	35·56	—	—
2802	„	„ 4	midnight	49 0	27 10	11·1	19·79	35·75	—	—
2803	„	„ 5	noon . .	47 35	32 27	13·3	20·00	35·12	—	—
2804	„	„ 5	midnight	45 58	37 24	12·8	19·99	36·11	—	—
2805	„	„ 6	noon . .	44 14	42 33	12·2	20·23	36·53	27·37	—
2806	„	„ 6	midnight	42 7	47 1	10·0	19·39	35·03	—	—
2807	„	„ 7	noon . .	40 59	52 7	11·7	19·77	35·72	—	—
2808	„	„ 7	midnight	40 48	57 31	16·1	19·16	34·62	—	—
2809	„	„ 8	noon . .	40 31	63 6	16·7	20·15	36·39	27·27	—
2810	„	„ 8	midnight	40 34	68 34	13·9	18·45	33·36	24·84	—
2811	„	„ 14	„	40 10	69 41	15·0	19·36	34·98	—	—
2812	„	„ 15	noon . .	40 30	64 46	13·3	20·02	36·16	—	—
2813	„	„ 15	midnight	40 54	59 27	14·4	19·50	35·23	—	—
2814	„	„ 16	noon . .	41 22	53 53	17·8	19·31	34·89	—	—
2815	„	„ 16	midnight	42 9	48 54	14·4	18·44	33·34	—	—
2816	„	„ 17	noon . .	44 12	44 12	17·8	19·62	35·45	—	—
2817	„	„ 17	midnight	45 51	39 11	17·8	19·97	36·07	—	—
2818	„	„ 18	noon . .	47 31	33 56	15·6	19·71	35·61	—	—
2819	„	„ 18	midnight	48 46	28 26	15·6	19·63	35·47	—	—
2820	„	„ 19	noon . .	49 47	22 45	15·6	19·68	35·56	—	—
2821	„	„ 19	midnight	50 36	16 52	14·4	19·63	35·47	—	—
2822	„	„ 20	noon . .	51 15	10 53	13·9	19·63	35·47	—	—
					E.					
2823	Monarch . .	Jan. 6	„	50 59	1 45	6·7	18·98	34·30	—	—
2824	„	„ 7	„	50 59	1 45	6·1	18·94	34·23	—	—
2825	„	„ 8	„	51 29	1 31	6·7	19·17	34·63	—	—
2826	„	„ 9	„	52 55	4 12	2·2	19·31	34·89	—	—
2827	„	„ 10	„	53 36	6 14	1·1	17·47	31·60	23·54	—
2828	„	„ 12	„	53 48	6 43	0·0	17·50	31·65	—	—
2829	„	„ 13	„	53 46	6 42	1 7	17·54	31·71	—	—
2830	„	„ 14	„	53 50	6 36	1·7	17·53	31·70	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	E.					
2831	Monarch . .	Jan. 15	noon . .	53° 48′	6° 41′	1·7	17·57	31·77	—	—
2832	,,	,, 16	,,	52 44	3 28	5·6	19·35	34·96	—	—
2833	,,	Apr. 12	,,	52 24	4 21	7·8	16·78	30·37	22·59	—
2834	,,	,, 13	,,	52 24	4 23	7·8	17·07	30·87	22·97	—
2835	,,	,, 15	,,	52 11	3 11	7·8	19·31	34·89	—	—
2836	,,	May 3	,,	Calais	Roads	10·0	18·89	34·14	—	—
					W.					
2837	,,	,, 15	,,	50° 19′	4° 33′	10·8	19·49	35·21	—	—
2838	,,	,, 16	,,	52 16	5 26	9·4	19·32	34·91	—	—
2839	,,	,, 17	,,	55 55	6 6	8·3	18·90	34·16	—	—
2840	,,	,, 18	,,	Castle Bay,	Barra Id.	9·4	19·22	34·72	—	—
2841	,,	,, 19	,,	,,	,,	9·4	19·19	34·67	—	—
2842	,,	,, 20	,,	Oban	Harbour	9·4	18·58	33·58	—	—
2843	,,	,, 21	,,	54° 3′	4°47′50″	11·1	19·03	34·39	—	—
2844	,,	,, 23	,,	Holyhead	Harb.	10·0	19·12	34·54	—	—
2845	,,	,, 25	,,	51° 25′	9° 28′	12·2	19·42	35·08	—	—
2846	,,	,, 26	,,	Crook	haven	11·7	19·49	35·21	26·28	—
2847	,,	June 3	,,	51° 23′ 30″	9° 38′	11·7	19·43	35·10	—	—
2848	,,	,, 4	,,	Fastnet L.H. dist., cables	Rock S.55°E. 2·3	11·1	19·45	35·14	—	—
2849	,,	,, 5	,,	51° 27′	9° 6′	14·4	19·42	35·08	—	—
2850	,,	,, 6	,,	51 53	6 22	12·2	19·41	35·07	—	—
2851	,,	,, 12	,,	51 26	5 13	13·3	19·18	34·65	—	—
2852	,,	,, 13	,,	50 25	1 55	13·3	19·49	35·21	26·27	—
					E.					
2853	California .	Apr. 2	5 P.M. .	36 8	5 10	15·0	20·45	36·93	—	—
2854	,,	,, 2	8 P.M. .	36 14	4 38	15·0	20·21	36·49	—	—
2855	,,	,, 2	midnight	36 21	3 56	15·0	20·45	36·93	—	—
2856	,,	,, 3	4 A.M. .	36 29	3 0	14·4	20·79	37·53	28·11	—
					W.					
2857	,,	,, 3	noon . .	37 3	1 26	14·4	20·66	37·30	—	—
2858	,,	,, 3	8 P.M. .	37 52	0 18	14·4	20·55	37·10	—	—
					E.					
2859	,,	,, 4	4 A.M. .	38 58	0 40	13·9	20·84	37·62	—	—
2860	,,	,, 4	noon . .	40 6	1 36	13·3	20·91	37·75	—	—
2861	,,	,, 4	8 P.M. .	41 10	2 36	13·3	20·86	37·65	—	—
2862	,,	,, 5	4 A.M. .	42 6	3 22	13·3	20·81	37·57	—	—
2863	,,	,, 5	noon . .	42 47	4 30	13·3	20·78	37·51	—	—
2864	,,	,, 13	,,	43 54	8 28	13·3	21·01	37·93	—	—
2865	,,	May 2	,,	39 25	10 30	15·0	21·06	38·02	—	—
2866	,,	,, 2	midnight	38 42	8 10	15·6	20·78	37·51	—	—
2867	,,	,, 3	noon . .	38 11	5 35	15·6	20·44	36·91	—	—
2868	,,	,, 3	midnight	37 44	3 11	15·0	20·70	37·37	27·87	—
2869	,,	,, 4	noon . .	37 18	0 48	15·0	20·76	37·47	—	—
2870	,,	,, 4	midnight	36 52	2 22	15·0	20·78	37·51	—	—
					W.					
2871	,,	,, 5	noon . .	36 26	4 4	15·6	20·33	36·70	27·46	—
2872	,,	,, 7	,,	36 47	9 3	15·0	19·88	35·91	—	—
2873	,,	,, 7	midnight	37 25	11 24	15·0	19·97	36·07	—	—
2874	,,	,, 8	noon . .	38 3	13 45	15·0	20·03	36·18	—	—
2875	,,	,, 8	midnight	38 42	16 21	15·0	19·96	36·05	—	—
2876	,,	,, 9	noon . .	39 22	19 0	15·0	19·86	35·88	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2877	California .	May 9	midnight	39° 53′	21° 37′	15·0	19·88	35·91	—	—
2878	”	” 10	noon . .	40 24	24 18	15·0	19·97	36·07	—	—
2879	”	” 10	midnight	40 33	27 7	15·0	19·90	35·95	—	—
2880	”	” 11	noon . .	40 41	29 56	14·4	19·86	35·88	—	—
2881	”	” 11	midnight	40 47	32 23	14·4	19·96	36·05	—	—
2882	”	” 12	noon . .	40 53	35 14	14·4	20·18	36·44	—	—
2883	”	” 12	midnight	40 59	37 49	15·0	20·03	36·18	—	—
2884	”	” 13	noon . .	41 6	40 25	15·6	20·10	36·30	—	—
2885	”	” 13	midnight	41 5	42 43	16·7	20·08	36·27	—	—
2886	”	” 14	noon . .	41 3	44 51	17·2	20·05	36·21	—	—
2887	”	” 14	midnight	41 3	47 20	16·7	19·95	36·04	—	—
2888	”	” 15	noon . .	41 1	49 50	16·7	19·64	35·48	—	—
2889	”	” 15	midnight	41 4	52 10	14·4	19·32	34·91	—	—
2890	”	” 16	noon . .	41 7	54 31	14·4	18·70	33·80	—	—
2891	”	” 16	midnight	41 7	56 46	15·6	19·88	35·91	—	—
2892	”	” 17	noon . .	41 7	59 2	16·7	18·70	33·80	—	—
2893	”	” 17	midnight	41 9	61 27	16·7	19·49	35·21	—	—
2894	”	” 18	noon . .	41 11	63 53	16·7	19·83	35·82	—	—
2895	”	” 18	midnight	40 56	66 23	8·3	17·97	32·49	—	—
2896	”	” 19	noon . .	40 42	68 58	7·8	18·05	32·63	—	—
2897	”	” 19	midnight	40 30	71 28	7·8	17·70	32·01	—	—
2898	”	” 29	”	40 23	72 0	8·9	17·15	31·02	—	—
2899	”	” 30	noon . .	40 21	70 1	11·1	17·87	32·31	24·08	—
2900	”	” 30	midnight	40 24	67 48	11·1	18·30	33·08	—	—
2901	”	” 31	noon . .	40 28	65 35	15·6	17·68	31·97	23·86	—
2902	”	” 31	midnight	40 35	63 26	16·7	18·74	33·87	—	—
2903	”	June 1	noon . .	41 26	61 16	13·9	18·53	33·49	—	—
2904	”	” 1	midnight	41 27	58 52	18·9	19·51	35·25	—	—
2905	”	” 2	noon . .	41 28	56 28	16·7	19·08	34·47	—	—
2906	”	” 2	midnight	41 23	54 1	17·8	19·44	35·12	—	—
2907	”	” 3	noon . .	41 17	51 34	16·7	19·67	35·54	—	—
2908	”	” 3	midnight	41 44	49 22	15·6	19·15	34·60	—	—
2909	”	” 4	noon . .	42 19	47 10	10·0	19·13	34·56	—	—
2910	”	” 4	midnight	43 25	45 14	14·4	19·10	34·51	—	—
2911	”	” 5	noon . .	44 32	43 17	15·6	20·06	36·23	27·02	—
2912	”	” 5	midnight	45 54	41 28	15·6	20·07	36·25	—	—
2913	”	” 6	noon . .	46 16	39 39	14·4	19·80	35·77	—	—
2914	”	” 6	midnight	47 19	37 40	14·4	19·75	35·68	—	—
2915	”	” 7	noon . .	48 22	35 40	14·4	19·78	35·73	—	—
2916	”	” 7	midnight	49 18	32 28	13·3	19·59	35·40	—	—
2917	”	” 8	noon . .	50 14	31 15	11·1	19·57	35·36	—	—
2918	”	” 8	midnight	50 59	28 44	12·2	19·50	35·23	—	—
2919	”	” 9	noon . .	51 45	26 12	12·2	19·62	35·45	—	—
2920	”	” 9	midnight	52 29	23 53	12·2	19·60	35·41	—	—
2921	”	” 10	noon . .	53 13	21 34	12·2	19·59	35·40	—	—
2922	”	” 10	midnight	53 49	18 45	11·1	19·63	35·47	—	—
2923	”	” 11	noon . .	54 24	15 56	11·1	19·63	35·47	—	—
2924	”	” 11	midnight	54 57	18 57	11·1	19·59	35·40	—	—
2925	”	” 12	noon . .	55 30	9 54	11·1	19·57	35·36	—	—
2926	Siberian . .	” 21	”	51 22	14 47	13·9	19·68	35·56	26·58	—
2927	”	” 22	”	51 32	21 20	13·9	19·64	35·48	—	—
2928	”	” 23	”	51 43	28 40	13·9	19·57	35·36	—	—
2929	”	” 24	”	51 15	35 48	12·2	19·49	35·21	—	—
2930	”	” 25	”	52 18	42 16	12·8	19·14	34·58	—	—
2931	”	26	”	48 39	48 32	5·6	18·32	33·11	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2932	Siberian . .	June 27	noon . .	47° 54′	51° 46′	6·7	18·31	33·10	—	—
2933	„	„ 29	„	45 48	55 55	8·3	17·89	32·35	—	—
2934	„	„ 30	„	Egg I., 12 miles	N.Scotia	12·2	17·79	32·17	—	—
2935	„	July 2	„	41° 45′	66° 15′	12·2	17·97	32·49	—	—
2936	„	„ 3	„	39 33	71 42	21·7	18·20	32·90	—	—
2937	„	„ 10	„	39 28	71 49	25·0	19·06	34·44	—	—
2938	„	„ 11	„	41 3	66 48	22·2	19·11	34·53	—	—
2939	„	„ 12	„	42 30	61 30	15·6	18·19	32·88	—	—
2940	„	„ 13	„	44 41	56 29	14·4	17·29	31·27	—	—
2941	„	„ 15	„	49 23	47 58	10·0	18·58	33·53	—	—
2942	„	„ 16	„	51 25	41 50	13·9	19·31	34·89	—	—
2943	„	„ 17	„	52 55	36 2	12·2	19·29	34·86	—	—
2944	„	„ 18	„	54 3	29 43	13·3	19·47	35·17	—	—
2945	„	„ 19	„	55 2	22 42	13·9	19·52	35·27	—	—
2946	„	„ 20	„	55 35	14 55	15·6	19·57	35·36	26·32	—
2947	„	„ 21	„	N. coast	Ireland	15·0	19·29	34·86	—	—
2926A	Laura . .	June 6	„	59° 32′	2° 24′	9·5	19·35	34·96	—	—
2927A	„	„ 6	8 P.M. .	60 17	3 42	9·3	19·58	35·38	—	—
2928A	„	„ 7	4 A.M. .	61 10	5 32	8·3	19·61	35·43	26·42	—
2929A	„	„ 9	„	62 29	8 2	8·5	19·56	35·34	26·40	—
2930A	„	„ 9	noon . .	62 42	11 11	9·5	19·51	35·25	—	—
2931A	„	„ 9	8 P.M. .	62 55	14 4	9·2	19·49	35·21	—	—
2932A	„	„ 10	4 A.M. .	63 9	17 6	8·8	19·50	35·23	—	—
2933A	„	„ 10	noon . .	63 23	19 46	9·5	19·49	35·21	—	—
2934A	„	„ 10	8 P.M. .	63 34	21 49	9·0	19·47	35·17	—	—
2935A	„	„ 20	4 A.M. .	64 8	22 54	7·5	19·03	34·39	25·73	—
2936A	„	„ 20	noon . .	63 33	20 45	9·0	19·42	35·08	—	—
2937A	„	„ 20	8 P.M. .	63 14	18 45	9·0	19·35	34·96	—	—
2938A	„	„ 21	4 A.M. .	62 57	16 30	8·8	19·50	35·23	26·37	—
2939A	„	„ 21	noon . .	62 42	14 27	9·5	19·50	35·23	—	—
2940A	„	„ 21	8 P.M. .	62 37	11 52	9·0	19·49	35·21	—	—
2941A	„	„ 22	4 A.M. .	62 34	9 25	9·0	19·48	35·19	—	—
2942A	„	„ 22	noon . .	62 26	7 10	8·5	19·45	35·14	—	—
2943A	„	„ 24	4 A.M. .	61 40	6 40	8·0	19·46	35·15	—	—
2944A	„	„ 24	noon . .	61 5	5 28	10·0	19·47	35·17	—	—
2945A	„	„ 24	8 P.M. .	60 8	3 25	11·0	19·55	35·32	—	—
2948	Teutonic .	July 1	midnight	51 3	14 40	13·9	19·58	35·38	—	—
2949	„	„ 2	noon . .	50 25	20 47	15·0	19·61	35·43	—	—
2950	„	„ 2	midnight	49 30	26 39	15·6	19·70	35·59	—	—
2951	„	„ 3	noon . .	48 22	32 24	15·6	19·56	35·34	—	—
2952	„	„ 3	midnight	46 31	38 0	16·7	19·53	35·28	—	—
2953	„	„ 4	noon . .	45 13	42 51	17·8	19·92	35·98	—	—
2954	„	„ 4	midnight	43 17	47 56	12·2	18·16	32·82	—	—
2955	„	„ 5	noon . .	42 10	53 23	17·8	19·36	34·98	—	—
2956	„	„ 5	midnight	41 40	58 53	18·3	19·54	35·30	—	—
2957	„	„ 6	noon . .	41 10	64 18	15·6	17·56	31·75	—	—
2958	„	„ 6	midnight	40 37	69 14	16·1	17·63	31·88	—	—
2959	„	„ 14	„	40 12	69 35	21·1	18·38	33·22	—	—
2960	„	„ 15	noon . .	40 31	65 20	26·1	19·85	35·86	—	—
2961	„	„ 15	midnight	40 53	60 30	18·9	18·08	32·68	—	—
2962	„	„ 16	noon . .	41 16	55 37	23·3	19·03	34·39	—	—
2963	„	„ 16	midnight	41 37	50 41	20·0	18·92	34·19	—	—
2964	„	„ 17	noon . .	43 8	46 17	20·0	19·41	35·07	—	—
2965	„	„ 17	midnight	44 55	41 40	17·8	19·93	36·00	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
2966	Teutonic . .	July 18	noon . .	46° 35′	37° 7′	15·6	19·69	35·58	—	—
2967	,,	,, 18	midnight	47 57	32 0	15·6	20·09	36·29	—	—
2968	,,	,, 19	noon . .	49 12	26 57	16·1	19·69	35·58	—	—
2969	,,	,, 19	midnight	50 5	21 24	16·1	19·62	35·45	—	—
2970	,,	,, 20	noon . .	50 57	15 39	16·1	19·59	35·40	—	—
2971	Anchoria .	June 27	,,	55 16	11 59	12·8	19·55	35·32	—	—
2972	,,	,, 28	,,	54 51	20 17	12·2	19·57	35·36	—	—
2973	,,	,, 29	,,	53 45	28 22	12·8	19·58	35·38	—	—
2974	,,	,, 30	,,	52 39	35 42	12·2	19·39	35·03	—	—
2975	,,	July 1	,,	50 39	42 12	15·0	19·78	35·73	26·79	—
2976	,,	,, 2	,,	48 20	48 3	6·1	18·23	32·95	—	—
2977	,,	,, 3	,,	45 43	53 45	7·8	18·03	32·59	—	—
2978	,,	,, 4	,,	43 23	59 39	12·8	18·09	32·70	—	—
2979	,,	,, 5	,,	41 19	65 45	15·0	18·17	32·84	—	—
2980	,,	,, 6	,,	40 30	71 36	21·1	17·55	31·73	23·58	—
2981	,,	,, 11	,,	40 34	69 20	17·2	17·68	31·97	—	—
2982	,,	,, 12	,,	41 50	63 11	16·1	17·62	31·86	23·64	—
2983	,,	,, 13	,,	44 9	57 27	13·9	17·84	32·26	—	—
2984	,,	,, 14	,,	46 30	52 5	8·9	17·89	32·35	—	—
2985	,,	,, 15	,,	49 9	46 13	11·1	18·85	34·07	—	—
2986	,,	,, 16	,,	51 20	39 40	12·8	19·29	34·86	—	—
2987	,,	,, 17	,,	52 43	33 2	12·2	19·39	35·03	—	—
2988	,,	,, 18	,,	53 55	26 5	13·9	19·57	35·36	—	—
2989	,,	,, 19	,,	54 49	18 27	13·9	19·60	35·41	—	—
2990	,,	,, 20	,,	55 21	11 6	15·0	19·63	35·47	26·44	—
2991	Laura . .	,, 15	4 A.M. .	59 38	2 45	10·7	19·26	34·80	—	—
2992	,,	,, 15	noon . .	60 34	4 34	12·5	19·53	35·28	26·25	—
2993	,,	,, 15	8 P.M. .	61 16	6 15	12·5	19·47	35·17	—	—
2994	,,	,, 18	4 A.M. .	62 26	8 58	11·2	19·50	35·23	—	—
2995	,,	,, 18	noon . .	62 37	11 22	10·7	19·50	35·23	—	—
2996	,,	,, 18	8 P.M. .	62 51	14 11	11·0	19·49	35·21	—	—
2997	,,	,, 19	4 A.M. .	63 20	16 45	11·5	19·45	35·14	—	—
2998	,,	,, 19	noon . .	63 24	18 40	12·2	19·48	35·19	—	—
2999	,,	,, 19	8 P.M. .	63 24	20 3	11·5	19·29	34·86	—	—
3000	,,	,, 20	4 A.M. .	63 26	21 40	11·7	18·69	33·78	—	—
3001	,,	,, 20	noon . .	63 57	23 1	12·0	18·57	33·56	—	—
3002	,,	,, 22	8 P.M. .	64 25	22 19	11·5	18·27	33·02	24·59	—
3003	,,	,, 23	4 A.M. .	65 8	23 45	10·5	19·11	34·53	—	—
3004	,,	,, 23	8 P.M. .	65 29	24 36	10·5	18·51	33·46	—	—
3005	,,	,, 25	,,	66 14	23 40	9·5	18·80	33·98	—	—
3006	,,	,, 26	noon . .	66 7	23 42	9·0	19·07	34·46	—	—
3007	,,	,, 26	8 P.M. .	65 20	24 30	11·5	19·15	34·60	—	—
3008	,,	,, 27	4 A.M. .	64 26	22 58	11·5	18·99	34·32	—	—
3009	,,	,, 30	,,	64 14	22 33	11·5	18·54	33·51	24·97	—
3010	,,	,, 30	noon . .	63 32	21 6	11·0	19·14	34·58	—	—
3011	,,	,, 30	8 P.M. .	63 17	18 58	11·0	19·45	35·14	—	—
3012	,,	,, 31	4 A.M. .	62 48	16 30	11·7	19·49	35·21	—	—
3013	,,	,, 31	noon . .	62 36	13 39	12·5	19·41	35·07	—	—
3014	,,	,, 31	8 P.M. .	62 32	10 45	12·0	19·46	35·15	—	—
3015	,,	Aug. 1	4 A.M. .	62 24	8 1	12·0	19·53	35·28	—	—
3016	,,	,, 1	noon . .	62 24	6 47	11·5	19·45	35·14	—	—
3017	,,	,, 1	8 P.M. .	62 8	6 30	11·5	19·45	35·14	—	—
3018	,,	,, 2	,,	61 15	5 21	11·8	19·40	35·05	—	—
3019	,,	,, 3	4 A.M. .	60 12	3 34	12·7	19·15	34·60	—	—
3020	,,	,, 3	noon . .	59 35	2 26	13·0	19·36	34·98	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3021	Para . . .	Jan. 28	noon . .	47° 48′	7° 11′	11·1	20·01	36·14	—	—
3022	,,	,, 29	,,	44 29	13 40	11·1	20·03	36·18	—	—
3023	,,	,, 30	,,	41 22	19 53	13·9	20·45	36·93	—	—
3024	,,	Mar. 14	,,	42 41	24 42	13·1	20·15	36·39	—	—
3025	,,	,, 15	,,	45 32	17 49	12·2	20·23	36·53	—	—
3026	,,	,, 16	,,	47 37	10 24	11·1	20·41	31·86	27·37	—
3027	,,	Apr. 8	,,	48 2	7 0	10·6	20·03	36·18	—	—
3028	,,	,, 9	,,	45 6	12 55	12·2	20·09	36·29	—	—
3029	,,	,, 10	,,	41 31	18 48	12·8	20·02	36·16	—	—
3030	,,	May 23	,,	41 51	27 50	15·0	20·12	36·33	—	—
3031	,,	,, 24	,,	43 53	21 23	13·9	19·78	35·73	26·77	—
3032	,,	,, 25	,,	46 22	14 58	13·3	19·90	35·95	—	—
3033	,,	,, 26	,,	49 6	7 38	12·8	19·85	35·86	—	—
3034	,,	June 17	,,	47 51	6 36	15·0	19·85	35·86	—	—
3035	,,	,, 18	,,	44 38	12 47	17·8	19·84	35·84	26·72	—
3036	,,	,, 19	,,	43 12	15 34	18·9	19·91	35·97	—	—
3037	,,	,, 20	,,	40 50	19 43	19·4	19·86	35·88	—	—
3038	,,	Aug. 2	,,	40 24	25 30	21·1	19·89	35·93	—	—
3039	,,	,, 3	,,	43 4	20 0	19·4	19·90	35·95	—	—
3040	,,	,, 4	,,	45 38	13 53	18·3	19·88	35·91	—	—
3041	,,	,, 5	,,	48 29	7 44	18·3	19·78	35·73	26·61	—
3042	Loughrigg Holme	July 3	midnight	58 40	5 20	10·6	19·36	34·98	—	—
3043	,,	,, 4	noon . .	58 32	8 22	11·9	19·56	35·34	—	—
3044	,,	,, 4	midnight	58 22	11 50	11·1	19·53	35·28	—	—
3045	,,	,, 5	noon . .	58 14	14 5	11·0	19·50	35·23	—	—
3046	,,	,, 5	midnight	57 41	16 44	10·8	19·54	35·30	—	—
3047	,,	,, 6	noon . .	57 9	19 20	11·7	19·50	35·23	—	—
3048	,,	,, 6	8 P.M. .	56 53	21 27	11·6	19·57	35·36	—	—
3049	,,	,, 6	midnight	56 44	22 35	11·1	19·53	35·28	—	—
3050	,,	,, 7	4 A.M. .	56 36	23 38	11·4	19·51	35·25	—	—
3051	,,	,, 7	noon . .	56 22	25 27	11·4	19·46	35·15	—	—
3052	,,	,, 7	8 P.M. .	56 4	26 52	10·8	19·44	35·12	—	—
3053	,,	,, 7	midnight	55 54	27 40	10·3	19·44	35·12	26·14	—
3054	,,	,, 8	8 A.M. .	55 36	29 16	11·8	19·47	35·17	—	—
3055	,,	,, 8	noon . .	55 27	29 59	10·6	19·33	34·93	—	—
3056	,,	,, 8	8 P.M. .	55 7	31 36	10·5	19·39	35·03	—	—
3057	,,	,, 8	midnight	54 56	32 27	10·7	19·42	35·08	—	—
3058	,,	,, 9	8 A.M. .	54 35	34 14	10·6	19·30	34·87	—	—
3059	,,	,, 9	noon . .	54 23	35 12	10·4	19·22	34·72	—	—
3060	,,	,, 9	8 P.M. .	54 8	36 38	10·7	19·27	34·82	—	—
3061	,,	,, 9	midnight	53 55	37 9	10·0	19·30	34·87	25·90	—
3062	,,	,, 10	8 A.M. .	53 24	38 22	9·7	19·20	34·69	—	—
3063	,,	,, 10	noon . .	53 3	39 8	11·2	19·31	34·89	—	—
3064	,,	,, 10	midnight	52 0	41 38	11·2	19·22	34·72	—	—
3065	,,	,, 11	noon . .	50 49	44 26	14·2	19·44	35·12	26·13	—
3066	,,	,, 11	midnight	49 32	46 59	11·1	19·08	34·47	—	—
3067	,,	,, 12	noon . .	48 17	49 27	5·8	17·99	32·53	—	—
3068	,,	,, 12	midnight	47 20	50 42	7·3	17·99	32·53	—	—
3069	,,	,, 13	noon . .	46 43	52 0	8·7	17·98	32·51	24·03	—
3070	,,	,, 13	midnight	46 27	55 13	10·0	17·84	32·26	—	—
3071	,,	,, 14	noon . .	46 21	57 52	12·8	17·79	32·17	—	—
3072	,,	Aug. 6	6 A.M. .	51 48	55 38	6·9	16·25	29·42	—	—
3073	,,	,, 6	noon . .	52 4	54 26	9·3	16·45	29·77	—	—
3074	,,	,, 6	8 P.M. .	52 37	52 52	8·0	17·74	32·07	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3075	Loughrigg Holme	Aug. 7	4 A.M.	53° 9′	51° 20′	8·0	18·58	33·58	24·95	—
3076	,,	,, 7	noon	53 38	49 56	11·0	18·92	34·19	—	—
3077	,,	,, 7	8 P.M.	54 9	48 12	10·6	19·06	34·44	—	—
3078	,,	,, 8	4 A.M.	54 40	46 28	9·6	19·16	34·62	—	—
3079	,,	,, 8	noon	55 10	44 43	11·3	19·16	34·62	25·76	—
3080	,,	,, 8	8 P.M.	55 34	42 46	10·0	19·23	34·74	—	—
3081	,,	,, 9	4 A.M.	55 59	40 47	9·5	19·26	34·80	—	—
3082	,,	,, 9	noon	56 24	38 52	9·3	19·30	35·87	—	—
3083	,,	,, 9	8 P.M.	56 38	36 43	9·8	19·40	35·05	26·04	—
3084	,,	,, 10	4 A.M.	56 52	34 30	10·0	19·39	35·03	—	—
3085	,,	,, 10	noon	57 7	32 25	11·1	19·44	35·12	—	—
3086	,,	,, 10	8 P.M.	57 20	30 11	11·8	19·47	35·17	—	—
3087	,,	,, 11	4 A.M.	57 33	27 58	12·1	19·47	35·17	26·14	—
3088	,,	,, 11	noon	57 47	25 52	12·3	19·45	35·14	—	—
3089	,,	,, 11	8 P.M.	57 57	23 42	12·3	19·43	35·10	—	—
3090	,,	,, 12	4 A.M.	58 6	21 48	12·9	19·49	35·21	—	—
3091	,,	,, 12	noon	58 12	20 33	12·9	19·48	35·19	26·16	—
3092	,,	,, 12	8 P.M.	58 18	18 23	13·2	19·56	35·34	—	—
3093	,,	,, 13	4 A.M.	58 24	16 25	13·4	19·54	35·30	—	—
3094	,,	,, 13	noon	58 31	14 20	13·9	19·52	35·27	—	—
3095	,,	,, 13	8 P.M.	58 34	12 6	14·3	19·59	35·40	—	—
3096	,,	,, 14	4 A.M.	58 36	9 54	14·4	19·57	35·36	—	—
3097	,,	,, 14	noon	58 39	7 38	14·3	19·50	35·23	—	—
3098	,,	,, 14	8 P.M.	58 39	5 8	14·3	19·34	34·94	—	—
		1896.								
3099	Minia	Oct. 24	noon	50 0	7 52	11·6	18·93	34·21	—	—
3100	,,	,, 26	,,	51 20	13 23	11·4	19·57	35·36	—	—
3101	,,	,, 27	,,	51 29	19 32	12·2	—	—	—	—
3102	,,	,, 28	,,	51 16	26 0	12·8	19·16	34·62	—	—
3103	,,	,, 29	,,	50 52	32 28	13·0	—	—	—	—
3104	,,	,, 30	,,	50 37	38 23	14·4	19·35	34·96	—	—
3105	,,	,, 31	,,	49 35	44 26	12·3	17·90	32·37	—	—
3106	,,	Nov. 1	,,	48 25	49 45	6·8	17·23	31·17	23·16	—
3107	,,	,, 9	8 A.M.	46 32	59 30	8·3	16·26	29·44	21·75	—
3108	,,	,, 13	,,	44 54	61 21	9·2	16·30	29·50	—	—
3109	,,	Dec. 22	6 A.M.	49 0	50 27	−0·6	18·15	32·80	—	—
		1897.								
3110	,,	Jan. 22	noon	42 42	68 54	4·7	—	—	—	—
3111	,,	May 16	8 A.M.	48 52	50 35	0·6	—	—	—	—
3112	,,	,, 24	4 P.M.	48 19	48 16	2·8	18·03	32·59	—	—
3113	,,	,, 25	noon	48 21	44 22	6·2	17·96	32·48	—	—
3114	,,	,, 26	8 A.M.	48 19	40 24	14·0	17·97	32·49	24·19	—
3115	,,	June 1	,,	48 22	39 30	13·3	18·94	34·23	—	—
3116	,,	July 19	1 P.M.	47 44	43 53	11·1	19·62	35·45	—	—
3117	,,	,, 20	noon	48 18	39 49	16·9	19·63	35·47	—	—
3118	,,	,, 21	,,	49 20	36 24	14·2	18·60	33·62	24·97	—
3119	,,	,, 20	,,	48 18	39 49	16·9	19·72	35·63	26·60	—
3120	,,	,, 21	,,	49 20	36 24	14·2	19·41	35·07	—	—
3121	,,	,, 22	1 P.M.	50 20	31 30	15·0	19·43	35·10	—	—
3122	,,	,, 23	noon	51 21	26 12	15·8	19·61	35·43	—	—
3123	,,	,, 25	,,	51 53	14 57	16·4	—	—	—	—
3124	Traveller	Apr. 8	,,	59 8	5 1	7·2	19·48	35·19	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3125	Traveller .	Apr. 9	noon . .	59° 45′	7° 1′	8·3	19·61	35·43	—	—
3126	,,	,, 10	,,	58 56	7 50	8·9	19·61	35·43	—	—
3127	,,	,, 11	,,	59 28	11 9	8·8	19·59	35·40	—	—
3128	,,	,, 12	,,	60 8	13 9	8·3	19·57	35·36	26·21	—
3129	,,	,, 13	,,	60 28	16 13	8·3	19·55	35·32	—	—
3130	,,	,, 14	,,	60 18	16 13	8·4	19·64	35·48	—	—
3131	,,	,, 15	,,	60 9	14 20	8·3	19·55	35·32	—	—
3132	,,	,, 16	,,	59 32	13 11	8·4	19·59	35·40	—	—
3133	,,	,, 17	,,	58 39	12 16	8·3	19·60	35·41	—	—
3134	,,	,, 18	,,	57 32	12 10	8·9	19·59	35·40	—	—
3135	,,	,, 19	,,	58 3	12 40	8·8	19·57	35·36	—	—
3136	,,	,, 20	,,	58 2	14 0	8·9	19·54	35·30	26·25	—
3137	,,	,, 21	,,	57 50	18 40	9·4	19·54	35·30	—	—
3138	,,	,, 22	,,	58 17	22 56	8·9	19·54	35·30	—	—
3139	,,	,, 23	,,	58 34	25 32	8·3	19·52	35·27	—	—
3140	,,	,, 24	,,	58 44	26 47	8·3	19·53	35·28	—	—
3141	,,	,, 25	,,	58 37	29 33	7·2	19·45	35·14	—	—
3142	,,	,, 26	,,	57 47	30 31	7·4	19·46	35·15	26·18	—
3143	,,	,, 27	,,	56 55	30 50	8·4	19·46	35·15	—	—
3144	,,	,, 28	,,	57 35	30 34	7·9	19·44	35·12	—	—
3145	,,	,, 29	,,	58 23	28 36	8·1	19·54	35·30	—	—
3146	,,	,, 30	,,	58 59	27 55	7·8	19·47	35·17	—	—
3147	,,	May 1	,,	59 38	26 55	7·2	19·53	35·28	—	—
3148	,,	,, 2	,,	60 3	25 59	6·1	19·53	35·28	26·31	—
3149	,,	,, 3	,,	59 44	26 52	7·5	19·49	35·21	—	—
3150	,,	,, 4	,,	59 16	27 26	7·3	19·54	35·30	—	—
3151	,,	,, 5	,,	58 28	27 46	7·3	19·52	35·27	—	—
3152	,,	,, 6	,,	58 25	27 22	7·6	19·44	35·12	—	—
3153	,,	,, 7	,,	59 1	27 37	7·4	19·46	35·15	26·19	—
3154	,,	,, 8	,,	59 1	27 37	7·6	19·44	35·12	—	—
3155	,,	,, 9	,,	58 3	27 57	7·8	19·41	35·07	—	—
3156	,,	,, 10	,,	58 41	30 36	7·3	19·40	35·05	—	—
3157	,,	,, 11	,,	58 50	33 41	6·3	19·36	34·98	—	—
3158	,,	,, 12	,,	59 6	36 15	5·6	19·45	35·14	—	—
3159	,,	,, 13	,,	59 59	35 44	4·7	19·35	34·96	—	—
3160	,,	,, 14	,,	59 6	36 0	6·2	19·46	35·15	26·10	—
3161	,,	,, 15	,,	58 20	37 37	5·3	19·35	34·96	—	—
3162	,,	,, 16	,,	58 8	38 57	4·7	19·36	34·98	—	—
3163	,,	,, 17	,,	58 2	41 25	3·1	18·72	33·83	25·28	—
3164	,,	,, 18	,,	58 23	42 42	3·3	18·94	34·23	—	—
3165	,,	,, 19	,,	58 28	45 38	3·2	19·05	34·42	—	—
3166	,,	,, 20	,,	59 28	47 58	2·8	18·99	34·32	—	—
3167	,,	,, 21	,,	60 58	48 28	0·3	18·50	33·44	—	—
3168	,,	,, 22	,,	61 6	48 40	0·6	17·20	31·11	—	—
3169	,,	July 12	,,	58 19	49 58	5·8	19·10	34·51	—	—
3170	,,	,, 13	,,	58 11	47 9	5·7	19·04	34·40	—	—
3171	,,	,, 15	,,	57 57	41 2	6·7	19·26	34·80	—	—
3172	,,	,, 16	,,	58 10	39 13	7·1	19·26	34·80	—	—
3173	,,	,, 17	,,	58 19	38 5	7·5	19·28	34·84	—	—
3174	,,	,, 18	,,	58 14	34 49	8·9	19·29	34·86	—	—
3175	,,	,, 19	,,	58 23	32 22	10·0	19·31	34·89	—	—
3176	,,	,, 20	,,	58 52	31 16	10·0	19·32	34·91	—	—
3177	,,	,, 21	,,	59 4	30 32	10·6	19·29	34·86	—	—
3178	,,	,, 22	,,	59 8	30 26	11·1	19·31	34·89.	—	—
3179	,,	,, 23	,,	58 46	28 44	11·4	19·45	35·14	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3180	Traveller .	July 24	noon . .	58° 29′	27° 44′	12·2	19·45	35·14	—	—
3181	,,	,, 25	,,	58 26	26 55	12·8	19·45	35·14	—	—
3182	,,	,, 26	,,	58 34	24 13	12·5	19·47	35·17	26·11	—
3183	,,	,, 27	,,	58 21	21 37	12·8	19·47	35·17	—	—
3184	Thorwaldsen	Apr. 5	8 A.M. .	59 48	2 18	6·7	19·55	35·32	—	—
3185	,,	,, 5	noon . .	59 50	2 53	6·5	19·53	35·28	—	—
3186	,,	,, 5	4 P.M. .	59 52	3 36	6·8	19·56	35·34	—	—
3187	,,	,, 6	8 A.M. .	60 7	8 17	7·7	10·57	35·36	26·28	—
3188	,,	,, 6	noon . .	60 1	9 26	7·6	19·57	35·36	—	—
3189	,,	,, 6	4 P.M. .	59 55	10 46	7·8	19·63	35·47	—	—
3190	,,	,, 7	noon . .	59 57	11 59	8·2	19·59	35·40	—	—
3191	,,	,, 8	,,	59 51	14 8	7·8	19·56	35·34	26·21	—
3192	,,	,, 9	,,	59 30	13 33	8·0	19·57	35·36	—	—
3193	,,	,, 10	,,	59 11	13 52	8·5	19·59	35·40	—	—
3194	,,	,, 11	,,	59 11	16 26	8·6	19·58	35·38	—	—
3195	,,	,, 12	,,	59 22	15 44	8·3	19·57	35·36	26·20	—
3196	,,	,, 13	,,	59 33	17 45	8·5	19·57	35·36	—	—
3197	,,	,, 14	,,	58 51	17 25	8·2	19·56	35·34	—	—
3198	,,	,, 21	8 A.M. .	58 25	20 33	9·0	19·54	35·30	—	—
3199	,,	,, 21	noon . .	58 16	20 50	9·2	19·56	35·34	26·23	—
3200	,,	,, 21	4 P.M. .	58 13	21 8	9·2	19·57	35·36	—	—
3201	,,	,, 22	8 A.M. .	57 49	24 1	8·7	19·40	35·05	—	—
3202	,,	,, 22	noon . .	57 48	24 46	8·8	19·54	35·30	—	—
3203	,,	,, 22	4 P.M. .	57 50	25 8	8·8	19·56	35·34	26·20	—
3204	,,	,, 23	8 A.M. .	57 25	25 38	7·0	19·50	35·23	—	—
3205	,,	,, 23	noon . .	57 17	25 39	6·8	19·44	35·12	—	—
3206	,,	,, 23	4 P.M. .	57 6	25 36	7·5	19·45	35·14	—	—
3207	,,	,, 24	8 A.M. .	57 13	26 37	7·5	19·51	35·25	—	—
3208	,,	,, 24	noon . .	57 10	27 32	8·5	19·52	35·27	—	—
3209	,,	,, 24	4 P.M. .	57 11	27 42	8·2	19·46	35·15	—	—
3210	,,	,, 25	8 A.M. .	57 6	28 28	6·7	19·41	35·07	—	—
3211	,,	,, 25	noon . .	56 57	28 43	6·6	19·43	35·10	—	—
3212	,,	,, 25	4 P.M. .	56 47	28 59	6·6	19·46	35·15	—	—
3213	,,	,, 26	8 A.M. .	55 55	29 52	7·0	19·42	35·08	—	—
3214	,,	,, 26	noon . .	56 9	30 30	6·8	19·41	35·07	—	—
3215	,,	,, 26	4 P.M. .	56 26	30 35	7·0	19·43	35·10	—	—
3216	,,	,, 27	8 A.M. .	56 24	30 40	7·4	19·45	35·14	—	—
3217	,,	,, 27	noon . .	56 29	31 16	7·2	19·45	35·14	26·06	—
3218	,,	,, 27	4 P.M. .	56 40	30 47	7·5	19·43	35·10	—	—
3219	,,	,, 28	8 A.M. .	56 35	32 10	6·8	19·44	35·12	—	—
3220	,,	,, 28	noon . .	56 27	32 14	7·0	19·43	35·10	—	—
3221	,,	,, 28	4 P.M. .	56 11	32 25	7·0	19·37	35·00	25·92	—
3222	,,	,, 29	8 A.M. .	56 16	33 23	7·0	19·40	35·05	—	—
3223	,,	,, 29	noon . .	56 27	33 21	7·2	19·45	35·14	—	—
3224	,,	,, 29	4 P.M. .	56 39	33 19	7·2	19·44	35·12	—	—
3225	,,	,, 30	8 A.M. .	56 25	33 6	7·5	19·39	35·03	—	—
3226	,,	,, 30	noon . .	56 18	33 7	7·5	19·43	35·10	—	—
3227	,,	,, 30	4 P.M. .	56 5	33 5	7·5	19·39	35·03	—	—
3228	,,	May 7	noon . .	56 56	34 46	5·7	19·40	35·05	—	—
3229	,,	,, 8	,,	56 17	36 22	5·8	19·35	34·96	—	—
3230	,,	,, 9	8 A.M. .	56 40	38 34	5·0	19·24	34·76	—	—
3231	,,	,, 9	noon . .	56 47	39 42	5·5	19·32	34·91	—	—
3232	,,	,, 9	4 P.M. .	56 53	40 37	4·5	19·30	34·87	—	—
3233	,,	,, 10	8 A.M. .	57 5	43 36	3·8	19·30	34·87	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3234	Thorwaldsen.	May 10	noon . .	57° 28′	44° 30′	3·8	19·29	34·86	—	—
3235	,,	,, 10	4 P.M. .	57 33	45 29	4·0	19·22	34·72	—	—
3236	,,	,, 11	8 A.M. .	57 46	47 17	2·7	19·15	34·60	—	—
3237	,,	,, 11	noon . .	57 51	47 23	3·0	19·16	34·62	—	—
3238	,,	,, 11	4 P.M. .	58 3	48 4	3·5	19·29	34·86	—	—
3239	,,	July 31	noon . .	60 18	7 16	12·0	19·44	35·12	—	—
3240	,,	Aug. 1	,,	60 9	5 47	13·8	19·44	35·12	—	—
3241	,,	,, 2	8 A.M. .	59 44	3 59	13·7	19·61	35·43	26·30	—
3242	,,	,, 2	4 P.M. .	59 36	2 55	12·8	19·54	35·30	26·20	—
3243	,,	July 16	noon . .	56 4	33 20	10·7	19·37	35·00	—	—
3244	,,	,, 10	4 P.M. .	57 55	49 17	5·5	19·18	34·65	—	—
3245	,,	,, 11	8 A.M. .	57 19	47 1	5·5	19·19	34·67	—	—
3246	,,	,, 11	noon . .	57 8	46 31	6·0	19·21	34·71	—	—
3247	,,	,, 11	4 P.M. .	57 8	46 14	6·0	19·25	34·78	25·81	—
3248	,,	,, 12	8 A.M. .	57 8	43 38	5·5	19·28	34·84	—	—
3249	,,	,, 12	noon . .	56 52	42 57	6·5	19·25	34·78	—	—
3250	,,	,, 13	8 A.M. .	56 59	39 50	6·4	19·33	34·93	—	—
3251	,,	,, 13	noon . .	57 1	39 15	6·5	19·28	34·84	25·88	—
3252	,,	,, 13	4 P.M. .	57 2	38 35	7·3	19·27	34·82	—	—
3253	,,	,, 14	8 A.M. .	57 5	35 57	8·8	19·30	34·87	—	—
3254	,,	,, 14	noon . .	56 51	35 20	9·0	19·35	34·96	—	—
3255	,,	,, 14	4 P.M. .	56 51	35 3	9·7	19·30	34·87	25·71	—
3256	,,	,, 15	8 A.M. .	56 19	34 9	9·5	19·39	35·03	—	—
3257	,,	,, 15	noon . .	56 12	33 51	10·7	19·45	35·14	—	—
3258	,,	,, 15	4 P.M. .	56 5	33 29	10·7	19·47	35·17	—	—
3259	,,	,, 21	noon . .	57 10	32 53	11·5	19·41	35·07	—	—
3260	,,	,, 25	,,	57 9	28 27	14·0	19·56	35·34	—	—
3261	,,	,, 26	8 A.M. .	57 48	25 57	12·4	19·53	35·28	—	—
3262	,,	,, 26	noon . .	57 49	24 43	12·8	19·56	35·34	—	—
3263	,,	,, 26	4 P.M. .	57 59	24 2	13·0	19·36	34·98	—	—
3264	,,	,, 27	8 A.M. .	58 30	21 52	12·2	19·50	35·23	—	—
3265	,,	,, 27	noon . .	58 36	20 58	13·6	—	—	—	—
3266	,,	,, 27	4 P.M. .	58 48	20 2	13·0	19·53	35·28	—	—
3267	,,	,, 28	8 A.M. .	59 7	17 34	13·2	—	—	—	—
3268	,,	,, 28	noon . .	59 11	16 52	13·1	—	—	—	—
3269	,,	,, 28	4 P.M. .	59 15	16 6	13·0	—	—	—	—
3270	,,	,, 29	8 A.M. .	59 29	13 11	12·5	—	—	—	—
3271	,,	,, 29	noon . .	59 30	13 4	13·0	—	—	—	—
3272	,,	,, 29	4 P.M. .	59 34	12 31	13·0	—	—	—	—
3273	,,	,, 30	noon . .	59 55	9 51	12·7	—	—	—	—
3271A	Teutonic . .	Aug. 5	midnight	51 28	15 18	16·1	19·63	35·47	—	—
3272A	,,	,, 6	noon . .	51 30	21 0	15·6	19·61	35·43	—	—
3273A	,,	,, 6	midnight	50 46	27 25	15·0	19·66	35·52	—	—
3274	,,	,, 7	noon . .	50 0	34 4	15·0	19·47	35·17	—	—
3275	,,	,, 7	midnight	48 34	40 7	15·6	19·53	35·28	—	—
3276	,,	,, 8	noon . .	47 10	45 58	11·7	18·28	33·04	—	—
3277	,,	,, 8	midnight	45 32	51 25	13·3	18·01	32·56	—	—
3278	,,	,, 9	noon . .	43 53	56 55	17·8	18·11	32·73	—	—
3279	,,	,, 9	midnight	42 33	62 22	18·9	17·57	31·77	23·52	—
3280	,,	,, 10	noon . .	41 11	67 57	16·7	17·90	32·37	24·03	—
3281	,,	,, 10	midnight	off Fire	Island	21·7	17·02	30·78	—	—
3282	,,	,, 18	,,	40° 10′	70° 0′	22·2	18·66	33·73	—	—
3283	,,	,, 19	noon . .	41·16	65 12	22·2	19·00	34·33	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3284	Teutonic. .	Aug. 19	midnight	42° 14′	60° 26′	19·4	17·69	31·99	—	—
3285	,,	,, 20	noon . .	43 27	55 41	20·6	18·50	33·44	—	—
3286	,,	,, 20	midnight	44 48	50 55	16·7	17·98	32·51	—	—
3287	,,	,, 21	noon . .	46 11	45 40	13·9	17·95	32·46	—	—
3288	,,	,, 21	midnight	47 41	40 14	15·0	18·45	33·36	—	—
3289	,,	,, 22	noon . .	49 5	35 1	17·2	19·68	35·56	—	—
3290	,,	,, 22	midnight	50 8	30 0	15·6	19·69	35·58	—	—
3291	,,	,, 23	noon . .	50 47	23 33	15·0	19·67	35·54	—	—
3292	,,	,, 23	midnight	51 10	17 27	15·0	19·65	35·50	—	—
3293	,,	,, 24	noon . .	51 20	11 29	14·4	19·63	35·47	—	—
3294	Anchoria .	July 31	,,	55 10	14 4	15·0	19·63	35·47	—	—
3295	,,	Aug. 1	,,	54 36	22 11	14·4	19·59	35·40	—	—
3296	,,	,, 2	,,	53 39	29 47	13·3	19·49	35·21	—	—
3297	,,	,, 3	,,	52 9	37 0	14·4	19·53	35·28	—	—
3298	,,	,, 4	,,	50 10	43 29	15·6	18·73	33·85	—	—
3299	,,	,, 5	,,	47 45	49 57	11·7	17·52	31·68	—	—
3300	,,	,, 6	,,	45 4	55 26	16·1	18·11	32·73	—	—
3301	,,	,, 7	,,	42 36	61 37	17·2	17·67	31·95	23·60	—
3302	,,	,, 8	,,	40 59	68 34	15·0	18·00	32·54	—	—
3303	,,	,, 15	,,	40 36	69 23	15·0	18·01	32·56	—	—
3304	,,	,, 16	,,	42 2	63 40	18·9	17·56	31·75	23·42	—
3305	,,	,, 17	,,	44 6	57 37	17·2	17·38	31·43	23·36	—
3306	,,	,, 18	,,	46 30	51 45	13·9	17·93	32·42	—	—
3307	,,	,, 19	,,	49 6	45 49	12·2	18·61	33·64	—	—
3308	,,	,, 20	,,	50 53	39 14	14·4	19·46	35·15	—	—
3309	,,	,, 21	,,	52 30	32 0	12·2	19·42	35·08	26·08	—
3310	,,	,, 22	,,	54 2	24 33	12·8	19·55	35·32	—	—
3311	,,	,, 23	,,	54 50	16 29	13·9	19·61	35·43	26·30	—
3312	,,	,, 24	,,	55 16	8 26	13·9	19·47	35·17	—	—
3313	Siberian . .	,, 1	,,	off Kinsale Hd., Ireland		17·8	19·44	35·12	—	—
3314	,,	,, 2	,,	51° 36′	15° 56′	18·3	19·72	35·63	—	—
3315	,,	,, 3	,,	51 44	23 23	15·6	19·26	34·80	—	—
3316	,,	,, 4	,,	51 46	29 51	14·4	19·82	35·80	26·58	—
3317	,,	,, 5	,,	51 18	37 0	15·0	19·68	35·56	—	—
3318	,,	,, 6	,,	50 · 1	43 35	16·7	18·79	33·96	—	—
3319	,,	,, 7	,,	48 10	49 48	11·1	17·46	31·57	23·54	—
3320	,,	,, 9	,,	off C. Spear., Newfoundland		16·1	17·40	31·47	—	—
3321	,,	,, 10	,,	45° 30′	58° 15′	16·7	16·78	30·37	22·42	—
3322	,,	,, 13	,,	41 17	66 53	15·6	18·09	32·70	—	—
3323	,,	,, 14	,,	39 8	72 18	23·9	18·93	34·21	—	—
3324	,,	,, 20	,,	38 52	74 3	23·9	17·20	31·11	—	—
3325	,,	,, 21	,,	40 7	69 5	22·2	17·21	31·13	—	—
3326	,,	,, 22	,,	41 38	64 0	19·4	18·97	34·28	—	—
3327	,,	,, 23	,,	43 36	59 7	20·0	17·46	31·57	23·39	—
3328	,,	,, 24	,,	45 58	54 0	15·0	17·52	31·68	—	—
3329	,,	,, 25	,,	48 12	51 5	11·7	17·43	31·52	—	—
3330	,,	,, 26	,,	50 12	45 32	14·4	19·25	35·78	—	—
3331	,,	,, 27	,,	52 3	39 15	12·2	19·45	35·14	—	—
3332	,,	,, 28	,,	53 25	32 23	11·7	19·56	35·34	26·28	—
3333	,,	,, 29	,,	54 25	25 20	16·1	19·64	35·48	—	—
3334	,,	,, 30	,,	55 11	17 55	15·6	19·60	35·41	—	—
3335	,,	,, 31	,,	55 19	10 10	13·9	—	—	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3336	Siberian . .	Sept. 1	2 A.M. .	off Ails	a Craig	13·9	18·58	33·58	—	—
3337	Laura . .	Aug. 22	8 P.M. .	59° 28′	3° 3′	12·3	19·57	35·36	—	—
3338	,,	,, 23	4 A.M. .	60 6	3 43	12·0	19·60	35·41	—	—
3339	,,	,, 23	noon . .	60 55	5 29	12·0	19·49	35·21	—	—
3340	,,	,, 24	4 A.M .	61 56	6 45	10·3	19·46	35·14	26·12	—
3341	,,	,, 25	8 P.M. .	62 24	7 26	11·3	19·45	35·14	—	—
3342	,,	,, 26	4 A.M. .	62 31	10 24	11·5	19·41	35·07	—	—
3343	,,	,, 26	noon . .	62 41	13 32	12·0	19·47	35·17	—	—
3344	,,	,, 26	8 P.M. .	62 48	16 28	12·2	19·46	35·14	26·06	—
3345	,,	,, 27	4 A.M. .	62 50	19 18	11·5	19·54	35·30	—	—
3346	,,	,, 27	noon . .	63 37	21 14	11·5	19·20	34·69	—	—
3347	,,	,, 27	8 P.M. .	64 14	22 34	11·0	18·98	34·30	25·53	—
3348	,,	Sept. 2	4 A.M. .	64 8	23 0	10·2	19·16	34·62	—	—
3349	,,	,, 2	noon . .	63 30	20 52	11·0	18·78	33·94	25·21	—
3350	,,	,, 2	8 P.M. .	63 20	19 33	10·5	18·81	34·00	—	—
3351	,,	,, 3	4 A.M. .	63 0	16 51	10·3	19·47	35·17	—	—
3352	,,	,, 3	noon . .	62 42	14 9	10·5	19·46	35·15	26·12	—
3353	,,	,, 3	8 P.M. .	62 36	11 24	10·0	19·51	35·25	—	—
3354	,,	,, 4	4 A.M. .	62 25	8 46	9·5	19·53	35·28	—	—
3355	,,	,, 4	noon . .	62 20	7 0	9·5	19·53	35·28	—	—
3356	,,	,, 5	4 A.M. .	61 56	6 35	9·5	19·52	35·27	—	—
3357	,,	,, 5	noon . .	61 10	5 12	10·0	19·50	35·23	—	—
3358	,,	,, 6	4 A.M. .	60 12	3 33	11·0	19·47	35·17	—	—
3359	,,	,, 6	noon . .	59 41	2 40	11·5	19·60	35·41	—	—
3360	Teutonic . .	,, 2	midnight	51 24	15 0	14·4	19·78	35·73	—	—
3361	,,	,, 3	noon . .	51 19	21 19	13·3	19·81	35·79	26·60	—
3362	,,	,, 3	midnight	50 37	27 46	12·2	19·72	35·63	—	—
3363	,,	,, 4	noon . .	50 0	33 55	16·7	19·60	35·41	—	—
3364	,,	,, 4	midnight	48 45	39 50	18·9	19·14	34·58	—	—
3365	,,	,, 5	noon . .	47 10	45 51	13·3	18·35	33·17	—	—
3366	,,	,, 5	midnight	45 3	51 0	14·4	18·00	32·54	—	—
3367	,,	,, 6	noon . .	43 47	57 11	17·8	16·72	30·24	22·22	—
3368	,,	,, 6	midnight	42 23	62 40	20·0	18·03	32·59	—	—
3369	,,	,, 7	noon . .	40 58	67 56	16·7	18·04	32·61	—	—
3370	,,	,, 7	midnight	off Fire	Island	20·0	17·11	30·95	22·92	—
3371	,,	,, 15	,,	40° 9′	69° 55′	18·3	18·73	33·85	—	—
3372	,,	,, 16	noon . .	41 4	65 4	17·8	17·67	31·95	23·65	—
3373	,,	,, 16	midnight	42 15	61 10	16·7	18·03	32·59	—	—
3374	,,	,, 17	noon . .	43 30	55 23	17·8	17·90	32·37	—	—
3375	,,	,, 17	midnight	44 48	50 33	15·0	17·98	32·51	—	—
3376	,,	,, 18	noon . .	46 2	45 40	15·0	18·24	32·97	—	—
3377	,,	,, 18	midnight	47 35	40 33	18·9	19·44	35·12	—	—
3378	,,	,, 19	noon . .	49 5	35 22	17·2	19·60	35·41	—	—
3379	,,	,, 19	midnight	49 56	29 50	16·7	19·56	35·34	—	—
3380	,,	,, 20	noon . .	50 35	23 34	15·6	19·67	35·54	26·34	—
3381	,,	,, 20	midnight	51 2	17 22	15·0	19·64	35·48	—	—
3382	,,	,, 21	noon . .	51 24	11 12	14·4	19·65	35·50	—	—
					E.					
3383	Balaena . .	Apr. 19	4 P.M. .	64 40	2 0	7·8	19·45	35·14	—	—
3384	,,	,, 20	noon . .	66 22	2 40	6·1	19·41	35·07	—	—
3385	,,	,, 21	,,	68 40	2 50	5·0	19·40	35·05	26·04	—
3386	,,	,, 22	,,	71 40	2 50	3·1	19·36	34·98	—	—
3387	,,	,, 23	,,	74 5	3 0	2·2	19·25	34·78	—	—
3388	,,	,, 24	,,	76 40	2 30	2·2	19·35	34·96	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	E.					
3389	Balaena . .	Apr. 25	noon . .	77° 40′	1° 0′	0·6	19·31	34·89	—	—
3390	,,	,, 26	,,	78 30	0 0	−1·1	19·13	34·56	—	—
3391	,,	,, 27	,,	79 10	1 0	0·0	19·00	34·33	—	—
3392	,,	,, 28	,,	79 0	1 30	0·3	19·06	34·44	25·58	—
3393										
					W.					
3394	,,	May 1	1 P.M. .	78 30	0 30	0·0	18·78	33·94	—	—
3395	,,	,, 19	,,	77 55	3 30	0·0	19·13	34·96	—	—
3396	,,	,, 20	,,	77 6	4 30	−0·6	18·97	34·28	—	—
3397	,,	,, 21	,,	76 25	6 20	−0·1	18·99	34·32	—	—
3398	,,	,, 22	,,	76 20	5 0	−0·2	18·94	34·23	25·40	—
3399	,,	,, 23	,,	77 30	3 30	0·3	19·19	34·67	—	—
					E.					
3400	,,	,, 24	,,	78 30	0 20	0·6	19·38	35·01	—	—
3401	,,	,, 25	,,	79 20	1 30	0·1	19·21	34·71	—	—
3402	,,	,, 26	,,	79 45	2 0	0·4	19·02	34·37	—	—
3403	,,	,, 27	,,	78 40	0 0	0·6	19·08	34·47	25·58	—
3404	,,	,, 30	,,	78 35	0 20	0·0	19·08	34·47	—	—
					W.					
3405	,,	June 1	,,	78 11	2 0	0·3	19·09	34·49	—	—
3406	,,	,, 2	,,	78 30	1 0	0·0	18·89	34·14	—	—
					E.					
3407	,,	,, 3	,,	79 20	3 10	0·0	18·88	34·12	—	—
3408	,,	,, 4	,,	79 10	2 30	−0·6	18·82	34·01	—	—
3409	,,	,, 5	,,	78 50	1 20	−0·6	18·92	34·19	—	—
3410	,,	,, 6	,,	78 40	0 50	0·3	19·10	34·51	25·50	—
3411	,,	,, 7	,,	78 38	0 0	0·0	18·96	34·26	—	—
					W.					
3412	,,	,, 8	,,	78 32	0 50	0·6	18·96	34·26	—	—
3413	,,	,, 10	,,	77 15	1 20	0·6	19·11	34·53	—	—
3414	,,	,, 11	,,	76 0	6 20	1·1	19·03	34·39	—	—
3415	,,	,, 12	,,	74 45	10 0	0·6	18·98	34·30	—	—
3416	,,	,, 13	,,	74 50	12 0	0·0	18·73	33·85	25·12	—
3417	,,	,, 15	,,	74 45	13 0	−0·6	18·62	33·66	—	—
3418	,,	,, 17	,,	74 24	13 0	−0·1	18·53	33·49	—	—
3419	,,	,, 18	,,	74 4	14 40	0·0	18·55	33·53	—	—
3420	,,	,, 22	,,	75 10	12 0	0·3	18·67	33·75	—	—
3421	,,	,, 24	,,	73 36	15 30	0·8	18·38	33·22	—	—
3422	,,	,, 25	,,	73 5	13 0	2·8	18·67	33·75	—	—
3423	,,	,, 26	,,	73 10	6 0	1·1	18·75	33·89	—	—
3424	,,	,, 27	,,	73 10	0 0	2·5	19·05	34·42	—	—
					E.					
3425	,,	,, 28	,,	73 30	8 0	5·6	19·35	34·96	—	—
3426	,,	,, 29	,,	74 0	15 0	6·1	19·40	35·05	26·04	—
3427	,,	,, 30	4 P.M. .	75 0	20 0	0·6	18·58	33·58	—	—
3428	,,	July 2	1 P.M. .	75 50	28 0	2·2	18·60	33·62	24·98	—
3429	,,	,, 3	,,	76 2	31 0	0·6	17·57	31·77	—	—
3430	,,	,, 4	,,	76 0	37 30	0·0	17·73	32·06	—	—
3431	,,	,, 5	,,	76 40	44 0	0·6	17·84	32·26	—	—
3432	,,	,, 6	,,	78 20	47 0	0·6	18·60	33·62	—	—
3433	,,	,, 7	,,	79 35	50 0	0·8	18·70	33·80	—	—
3434	,,	,, 11	,,	80 0	48 0	1·4	18·48	33·41	24·67	—
3435	,,	Aug. 13	,,	77 50	34 0	0·0	16·64	30·11	22·20	—
3436	,,	,, 14	,,	76 30	31 0	1·7	17·65	31·92	—	—
3437	,,	,, 15	,,	76 0	31 30	2·8	17·99	32·53	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	E.					
3438	Balaena . .	Aug. 16	1 P.M. .	75° 30′	32° 30′	4·4	19·21	34·71	—	—
3439	,,	,, 17	,,	73 30	36 0	6·4	19·45	35·14	—	—
3440	,,	,, 18	,,	71 40	29 0	8·9	19·06	34·44	—	—
3441	,,	,, 20	,,	70 20	23 0	10·0	18·48	33·41	—	—
3442	,,	,, 21	,,	70 10	17 10	10·0	19·12	34·54	—	—
3443	,,	,, 22	,,	68 40	12 0	12·2	18·81	34·00	—	—
3444	,,	,, 23	,,	67 0	9 10	13·3	18·66	33·73	—	—
3445	,,	,, 24	,,	65 20	7 30	12·8	18·60	33·62	—	—
3446	,,	,, 25	,,	64 6	6 30	13·3	18·65	33·71	—	—
3447	,,	,, 26	,,	62 48	4 0	13·6	18·82	34·01	—	—
					W.					
3448	Anchoria. .	Sept. 4	noon . .	55 14	14 11	13·3	19·78	35·73	—	—
3449	,,	,, 5	,,	54 42	21 41	13·3	19·65	35·50	—	—
3450	,,	,, 6	,,	53 40	29 33	12·8	19·62	35·45	—	—
3451	,,	,, 7	,,	51 57	37 23	12·8	19·59	35·40	—	—
3452	,,	,, 8	,,	49 57	43 49	15·0	19·50	35·23	—	—
3453	,,	,, 9	,,	47 34	49 52	11·7	17·52	31·68	—	—
3454	,,	,, 10	,,	45 2	55 58	13·9	17·97	32·49	—	—
3455	,,	,, 11	,,	42 34	62 17	17·8	17·81	32·21	23·79	—
3456	,,	,, 12	,,	40 51	69 0	17·2	18·30	33·08	—	—
3457	,,	,, 19	,,	40 28	68 45	16·1	17·95	32·46	—	—
3458	,,	,, 20	,,	41 54	63 0	20·0	18·64	33·69	—	—
3459	,,	,, 21	,,	43 59	57 24	15·6	17·94	32·44	—	—
3460	,,	,, 22	,,	46 35	51 32	11·7	17·40	31·47	—	—
3461	,,	,, 23	,,	49 7	46 3	11·1	18·81	34·00	—	—
3462	,,	,, 24	,,	51 16	39 26	11·7	19·18	34·65	—	—
3463	,,	,, 25	,,	52 57	32 16	11·7	19·45	35·14	26·10	—
3464	,,	,, 26	,,	54 9	24 33	12·8	19·61	35·43	—	—
3465	,,	,, 27	,,	54 51	16 14	12·8	19·70	35·59	—	—
3466	,,	,, 28	,,	55 4	8 41	13·9	19·45	35·14	—	—
3467	Traveller. .	July 28	,,	57 46	17 31	13·6	19·55	35·32	—	—
3468	,,	,, 29	,,	57 38	13 28	13·6	19·52	35·27	—	—
3469	,,	,, 30	,,	58 7	11 14	13·4	19·58	35·38	—	—
3470	,,	,, 31	,,	58 28	10 38	13·9	19·56	35·34	26·23	—
3471	,,	Aug. 1	,,	58 36	7 56	13·9	19·57	35·36	—	—
3472	,,	,, 2	,,	58 36	5 30	13·8	19·43	35·10	—	—
3473	,,	,, 30	,,	58 41	7 2	12·8	19·55	35·32	—	—
3474	,,	,, 31	,,	59 25	12 16	12·2	19·50	35·23	26·23	—
3475	,,	Sept. 1	,,	59 7	18 30	12·2	19·44	35·12	—	—
3476	,,	,, 2	,,	58 40	22 46	12·2	19·51	35·25	—	—
3477	,,	,, 3	,,	58 31	25 59	11·9	19·50	35·23	—	—
3478	,,	,, 4	,,	59 33	28 54	10·6	19·42	35·08	—	—
3479	,,	,, 5	,,	59 50	30 18	10·0	19·39	35·03	—	—
3480	,,	,, 6	,,	59 25	32 44	10·0	19·33	34·93	—	—
3481	,,	,, 7	,,	59 6	35 0	9·7	19·31	34·89	—	—
3482	,,	,, 8	,,	58 32	39 27	9·3	19·28	34·84	—	—
3483	,,	,, 9	,,	58 22	44 40	8·1	19·17	34·63	25·75	—
3484	,,	,, 10	,,	58 55	46 38	8·1	19·21	34·71	—	—
3485	,,	,, 11	,,	59 30	47 35	7·3	19·15	34·60	—	—
3486	,,	,, 12	,,	61 0	48 40	1·4	17·03	30·80	22·93	—
3487	,,	,, 24	,,	59 40	49 13	6·7	19·15	34·60	—	—
3488	,,	,, 25	,,	58 27	45 55	7·1	19·35	34·96	—	—
3489	,,	,, 26	,,	58 8	43 40	7·1	19·27	34·82	—	—
3490	,,	,, 27	,,	58 1	38 38	8·1	19·31	34·89	—	—
3491	,,	,, 28	,,	57 48	34 36	9·2	19·36	34·98	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3492	Traveller .	Sept. 29	noon . .	57° 47′	33° 12′	10·1	19·51	31·25	—	—
3493	,,	,, 30	,,	58 28	31 46	9·7	19·33	34·93	—	—
3494	,,	Oct. 1	,,	58 40	30 23	10·0	19·36	34·98	—	—
3495	,,	,, 2	,,	58 40	25 45	11·1	19·50	35·23	—	—
3496	,,	,, 3	,,	58 47	21 41	11·6	19·51	35·25	—	—
3497	,,	,, 4	,,	59 7	18 19	11·4	19·49	35·21	—	—
3498	,,	,, 5	,,	59 37	16 31	11·1	19·45	35·14	—	—
3499	,,	,, 6	,,	58 57	12 14	11·7	19·53	35·28	—	—
3500	,,	,, 7	,,	58 18	8 4	11·9	19·39	35·03	25·95	—
3501	,,	,, 8	,,	Pentland Firth		11·8	19·21	34·71	—	—
					E.					
3502	,,	,, 9	,,	58° 2′	0° 52′	11·1	19·57	35·36	—	—
3503	,,	,, 10	,,	57 54	4 33	11·3	18·89	34·14	—	—
					W.					
3504	Siberian . .	Sept. 12	,,	51 40	8 22	14·4	19·59	34·50	—	—
3505	,,	,, 13	,,	51 44	15 33	15·0	19·67	35·54	—	—
3506	,,	,, 14	,,	51 48	22 22	15·0	19·56	35·34	—	—
3507	,,	,, 15	,,	51 37	28 26	13·9	19·59	35·40	—	—
3508	,,	,, 16	,,	51 5	35 20	13·9	19·44	35·12	—	—
3509	,,	,, 17	,,	50 7	42 3	15·6	19·40	35·05	—	—
3510	,,	,, 18	,,	48 47	48 32	10·6	18·71	33·82	—	—
3511	,,	,, 21	,,	off Ferryland Point, Newfoundland		12·8	17·05	30·83	22·77	—
3512	,,	,, 22	,,	45° 42′	55° 39′	12·2	17·82	32·22	—	—
3513	,,	,, 23	,,	off Green Id. Nova Scotia		15·0	16·34	29·58	—	—
3514	,,	,, 25	,,	42° 21′	65° 30′	15·0	17·45	31·56	23·25	—
3515	,,	,, 26	,,	39 51	70 20	19·4	19·23	34·74	—	—
3516	,,	Oct. 3	,,	39 6	72 35	18·9	18·98	34·30	—	—
3517	,,	,, 4	,,	40 20	68 50	15·6	18·33	33·13	—	—
3518	,,	,, 5	,,	41 42	64 12	15·6	17·85	32·28	—	—
3519	,,	,, 6	,,	43 28	59 9	13·3	17·03	30·80	—	—
3520	,,	,, 7	,,	45 50	54 56	12·2	17·87	32·31	—	—
3521	,,	,, 9	,,	49 17	48 20	6·7	18·76	33·90	—	—
3522	,,	,, 10	,,	51 17	42 19	15·6	19·57	35·36	—	—
3523	,,	,, 11	,,	52 30	36 24	10·0	19·32	34·91	26·00	—
3524	,,	,, 12	,,	53 49	29 43	11·1	19·54	35·30	—	—
3525	,,	,, 13	,,	55 0	22 50	13·3	19·68	35·56	—	—
3526	,,	,, 14	,,	55 20	19 0	7·8	19·67	35·54	—	—
3527	,,	,, 15	,,	55 33	16 25	11·1	19·64	35·48	—	—
3528	,,	,, 16	,,	56 0	13 30	11·1	19·64	35·48	—	—
3529	,,	,, 17	,,	off Mull of Kintyre		13·9	18·79	33·96	—	—
3530	Teutonic .	Sept. 30	midnight	51° 23′	15° 30′	13·9	19·67	35·54	—	—
3531	,,	Oct. 1	noon . .	51 22	21 14	15·6	19·91	35·97	—	—
3532	,,	,, 1	midnight	50 13	27 5	15·0	19·73	35·64	—	—
3533	,,	,, 2	noon . .	50 5	33 27	14·4	19·50	35·23	—	—
3534	,,	,, 2	midnight	48 50	38 20	16·1	19·75	35·68	—	—
3535	,,	,, 3	noon . .	47 34	44 19	10·6	18·69	33·78	25·10	—
3536	,,	,, 3	midnight	46 0	49 10	12·2	18·03	32·59	—	—
3537	,,	,, 4	noon . .	44 26	54 56	14·4	18·21	32·91	—	—
3538	,,	,, 4	midnight	42 50	60 26	12·8	17·27	31·23	—	—
3539	,,	,, 5	noon . .	41 36	65 56	16·7	18·21	32·91	—	—
3540	,,	,, 5	midnight	off Fire Id.		16·1	18·34	33·15	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3541	Teutonic .	Oct. 13	midnight	40° 10′	70° 0′	20·0	19·68	35·56	—	—
3542	,,	,, 14	noon . .	40 58	65 17	16·7	18·22	32·93	—	—
3543	,,	,, 14	midnight	42 10	60 10	15·6	17·89	32·35	—	—
3544	,,	,, 15	noon . .	43 23	55 40	15·6	18·40	33·26	—	—
3545	,,	,, 15	midnight	44 47	50 3	12·2	18·01	32·56	—	—
3546	,,	,, 16	noon .	46 12	45 51	11·1	18·49	33·43	—	—
3547	,,	,, 16	midnight	47 32	40 50	17·8	19·66	35·52	—	—
3548	,,	,, 17	noon . .	48 51	35 39	16·7	19·76	35·70	—	—
3549	,,	,, 17	midnight	49 48	29 55	15·0	19·78	35·73	—	—
3550	,,	,, 18	noon . .	50 45	24 37	15·6	19·76	35·70	—	—
3551	,,	,, 18	midnight	51 3	18 30	15·0	19·74	35·66	—	—
3552	,,	,, 19	noon . .	51 20	12 23	15·0	19·72	35·63	—	—
3553	Laura . .	Sept. 27	4 A.M. .	59 36	2 28	11·0	19·39	35·03	—	—
3554	,,	,, 27	noon . .	60 20	3 57	10·0	19·60	35·41	—	—
3555	,,	,, 27	8 P.M. .	61 21	5 52	9·5	19·47	35·17	—	—
3556	,,	,, 28	4 A.M. .	61 57	6 45	9·5	19·49	35·21	26·17	—
3557	,,	,, 30	,,	62 24	6 50	9·0	19·46	35·15	—	—
3558	,,	,, 30	noon . .	62 29	8 25	9·0	19·44	35·12	—	—
3559	,,	,, 30	8 P.M. .	62 35	10 53	9·0	19·50	35·23	—	—
3560	,,	Oct. 1	4 A.M. .	62 39	13 32	9·0	19·46	35·15	26·16	—
3561	,,	,, 1	noon . .	63 2	16 56	9·3	19·34	34·94	—	—
3562	,,	,, 1	8 P.M. .	63 16	18 46	8·5	18·53	33·49	—	—
3563	,,	,, 2	4 A.M. .	63 18	21 16	8·5	19·26	34·80	—	—
3564	,,	,, 2	noon . .	64 12	22 33	8·5	18·31	33·10	24·61	—
3565	,,	,, 6	8 P.M. .	64 33	24 10	9·0	19·43	35·10	—	—
3566	,,	,, 7	4 A.M. .	65 45	24 55	8·0	18·38	35·01	—	—
3567	,,	,, 10	noon . .	66 2	23 53	7·3	18·96	34·26	25·33	—
3568	,,	,, 15	4 A.M. .	65 8	23 26	5·2	19·30	34·87	—	—
3569	,,	,, 15	noon . .	65 18	23 12	6·3	19·19	34·67	—	—
3570	,,	,, 18	,,	64 58	24 10	6·2	19·26	34·80	—	—
3571	,,	,, 18	8 P.M. .	64 15	22 26	7·7	19·33	34·93	—	—
3572	,,	,, 20	,,	64 11	22 26	7·5	19·20	34·69	—	—
3573	,,	,, 21	4 A.M. .	63 40	21 47	7·0	19·43	35·10	—	—
3574	,,	,, 21	8 P.M. .	63 6	19 36	8·4	19·50	35·23	—	—
3575	,,	,, 22	4 A.M. .	62 52	16 54	9·0	19·44	35·12	—	—
3576	,,	,, 22	noon . .	62 42	14 8	9·0	19·46	35·15	26·11	—
3577	,,	,, 22	8 P.M. .	62 33	11 14	9·0	19·49	35·21	—	—
3578	,,	,, 23	4 A.M. .	62 23	8 25	7·5	19·43	35·10	—	—
3579	,,	,, 23	noon . .	62 38	7 5	8·0	19·54	35·30	—	—
3580	,,	,, 24	,,	61 56	6 41	8·0	19·57	35·36	—	—
3581	,,	,, 24	8 P.M. .	61 3	5 15	8·0	19·45	35·14	—	—
3582	,,	,, 25	4 A.M. .	60 15	3 47	8·7	19·57	35·36	—	—
3583	Anchoria .	,, 9	noon . .	55 23	14 7	12·2	19·64	35·48	—	—
3584	,,	,, 10	,,	54 41	21 51	12·8	19·56	35·34	—	—
3585	,,	,, 11	,,	53 36	30 21	12·2	19·47	35·17	—	—
3586	,,	,, 12	,,	51 56	38 0	11·7	19·24	34·76	25·73	—
3587	,,	,, 13	,,	49 48	44 17	11·1	18·77	33·92	—	—
3588	,,	,, 14	,,	47 47	50 13	6·7	17·54	31·71	—	—
3589	,,	,, 15	,,	44 47	55 58	10·6	17·89	32·35	—	—
3590	,,	,, 16	,,	42 32	62 21	13·3	17·42	31·51	23·24	—
3591	,,	,, 17	,,	40 48	68 11	12·8	18·02	32·58	—	—
3592	,,	,, 24	,,	40 40	68 54	12·8	17·93	32·42	—	—
3593	,,	,, 25	,,	41 55	63 6	12·8	18·26	33·00	—	—
3594	,,	,, 26	,,	44 11	57 47	6·7	18·00	32·54	24·08	—
3595	,,	,, 27	,,	46 24	52 10	5·0	17·75	32·09	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3596	Anchoria .	Oct. 28	noon . .	48° 55′	42° 26′	7·2	18·87	34·10	—	—
3597	,,	,, 29	,,	51 4	39 51	11·1	19·16	34·62	—	—
3598	,,	,, 30	,,	52 44	32 14	10·6	19·34	34·94	25·90	—
3599	,,	,, 31	,,	54 6	24 14	12·2	19·58	35·38	—	—
3600	,,	Nov. 1	,,	54 57	16 0	12·8	19·61	35·43	—	—
3601	,,	,, 2	,,	55 22	7 39	12·2	19·46	35·15	—	—
3602	Teutonic . .	Oct. 28	midnight	51 25	14 0	15·0	19·67	35·54	—	—
3603	,,	,, 29	noon . .	51 25	20 45	14·4	19·64	35·48	—	—
3604	,,	,, 29	midnight	50 50	26 48	14·4	19·67	35·54	—	—
3605	,,	,, 30	noon . .	50 15	32 51	13·9	19·51	35·25	—	—
3606	,,	,, 30	midnight	48 21	38 21	15·0	19·57	35·36	—	—
3607	,,	,, 31	noon . .	47 33	43 49	9·4	18·72	33·83	—	—
3608	,,	,, 31	midnight	45 57	49 52	8·3	17·89	32·35	—	—
3609	,,	Nov. 1	noon . .	44 24	55 54	9·4	18·33	33·13	—	—
3610	,,	,, 1	midnight	43 2	60 50	13·9	18·28	33·04	—	—
3611	,,	,, 2	noon . .	41 40	65 45	12·2	17·44	31·54	23·35	—
3612	,,	,, 2	midnight	50 miles W. Nantucket		13·9	17·90	32·37	—	—
3613	,,	,, 10	,,	40° 10′	70° 0′	13·9	18·40	33·26	—	—
3614	,,	,, 11	noon . .	41 1	64 56	13·3	18·11	32·73	—	—
3615	,,	,, 11	midnight	42 14	59 50	12·8	18·03	32·59	—	—
3616	,,	,, 12	noon . .	43 26	55 26	12·8	18·33	33·13	—	—
3617	,,	,, 12	midnight	44 56	50 40	8·3	17·84	32·26	23·93	—
3618	,,	,, 13	noon . .	46 15	45 50	8·3	18·40	33·26	—	—
3619	,,	,, 13	midnight	47 35	40 53	14·4	18·96	34·26	—	—
3620	,,	,, 14	noon . .	48 48	35 57	15·6	19·57	35·36	—	—
3621	,,	,, 14	midnight	49 55	30 37	14·4	19·47	35·17	—	—
3622	,,	,, 15	noon . .	50 35	25 15	14·4	19·50	35·23	—	—
3623	,,	,, 15	midnight	50 58	19 50	13·9	19·61	35·43	—	—
3624	,,	,, 16	noon . .	51 14	13 39	14·4	19·53	35·28	—	—
3625	Eclipse . .	Apr. 20	,,	58 57	8 0	9·7	19·40	35·05	26·08	—
3626	,,	,, 21	,,	59 2	12 5	9·4	19·57	35·36	—	—
3627	,,	,, 22	,,	59 16	16 13	9·1	19·62	35·45	—	—
3628	,,	,, 23	,,	59 51	21 25	9·2	19·57	35·36	—	—
3629	,,	,, 24	,,	59 25	23 21	8·7	19·53	35·28	26·21	—
3630	,,	,, 25	,,	59 10	26 38	7·7	19·49	35·21	—	—
3631	,,	,, 26	,,	59 17	29 26	7·2	19·50	35·23	—	—
3632	,,	,, 27	,,	58 34	30 12	4·4	19·49	35·21	—	—
3633	,,	,, 28	,,	58 12	31 20	7·5	19·46	35·15	—	—
3634	,,	,, 29	,,	56 36	31 32	7·2	19·51	35·25	26·14	—
3635	,,	,, 30	,,	56 24	32 0	7·5	19·52	35·27	—	—
3636	,,	May 1	,,	57 30	31 20	6·8	19·64	35·48	—	—
3637	,,	,, 2	,,	57 50	30 32	7·2	19·54	35·30	—	—
3638	,,	,, 3	,,	58 15	30 27	7·2	19·57	35·36	—	—
3639	,,	,, 4	,,	58 47	30 0	7·5	19·56	35·34	—	—
3640	,,	,, 5	,,	58 49	30 45	6·7	19·49	35·21	—	—
3641	,,	,, 6	,,	59 7	32 43	6·8	19·47	35·17	—	—
3642	,,	,, 7	,,	60 51	35 1	5·3	19·40	35·05	—	—
3643	,,	,, 8	,,	—	—	6·0	19·48	35·19	26·11	—
3644	,,	,, 9	,,	60 31	40 39	4·3	19·19	34·67	—	—
3645	,,	,, 10	,,	58 26	42 22	3·1	19·05	34·42	—	—
3646	,,	,, 11	,,	57 49	43 31	3·9	19·32	34·91	—	—
3647	,,	,, 12	,,	58 30	46 36	2·9	19·15	34·60	25·83	—
3648	,,	,, 13	,,	—	—	1·9	19·00	34·33	—	—
3649	,,	,, 14	,,	58 24	—	3·2	19·38	35·01	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3650	Eclipse . .	May 15	noon . .	58° 36′	53° 44′	3·2	19·39	35·03	—	—
3651	,,	,, 16	,,	—	—	−1·0	18·66	33·73	25·01	—
3652	,,	,, 17	,,	60 53	57 55	−1·1	18·72	33·83	—	—
3653	,,	,, 18	,,	61 18	58 51	−1·0	18·74	33·87	—	—
3654	,,	,, 19	,,	62 0	58 15	−1·1	18·63	33·67	—	—
3655	,,	,, 20	,,	62 46	57 5	−1·1	18·52	33·48	—	—
3656	,,	,, 21	,,	63 10	56 30	−1·1	18·45	33·36	—	—
3657	,,	,, 22	,,	64 19	54 52	0·0	18·61	33·64	—	—
3658	,,	,, 23	,,	65 45	53 22	1·7	18·73	33·85	—	—
3659	,,	,, 24	,,	—	—	1·7	18·59	33·60	24·87	—
3660	,,	,, 25	,,	—	—	1·7	18·66	33·73	—	—
3661	,,	,, 26	,,	65 53	54 30	0·3	18·81	34·00	—	—
3662	,,	,, 27	,,	66 6	56 34	0·2	18·65	33·71	—	—
3663	,,	,, 28	,,	—	—	−0·6	18·59	33·60	—	—
3664	,,	,, 29	,,	67 51	55 10	−1·0	18·37	33·20	—	—
3665	,,	,, 30	,,	68 38	54 10	0·0	18·31	33·10	—	—
3666	,,	June 1	,,	—	—	0·8	18·02	32·58	—	—
3667	,,	,, 2	,,	70 38	54 50	−0·6	18·37	33·20	—	—
3668	,,	,, 3	,,	70 57	54 15	0·0	18·24	32·97	—	—
3669	,,	,, 4	,,	71 6	55 3	0·1	17·86	32·30	—	—
3670	,,	,, 5	,,	72 7	56 3	−0·9	18·49	33·43	—	—
3671	,,	,, 6	,,	—	—	−0·7	18·32	33·11	—	—
3672	,,	,, 7	,,	—	—	0·0	18·45	33·36	—	—
3673	,,	,, 8	,,	73 40	57 20	−1·0	18·34	33·15	24·50	—
3674	,,	,, 9	,,	74 24	58 0	—	18·38	33·22	—	—
3675	,,	,, 10	,,	75 33	65 0	−0·6	18·47	33·39	—	—
3676	,,	,, 11	,,	76 15	70 0	—	18·53	33·49	—	—
3677	,,	,, 12	,,	—	—	5·0	18·52	33·48	—	—
3678	,,	,, 13	,,	75 11	73 20	−1·1	18·56	33·55	—	—
3679	,,	,, 14	,,	75 0	78 0	1·0	18·02	32·58	24·11	—
3680	,,	,, 15	,,	74 30	75 0	1·6	17·95	32·46	—	—
3681	,,	,, 16	,,	74 10	74 30	—	—	—	—	—
3682	,,	,, 17	,,	74 2	74 19	0·9	17·77	32·13	—	—
3683	,,	,, 18	,,	—	—	1·7	17·86	32·30	—	—
3684	,,	,, 19	,,	—	—	1·7	17·82	32·22	—	—
3685	,,	,, 20	,,	—	—	—	—	—	—	—
3686	,,	,, 21	,,	—	—	0·1	17·56	31·75	—	—
3687	,,	,, 22	,,	73 53	—	0·2	17·42	31·51	—	—
3688	,,	,, 23	,,	—	—	4·4	16·98	30·72	—	—
3689	,,	,, 24	,,	73 53	73 47	1·7	17·27	31·23	—	—
3690	,,	,, 25	,,	—	—	4·9	17·95	32·46	—	—
3691	,,	,, 26	,,	—	—	3·6	17·26	31·21	—	—
3692	,,	,, 27	,,	—	—	0·3	17·97	32·49	—	—
3693	,,	,, 28	,,	—	—	0·1	17·88	32·33	—	—
3694	,,	,, 29	,,	74 10	81 30	−1·1	17·90	32·37	—	—
3695	,,	,, 30	,,	—	—	−1·1	15·44	27·97	—	—
3696	,,	July 1	,,	74 10	81 30	−0·6	13·83	25·07	—	—
3697	,,	,, 2	,,	—	—	0·4	4·91	7·11	—	—
3698	,,	,, 3	,,	—	—	0·6	5·05	9·21	6·04	—
3699	,,	,, 4	,,	—	—	0·6	6·88	12·54	8·63	—
3700	,,	,, 5	,,	—	—	0·0	9·88	17·95	—	—
3701	,,	,, 6	,,	—	—	−0·3	16·56	29·96	—	—
3702	,,	,, 7	,,	73 45	77 50	0·6	17·72	32·04	—	—
3703	,,	,, 8	,,	72 45	76 4	0·8	18·29	33·06	—	—
3704	,,	,, 9	,,	73 22	73 3	1·1	17·56	31·75	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3705	Eclipse . .	July 10	noon . .	73° 30′	72° 50′	0·0	16·74	30·28	—	—
3706	,,	,, 11	,,	72 50	75 0	1·1	17·37	31·41	—	—
3707	,,	,, 12	,,	72 45	—	1·1	16·40	29·68	—	—
3708	,,	,, 13	,,	—	—	1·1	16·04	29·04	—	—
3709	,,	,, 14	,,	72 50	76 12	1·7	17·20	31·11	—	—
3710	,,	,, 15	,,	72 30	76 12	1·7	16·87	30·52	—	—
3711	,,	,, 16	,,	72 0	73 30	1·4	17·29	31·27	23·12	—
3712	,,	,, 17	,,	—	—	0·8	16·15	29·23	—	—
3713	,,	,, 18	,,	71 48	73 34	0·4	7·29	13·28	—	—
3714	,,	,, 19	,,	70 50	69 50	0·6	9·61	17·46	—	—
3715	,,	,, 20	,,	—	—	1·1	3·59	6·55	—	—
3716	,,	,, 21	,,	—	—	1·7	13·86	25·13	—	—
3717	,,	,, 22	,,	—	—	1·4	4·38	7·99	—	—
3718	,,	,, 23	,,	—	—	1·7	1·84	3·36	—	—
3719	,,	,, 24	,,	—	—	1·1	1·97	3·60	1·75	—
3720	,,	,, 25	,,	—	—	4·8	2·39	4·37	—	—
3721	,,	,, 26	,,	70 47	68 18	2·7	12·73	23·09	—	—
3722	,,	,, 27	,,	—	—	1·1	9·29	16·90	—	—
3723	,,	,, 28	,,	—	—	1·3	2·94	5·37	3·11	—
3724	,,	,, 29	,,	—	—	0·9	4·17	7·61	—	—
3725	,,	,, 30	,,	—	—	0·8	4·61	8·41	—	—
3726	,,	Aug. 1	,,	69 47	67 18	0·9	15·61	28·27	20·74	—
3727	,,	,, 2	,,	—	—	1·2	13·89	25·18	—	—
3728	,,	,, 3	,,	—	—	0·8	10·85	19·70	—	—
3729	,,	,, 4	,,	—	—	0·6	15·46	28·02	—	—
3730	,,	,, 5	,,	—	—	0·6	16·63	30·09	22·13	—
3731	,,	,, 6	,,	70 20	68 4	0·9	7·19	13·10	—	—
3732	,,	,, 7	,,	70 27	68 50	0·6	14·83	26·87	—	—
3733	,,	,, 8	,,	—	—	0·7	8·93	16·24	11·51	—
3734	,,	,, 9	,,	—	—	4·3	7·21	13·13	—	—
3735	,,	,, 10	,,	—	—	1·7	12·61	22·87	—	—
3736	,,	,, 11	,,	—	—	3·9	8·88	16·15	—	—
3737	,,	,, 12	,,	70 36	68 28	3·3	13·29	24·11	—	—
3738	,,	,, 13	,,	—	—	5·0	4·64	8·46	5·61	—
3739	,,	,, 14	,,	—	—	—	—	—	—	—
3740	,,	,, 15	,,	—	—	5·8	4·77	8·70	—	—
3741	,,	,, 16	,,	70 40	71 10	5·8	11·09	20·14	—	—
3742	,,	,, 17	,,	—	—	5·7	0·46	0·84	99·72	—
3743	,,	,, 18	,,	—	—	5·8	—	—	—	—
3744	,,	,, 19	,,	—	—	5·8	0·06	0·11	—	—
3745	,,	,, 20	,,	—	—	5·7	1·37	2·50	—	—
3746	,,	,, 21	,,	—	—	5·7	—	—	—	—
3747	,,	,, 22	,,	—	—	5·8	0·16	0·29	—	—
3748	,,	,, 23	,,	70 50	—	4·7	10·28	18·68	—	—
3749	,,	,, 24	,,	70 57	70 41	4·3	11·38	20·66	—	—
3750	,,	,, 25	,,	71 13	70 39	3·9	15·79	28·60	—	—
3751	,,	,, 26	,,	71 45	73 40	4·3	12·65	22·94	—	—
3752	,,	,, 27	,,	—	—	4·2	13·11	23·78	17·25	—
3753	,,	,, 28	,,	—	—	4·1	13·16	23·87	—	—
3754	,,	,, 29	,,	—	—	5·1	12·53	22·73	—	—
3755	,,	,, 30	,,	—	—	3·9	15·77	28·56	—	—
3756	,,	Sept. 1	,,	71 55	74 35	3·3	14·37	26·05	—	—
3757	,,	,, 2	,,	—	—	0·1	14·43	26·16	—	—
3758	,,	,, 3	,,	—	—	—	—	—	—	—
3759	,,	,, 4	,,	—	—	2·9	14·83	26·87	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3760	Eclipse . .	Sept. 5	noon . . .	—	—	2·7	14·83	26·87	—	—
3761	,,	,, 6	,,	—	—	2·1	15·32	27·76	—	—
3762	,,	,, 7	,,	—	—	2·3	15·07	27·31	—	—
3763	,,	,, 8	,,	—	—	1·6	16·76	30·32	—	—
3764	,,	,, 9	,,	—	—	2·7	15·85	28·70	—	—
3765	,,	,, 10	,,	—	—	2·2	15·74	28·51	—	—
3766	,,	,, 11	,,	—	—	—	—	—	—	—
3767	,,	,, 12	,,	—	—	—	—	—	—	—
3768	,,	,, 13	,,	—	—	—	16·01	28·99	—	—
3769	,,	,, 14	,,	—	—	0·1	15·85	28·70	—	—
3770	,,	,, 15	,,	—	—	—	—	—	—	—
3771	,,	,, 16	,,	—	—	0·0	16·04	29·04	—	—
3772	,,	,, 17	,,	71° 50′	73° 56′	0·4	16·13	29·20	—	—
3773	,,	,, 18	,,	—	—	0·6	16·13	29·20	—	—
3774	,,	,, 19	,,	—	—	0·3	16·69	30·19	—	—
3775	,,	,, 20	,,	—	—	—	16·40	29·68	—	—
3776	,,	,, 20	,,	—	—	—	16·25	29·42	—	—
3777	,,	,, 20	,,	—	—	—	—	—	—	—
3778	,,	,, 23	,,	72 2	—	0·0	16·22	29·36	—	—
3779	,,	,, 24	,,	—	—	—	—	—	—	—
3780	,,	,, 25	,,	—	—	−0·3	15·21	26·94	—	—
3781	,,	,, 26	,,	71 44	73 40	0·1	16·27	29·46	—	—
3782	,,	,, 27	,,	—	—	0·6	16·42	29·72	—	—
3783	,,	,, 28	,,	70 40	69 58	0·0	16·00	28·97	—	—
3784	,,	,, 29	,,	—	—	—	—	—	—	—
3785	,,	,, 30	,,	70 20	68 8	0·2	16·75	30·30	—	—
3786	,,	Oct. 1	,,	70 17	68 9	0·1	16·69	30·19	22·27	—
3787	,,	,, 2	,,	—	—	—	—	—	—	—
3788	,,	,, 3	,,	70 4	67 15	0·3	16·77	30·34	—	—
3789	,,	,, 4	,,	69 32	67 42	0·1	16·93	30·62	—	—
3790										
3791										
3792	,,	,, 7	,,	69 26	66 10	−0·7	17·15	31·02	22·93	—
3793										
3794	,,	,, 9	,,	69 50	67 10	−0·7	16·80	30·40	—	—
3795	,,	,, 10	,,	70 17	68 9	−0·1	16·87	30·52	—	—
3796	,,	,, 11	,,	—	—	−0·6	16·75	30·30	—	—
3797	,,	,, 12	,,	70 4	67 15	−0·3	16·89	30·55	—	—
3798	,,	,, 13	,,	69 30	66 12	−0·6	17·72	32·04	—	—
3799	,,	,, 14	,,	—	—	−0·6	17·00	30·75	—	—
3800	,,	,, 15	,,	—	—	−0·3	17·06	30·85	—	—
3804	,,	,, 19	,,	69 10	66 40	−1·1	17·14	31·00	—	—
3808	,,	,, 23	,,	68 0	65 45	−1·1	17·41	31·49	—	—
3811	,,	,, 26	,,	66 25	62 0	−1·3	17·40	31·47	—	—
3813	,,	,, 28	,,	64 26	57 55	0·6	18·53	33·49	—	—
3814	,,	,, 29	,,	—	—	1·1	19·10	34·51	—	—
3815	,,	,, 30	,,	61 21	54 36	1·4	18·23	32·95	24·38	—
3816	,,	Nov. 1	,,	58 10	44 18	5·3	19·35	34·96	—	—
3817	,,	,, 2	,,	58 29	39 0	6·1	19·30	34·87	—	—
3818	,,	,, 3	,,	58 44	34 52	7·3	19·35	34·96	—	—
3819	,,	,, 4	,,	58 32	31 18	6·7	19·64	35·48	—	—
3820	,,	,, 5	,,	—	—	9·4	19·49	35·21	—	—
3821	,,	,, 6	,,	—	—	8·9	19·42	35·08	—	—
3822	,,	,, 7	,,	—	—	8·9	19·42	35·08	—	—
3823	,,	,, 8	,,	60 27	28 11	9·4	19·44	35·12	26·09	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3824	Eclipse . .	Nov. 9	noon . .	60° 29′	24° 44′	8·9	19·50	35·23	—	—
3825	,,	,, 10	,,	60 8	20 39	10·4	19·55	35·32	—	—
3826	,,	,, 11	,,	59 36	15 17	10·6	19·55	35·32	—	—
3827	,,	,, 12	,,	59 6	13 0	10·1	19·52	35·27	26·18	—
3828	,,	,, 13	,,	58 10	12 11	10·8	19·63	35·47	—	—
3829	,,	,, 14	,,	57 27	10 32	10·2	19·62	35·45	—	—
3831	,,	,, 16	,,	57 48	6 15	11·0	19·23	34·74	25·75	—
3832	California .	Oct. 13	,,	36 33	8 31	18·9	20·37	36·78	—	—
3833	,,	,, 13	midnight	37 15	11 4	18·9	20·07	36·25	27·18	—
3834	,,	,, 14	noon . .	37 58	13 36	18·9	20·01	36·14	—	—
3835	,,	,, 14	midnight	38 28	15 38	18·9	20·08	36·27	—	—
3836	,,	,, 15	noon . .	38 54	17 25	18·9	20·05	36·21	—	—
3837	,,	,, 15	midnight	39 24	18 51	18·3	20·07	36·25	—	—
3838	,,	,, 16	noon . .	39 55	20 18	18·3	20·04	36·19	—	—
3839	,,	,, 16	midnight	40 14	21 58	18·3	20·10	36·30	—	—
3840	,,	,, 17	noon . .	40 33	23 43	18·3	20·06	36·23	—	—
3841	,,	,, 17	midnight	41 1	26 7	17·8	19·91	35·97	26·96	—
3842	,,	,, 18	noon . .	41 29	28 32	17·8	19·97	36·07	—	—
3843	,,	,, 18	midnight	41 57	31 2	17·8	19·95	36·04	—	—
3844	,,	,, 19	noon . .	42 24	33 32	17·8	19·81	35·79	—	—
3845	,,	,, 19	midnight	42 36	35 39	17·8	19·87	35·89	—	—
3846	,,	,, 20	noon . .	42 52	37 48	17·8	19·81	35·79	—	—
3847	,,	,, 20	midnight	42 57	39 38	17·2	19·87	35·89	—	—
3848	,,	,, 21	noon . .	43 3	41 28	17·2	19·71	35·61	—	—
3849	,,	,, 21	midnight	43 10	43 56	17·2	19·67	35·54	—	—
3850	,,	,, 22	noon . .	43 18	46 25	19·4	19·65	35·50	—	—
3851	,,	,, 22	midnight	43 22	49 5	11·1	18·57	33·56	—	—
3852	,,	,, 23	noon . .	43 25	51 44	8·9	17·94	32·44	23·99	—
3853	,,	,, 23	midnight	43 1	54 33	14·4	19·03	34·39	25·52	—
3854	,,	,, 24	noon . .	42 37	57 22	13·3	18·67	33·75	—	—
3855	,,	,, 24	midnight	42 15	60 9	12·2	18·68	33·76	—	—
3856	,,	,, 25	noon . .	41 53	62 56	13·3	18·42	33·30	—	—
3857	,,	,, 25	midnight	41 22	65 48	11·1	17·53	31·70	—	—
3858	,,	,, 26	noon . .	40 51	68 44	11·1	17·94	32·44	—	—
3859	,,	,, 26	midnight	40 30	71 24	11·1	18·54	33·51	—	—
3860	,,	Nov. 5	,,	40 15	72 0	11·1	18·28	33·04	—	—
3861	,,	,, 6	noon . .	40 21	69 36	11·1	17·95	32·46	—	—
3862	,,	,, 6	midnight	40 36	67 2	11·1	17·37	31·41	—	—
3863	,,	,, 7	noon . .	40 46	64 28	16·7	19·77	35·72	—	—
3864	,,	,, 7	midnight	41 9	61 53	18·9	19·60	35·41	—	—
3865	,,	,, 8	noon . .	41 32	59 22	19·4	19·50	35·23	—	—
3866	,,	,, 8	midnight	42 3	56 59	19·4	19·15	34·60	—	—
3867	,,	,, 9	noon . .	42 34	54 15	17·8	18·89	34·14	—	—
3868	,,	,, 9	midnight	42 56	51 40	4·4	18·40	33·26	—	—
3869	,,	,, 10	noon . .	43 18	49 5	5·6	18·35	33·17	—	—
3870	,,	,, 10	midnight	43 25	46 12	15·6	19·61	35·43	—	—
3871	,,	,, 11	noon . .	43 34	43 19	16·7	19·53	35·28	—	—
3872	,,	,, 11	midnight	43 17	40 23	16·7	19·87	35·89	—	—
3873	,,	,, 12	noon . .	43 1	37 28	15·6	19·91	35·97	—	—
3874	,,	,, 12	midnight	42 36	34 54	15·0	19·91	35·97	—	—
3875	,,	,, 13	noon . .	42 11	32 8	14·4	20·07	36·25	26·92	—
3876	,,	,, 13	midnight	41 46	29 27	14·4	19·93	36·00	—	—
3877	,,	,, 14	noon . .	41 21	26 46	14·4	19·94	36·02	—	—
3878	,,	,, 14	midnight	40 51	23 18	14·4	20·11	36·31	—	—
3879	,,	,, 15	noon . .	40 20	21 50	14·4	19·90	35·95	26·78	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3880	California .	Nov. 15	midnight	39° 47′	19° 27′	15·6	20·21	36·49	—	—
3881	,,	,, 16	noon . .	39 14	17 4	15·6	20·16	36·40	—	—
3882	,,	,, 16	midnight	38 46	14 42	15·6	20·00	36·12	—	—
3883	,,	,, 17	noon . .	37 59	12 22	15·6	20·13	36·35	27·13	—
3884	,,	,, 17	midnight	37 14	10 5	15·6	20·15	36·39	—	—
3885	,,	,, 18	noon . .	36 29	7 48	15·6	20·19	36·46	—	—
3886	,,	,, 18	midnight	36 0	5 20	15·6	20·27	36·60	—	—
3887	Siberian . .	Oct. 24	noon . .	Galley Ireland, N.	Head, bearing W.	14·4	19·66	35·52	—	—
3888	,,	,, 25	,,	51° 43′	15° 47′	13·3	19·63	35·47	—	—
3889	,,	,, 26	,,	51 48	22 38	13·3	19·61	35·43	—	—
3890	,,	,, 27	,,	51 37	29 25	13·9	19·58	35·38	—	—
3891	,,	,, 28	,,	51 8	35 35	12·8	19·42	35·08	—	—
3892	,,	,, 29	,,	50 34	41 8	14·4	19·56	35·34	—	—
3893	,,	,, 30	,,	49 12	45 55	7·8	18·82	34·01	—	—
3894	,,	,, 31	,,	47 49	51 29	4·4	17·82	32·22	—	—
3895	,,	Nov. 2	,,	46 1	55 12	6·1	17·72	32·04	—	—
3896	,,	,, 3	,,	44 57	61 0	8·9	16·91	30·59	—	—
3897	,,	,, 5	,,	43 36	64 15	9·4	16·85	30·48	—	—
3898	,,	,, 6	,,	40 24	68 48	13·3	17·99	32·53	—	—
3899	,,	,, 7	,,	38 59	73 0	16·1	19·29	34·86	—	—
3900	,,	,, 13	,,	39 44	70 16	16·7	19·62	35·45	—	—
3901	,,	,, 14	,,	41 8	66 57	12·8	18·01	32·56	—	—
3902	,,	,, 15	,,	44 1	64 0	8·3	17·20	31·11	—	—
3903	,,	,, 16	,,	off Chebr Hali Nova	ieto Hd., fax, Scotia	7·2	17·25	31·19	—	—
3904	,,	,, 17	,,	42° 25′	58° 14′	6·1	17·42	31·51	—	—
3905	,,	,, 18	,,	off C. Newfou	Race, ndland	3·9	17·49	31·63	—	—
3906	,,	,, 19	,,	48° 33′	49° 55′	1·1	18·08	32·68	—	—
3907	,,	,, 20	,,	50 22	44 49	11·7	19·24	34·76	—	—
3908	,,	,, 21	,,	52 4	39 16	9·4	19·30	34·87	—	—
3909	,,	,, 22	,,	53 2	34 53	10·0	19·29	34·86	—	—
3910	,,	,, 23	,,	53 28	31 27	10·6	19·35	34·96	—	—
3911	,,	,, 24	,,	54 21	25 20	11·1	19·49	35·21	—	—
3912	,,	,, 25	,,	55 4	18 14	11·7	19·61	35·43	26·37	—
3913	,,	,, 26	,,	55 17	11 0	11·1	19·64	35·48	—	—
3914	,,	,, 27	,,	Mull Gallo	of way	11·7	18·91	34·17	—	—
3915	,,	,, 28	,,	in Crosby Liver	Channel pool	10·6	18·34	33·15	—	—
3916	,,	,, 29	,,	off Port Scot	patrick, land	10·0	19·14	34·58	—	—
3917	Anchoria .	,, 13	,,	55° 19′	14° 40	11·7	19·52	35·27	26·21	—
3918	,,	,, 14	,,	54 34	22 51	12·2	19·58	35·38	—	—
3919	,,	,, 15	,,	53 24	30 49	10·6	19·41	35·07	—	—
3920	,,	,, 16	,,	51 51	38 23	9·4	19·28	34·84	—	—
3921	,,	,, 17	,,	50 0	44 11	11·7	19·63	35·47	26·47	—
3922	,,	,, 18	,,	48 22	48 22	5·0	18·92	34·19	—	—
3923	,,	,, 19	,,	45 41	54 1	3·3	17·74	32·07	—	—
3924	,,	,, 20	,,	43 14	60 9	5·0	18·12	32·75	—	—
3925	,,	,, 21	,,	41 13	66 31	8·3	17·53	31·70	23·42	—
3926	,,	,, 22	,,	40 25	73 7	11·7	18·19	32·88	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3927	Anchoria .	Nov. 28	noon . .	40° 44′	68° 50′	9·4	18·05	32·63	—	—
3928	,,	,, 29	,,	41 56	63 27	6·1	17·52	31·68	—	—
3929	,,	,, 30	,,	43 42	58 17	6·1	17·94	32·44	—	—
3930	,,	Dec. 1	,,	46 16	53 11	1·7	17·76	32·11	—	—
3931	,,	,, 2	,,	48 46	47 10	3·9	19·10	34·51	—	—
3932	,,	,, 3	,,	50 59	40 25	12·2	19·52	35·27	—	—
3933	,,	,, 4	,,	52 8	35 55	7·2	19·20	34·69	—	—
3934	,,	,, 5	,,	53 12	33 43	7·2	19·45	35·14	26·14	—
3935	,,	,, 6	,,	53 45	30 54	9·4	19·41	35·07	—	—
3936	,,	,, 7	,,	54 31	23 35	10·0	19·65	35·50	—	—
3937	,,	,, 8	,,	54 48	15 32	10·6	19·68	35·56	—	—
3938	,,	,, 9	,,	55 17	8 5	10·0	19·47	35·17	—	—
3939	Laura . .	Nov. 16	4 A.M. .	60 10	3 32	8·0	19·44	35·12	—	—
3940	,,	,, 16	noon . .	61 8	5 31	7·5	19·45	35·14	—	—
3941	,,	,, 18	4 A.M. .	61 55	6 33	7·0	19·42	35·08	—	—
3942	,,	,, 23	8 P.M. .	62 27	8 51	6·5	19·48	35·19	26·10	—
3943	,,	,, 24	4 A.M. .	62 36	11 12	7·5	19·46	35·15	—	—
3944	,,	,, 24	noon . .	62 45	14 31	7·0	19·49	35·21	—	—
3945	,,	,, 24	8 P.M. .	62 47	17 22	8·0	19·49	35·21	—	—
3946	,,	,, 25	4 A.M. .	62 50	19 48	8·0	19·39	35·03	26·12	—
3947	,,	,, 25	noon . .	63 23	20 0	7·0	19·30	34·87	—	—
3948	,,	,, 25	8 P.M. .	63 32	20 57	7·0	19·63	35·47	—	—
3949	,,	,, 26	4 A.M. .	63 30	22 10	7·0	19·67	35·54	—	—
3950	,,	,, 26	noon . .	63 45	22 48	6·0	19·33	34·93	—	—
3951	,,	Dec. 8	8 P.M. .	63 46	22 47	5·5	19·21	34·71	—	—
3952	,,	,, 9	4 A.M. .	63 29	20 23	5·5	19·37	35·00	—	—
3953	,,	,, 9	noon . .	63 20	18 50	5·5	19·16	34·62	—	—
3954	,,	,, 9	8 P.M. .	62 53	16 16	7·5	19·51	35·25	—	—
3955	,,	,, 10	4 A.M. .	62 47	13 35	7·2	19·49	35·21	—	—
3956	,,	,, 10	noon . .	62 31	11 2	7·2	19·50	35·23	—	—
3957	,,	,, 10	8 P.M. .	62 26	8 16	7·3	19·48	35·19	—	—
3958	,,	,, 13	4 A.M. .	61 16	6 7	7·5	19·49	35·21	—	—
3959	,,	,, 13	noon . .	60 31	4 33	7·8	19·49	35·21	—	—
3960	,,	,, 13	8 P.M. .	60 5	3 37	8·5	19·56	35·34	—	—
3961	,,	,, 14	4 A.M. .	59 38	2 38	9·0	19·56	35·34	—	—
3962	Teutonic . .	,, 2	midnight	51 23	14 30	12·8	19·71	35·61	—	—
3963	,,	,, 3	noon . .	51 23	20 46	13·9	19·64	35·48	—	—
3964	,,	,, 3	midnight	50 48	26 56	13·9	19·62	35·45	—	—
3965	,,	,, 4	noon . .	50 14	33 7	10·0	19·34	34·94	—	—
3966	,,	,, 4	midnight	49 8	37 33	9·4	19·44	35·12	—	—
3967	,,	,, 5	noon . .	48 2	42 0	7·2	19·63	35·47	—	—
3968	,,	,, 5	midnight	46 48	46 38	6·1	18·82	34·01	—	—
3969	,,	,, 6	noon . .	45 34	51 17	6·1	17·86	32·30	—	—
3970	,,	,, 6	midnight	44 9	56 37	5·0	17·98	32·51	—	—
3971	,,	,, 7	noon . .	42 45	61 58	8·3	18·26	33·00	—	—
3972	,,	,, 7	midnight	41 37	67 32	7·2	17·96	32·48	—	—
3973	,,	,, 8	noon . .	40 29	73 7	10·0	18·11	32·73	—	—
3974	,,	,, 15	midnight	40 12	69 57	9·4	17·73	32·06	—	—
3975	,,	,, 16	noon . .	41 6	65 14	12·2	18·71	33·82	—	—
3976	,,	,, 16	midnight	42 15	60 50	10·6	18·47	33·39	—	—
3977	,,	,, 17	noon . .	43 25	55 38	10·0	18·37	33·20	—	—
3978	,,	,, 17	midnight	44 50	50 39	5·0	17·90	32·37	—	—
3979	,,	,, 18	noon . .	46 16	45 41	5·0	18·69	33·78	—	—
3980	,,	,, 18	midnight	47 43	40 43	7·2	18·69	33·78	—	—
3981	,,	,, 19	noon . .	49 11	35 46	12·8	19·66	35·52	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
3982	Teutonic	Dec. 19	midnight	49° 57′	30° 13′	13·3	19·82	35·80	—	—
3983	,,	,, 20	noon . .	50 43	24 40	13·9	19·70	35·59	—	—
3984	,,	,, 20	midnight	51 1	18 42	15·6	19·73	35·64	—	—
3985	,,	,, 21	noon . .	51 20	12 44	12·8	19·69	35·58	—	—
3986	Loughrigg Holme	Aug. 28	,,	58 42	3 38	14·7	19·27	34·82	—	—
3987	,,	,, 28	8 P.M. .	58 41	6 10	13·7	19·36	34·98	—	—
3988	,,	,, 29	4 A.M. .	58 38	8 39	13·9	19·56	35·34	—	—
3989	,,	,, 29	noon . .	58 34	10 38	13·7	19·54	35·30	26·23	—
3990	,,	,, 29	9 P.M. .	58 27	13 14	12·9	19·49	35·21	—	—
3991	,,	,, 30	4 A.M. .	58 20	15 15	12·9	19·54	35·30	—	—
3992	,,	,, 30	noon . .	58 12	17 47	12·9	10·45	35·14	—	—
3993	,,	,, 30	8 P.M. .	57 57	20 11	13·0	19·49	35·21	26·13	—
3994	,,	,, 31	4 A.M. .	57 43	22 33	12·2	19·51	35·25	—	—
3995	,,	,, 31	noon . .	57 29	24 55	12·9	19·47	35·17	—	—
3996	,,	,, 31	8 P.M. .	57 11	27 15	12·1	19·49	35·21	—	—
3997	,,	Sept. 1	4 A.M. .	56 53	29 29	11·5	19·46	35·15	—	—
3998	,,	,, 1	noon . .	56 35	31 50	11·1	19·46	35·15	—	—
3999	,,	,, 1	8 P.M. .	56 16	34 3	10·7	19·42	35·08	—	—
4000	,,	,, 2	4 A.M. .	55 57	36 19	10·0	19·46	35·15	—	—
4001	,,	,, 2	noon . .	55 37	38 34	10·6	19·25	34·78	—	—
4002	,,	,, 2	8 P.M. .	55 11	40 27	10·4	19·22	34·72	—	—
4003	,,	,, 3	4 A.M. .	54 44	42 23	10·3	19·19	34·67	25·72	—
4004	,,	,, 3	noon . .	54 16	44 27	11·4	19·53	35·28	—	—
4005	,,	,, 3	8 P.M. .	53 47	46 30	11·2	19·09	34·49	—	—
4006	,,	,, 4	4 A.M. .	53 18	48 32	11·2	19·52	35·27	—	—
4007	,,	,, 4	noon . .	52 47	50 35	8·0	18·57	35·56	—	—
4008	,,	,, 4	8 P.M. .	52 14	52 29	8·2	17·74	32·07	—	—
4009	,,	,, 5	4 A.M. .	52 0	54 30	8·1	16·69	30·19	—	—
4010	,,	,, 5	8 A.M. .	51 44	55 26	9·2	16·60	30·03	—	—
4011	,,	,, 5	noon . .	51 30	56 22	13·0	16·77	30·34	—	—
4012	,,	,, 5	4 P.M. .	51 11	57 15	13·2	16·54	29·93	—	—
4013	,,	,, 5	8 P.M. .	50 48	58 3	12·7	17·10	30·93	—	—
4014	,,	Nov. 28	8 A.M. .	46 6	56 55	3·5	17·77	32·13	—	—
4015	,,	,, 28	noon . .	46 6	56 0	3·2	17·85	32·28	—	—
4016	,,	,, 28	8 P.M. .	46 15	54 30	2·3	17·63	31·88	23·58	—
4017	,,	,, 29	4 A.M. .	46 26	52 51	1·6	17·64	31·90	—	—
4018	,,	,, 29	noon . .	46 42	51 14	2·4	17·92	32·40	—	—
4019	,,	,, 29	8 P.M. .	47 2	49 38	0·6	18·14	32·79	—	—
4020	,,	,, 30	4 A.M. .	47 22	48 0	0·8	18·24	32·97	—	—
4021	,,	,, 30	noon . .	47 44	46 26	2·9	18·81	34·00	—	—
4022	,,	,, 30	8 P.M. .	48 2	44 52	5·1	18·81	34·00	—	—
4023	,,	Dec. 1	4 A.M. .	48 20	43 24	7·2	18·75	33·89	—	—
4024	,,	,, 1	noon . .	48 29	42 23	7·8	18·74	33·87	—	—
4025	,,	,, 1	8 P.M. .	48 47	41 8	10·8	19·15	34·60	—	—
4026	,,	,, 2	4 A.M. .	49 5	39 27	11·6	19·63	35·47	—	—
4027	,,	,, 2	noon . .	49 22	37 42	9·9	19·23	34·74	—	—
4028	,,	,, 2	8 P.M. .	49 36	35 49	12·9	19·60	35·41	—	—
4029	,,	,, 3	4 A.M. .	49 50	33 58	11·8	19·48	35·19	—	—
4030	,,	,, 3	noon . .	50 4	32 8	11·3	19·38	35·01	—	—
4031	,,	,, 3	8 P.M. .	50 13	30 20	10·2	19·59	35·40	26·29	—
4032	,,	,, 4	4 A.M. .	50 22	28 29	11·8	19·52	35·27	—	—
4033	,,	,, 4	noon . .	50 30	26 37	12·2	19·59	35·40	—	—
4034	,,	,, 4	8 P.M. .	50 31	24 42	12·6	19·60	35·41	—	—
4035	,,	,, 5	4 A.M. .	50 32	22 56	12·9	19·74	35·66	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
4036	Loughrigg Holme	Dec. 5	noon . .	50° 32′	21° 6′	12·2	19·78	35·73	—	—
4037	„	„ 5	8 P.M. .	50 29	19 17	11·7	19·62	35·45	—	—
4038	„	„ 6	4 A.M. .	50 26	17 25	11·2	19·71	35·61	—	—
4039	„	„ 6	noon . .	50 23	15 45	12·5	19·62	35·45	—	—
4040	„	„ 6	8 P.M. .	50 16	13 49	12·3	19·63	35·47	—	—
4041	„	„ 7	4 A.M. .	50 8	11 54	12·7	19·67	35·54	—	—
4042	„	„ 7	noon . .	50 0	9 58	11·6	19·56	35·34	—	—
4043	„	„ 7	8 P.M. .	49 42	8 6	12·3	19·63	35·47	—	—
4044	„	„ 8	4 A.M. .	49 23	6 14	11·8	19·66	35·52	—	—
4045	„	„ 8	noon . .	49 48	4 35	12·2	19·66	35·52	—	—
4046	Siberian . .	„ 5	„	off Tuskar Rk. L.	Ho.	11·1	19·40	35·05	—	—
4047	„	„ 6	„	51° 27′	12° 0′	11·1	19·65	35·50	—	—
4048	„	„ 7	„	51 37	16 1	12·2	19·67	35·54	—	—
4049	„	„ 8	„	51 40	17 45	11·7	19·67	35·54	—	—
4050	„	„ 9	„	51 40	20 40	11·1	19·72	35·63	—	—
4051	„	„ 10	„	51 44	24 0	11·7	19·67	35·54	—	—
4052	„	„ 11	„	51 44	29 25	10·0	19·65	35·50	—	—
4053	„	„ 12	„	51 26	35 2	9·4	19·51	35·25	—	—
4054	„	„ 13	„	51 17	36 55	7·8	19·33	34·93	—	—
4055	„	„ 14	„	50 46	41 49	7·8	19·16	34·62	—	—
4056	„	„ 15	„	49 27	47 18	5·0	18·98	34·30	—	—
4057	„	„ 16	„	4 miles John	N. of St. 's, N.F.	0·6	17·72	32·04	—	—
4058	„	„ 17	„	off Bay N.	of Bulls, F.	1·1	17·80	32·19	—	—
4059	„	„ 18	„	45° 47′	56° 45′	1·7	17·80	32·19	—	—
4060	„	„ 19	„	44 49	60 10	−1·7	16·80	30·40	—	—
4061	„	„ 20	„	44 25	62 50	1·7	17·14	31·00	—	—
4062	„	„ 21	„	43 58	63 53	3·3	17·18	31·07	—	—
4063	„	„ 22	„	40 33	68 5	7·8	17·98	32·51	—	—
4064	„	„ 23	„	38 50	73 15	11·1	19·02	34·37	—	—
4065	„	„ 31	„	39 17	72 50	11·1	19·04	34·40	—	—
		1898.								
4066	„	Jan. 1	„	40 36	68 3	7·2	18·00	32·54	—	—
4067	„	„ 2	„	42 3	63 6	6·1	18·20	32·90	—	—
4068	„	„ 3	„	43 53	58 10	1·7	17·66	31·93	—	—
4069	„	„ 4	„	46 18	53 35	−1·1	17·70	32·01	—	—
4070	„	„ 5	„	47 52	51 39	−1·7	18·08	32·68	—	—
4071	„	„ 6	„	49 33	46 13	3·9	18·99	34·32	—	—
4072	„	„ 7	„	50 40	43 43	10·0	19·59	35·40	—	—
4073	„	„ 8	„	51 51	38 5	7·2	19·28	34·84	—	—
4074	„	„ 9	„	53 7	33 8	7·2	19·41	35·07	—	—
4075	„	„ 10	„	54 9	26 53	8·9	19·48	35·19	—	—
		1897.								
4076	Anchoria .	Dec. 20	„	55 9	15 43	10·6	19·67	35·54	—	—
4077	„	„ 21	„	54 31	24 11	10·6	19·54	35·30	—	—
4078	„	„ 22	„	53 34	31 26	8·3	19·42	35·08	—	—
4079	„	„ 23	„	52 13	36 42	6·7	19·24	34·76	—	—
4080	„	„ 24	„	50 26	42 16	6·7	19·02	34·37	—	—
4081	„	„ 25	„	48 28	47 44	−0·6	18·57	33·56	—	—
4082	„	„ 26	„	47 5	50 33	0·6	18·23	32·95	—	—

Table I. (*continued*).

Lab. No.	Ship.	Date.	Hour.	Lat.	Long.	Temp.	χ.	p. from χ.	$_4S_{15}$ Sprengel.	SO_3.
		1897.		N.	W.					
4083	Anchoria .	Dec. 27	noon . .	45° 10′	55° 20′	1·7	17·97	32·49	—	—
4084	,,	,, 28	,,	42 35	61 15	6·1	18·32	33·11	—	—
4085	,,	,, 29	,,	40 53	67 22	7·2	18·01	32·56	—	—
4086	,,	,, 30	,,	40 30	73 37	7·2	17·98	32·51	—	—
		1898.								
4087	,,	Jan. 4	,,	40 27	73 6	5·6	18·01	32·56	—	—
4088	,,	,, 5	,,	40 49	67 17	7·2	17·99	32·53	—	—
4089	,,	,, 6	,,	42 14	61 10	2·8	17·58	31·79	—	—
4090	,,	,, 7	,,	44 9	55 24	2·8	18·38	33·22	—	—
4091	,,	,, 8	,,	46 18	49 58	1·1	18·11	32·73	—	—
4092	,,	,, 9	,,	48 32	44 54	3·3	19·10	34·51	—	—
4093	,,	,, 10	,,	50 53	38 12	8·9	19·44	35·12	—	—
4094	,,	,, 11	,,	52 34	30 47	7·8	19·29	34·86	—	—
4095	,,	,, 12	,,	54 2	23 3	10·6	19·66	35·52	—	—
4096	,,	,, 13	,,	54 53	14 46	10·6	19·63	35·47	—	—
		1897.								
4097	Loughrigg Holme	Dec. 25	,,	49 45	5 59	11·7	19·66	35·52	—	—
4098	,,	,, 25	8 P.M. .	48 49	6 33	11·3	19·67	35·54	—	—
4099	,,	,, 26	4 A.M. .	47 51	7 7	12·7	19·77	35·72	—	—
4100	,,	,, 26	noon . .	46 53	7 42	13·6	19·80	35·77	—	—
4101	,,	,, 26	8 P.M. .	45 52	8 18	13·8	19·80	35·77	—	—
4102	,,	,, 27	4 A.M. .	45 2	8 47	14·2	19·88	35·91	—	—
4103	,,	,, 27	noon . .	44 28	9 5	13·6	19·75	35·68	—	—
4104	,,	,, 27	8 P.M. .	43 48	9 27	13·3	19·79	35·75	—	—
4105	,,	,, 28	4 A.M. .	42 54	9 44	14·1	20·03	36·18	—	—
4106	,,	,, 28	noon . .	41 48	9 47	15·0	20·02	36·16	—	—
4107	,,	,, 28	8 P.M. .	40 39	9 47	16·6	20·04	36·19	—	—
4108	,,	,, 28	midnight	40 4	9 47	14·6	20·08	36·27	—	—
		1898.								
4109	,,	Jan. 23	noon . .	40 38	9 33	14·9	19·96	36·05	—	—
4110	,,	,, 23	8 P.M. .	41 57	9 26	14·4	19·95	36·04	—	—
4111	,,	,, 24	4 A.M. .	43 13	9 27	13·4	19·93	36·00	—	—
4112	,,	,, 24	noon . .	44 24	8 56	13·3	19·92	35·98	—	—
4113	,,	,, 24	8 P.M. .	45 35	8 24	12·7	19·81	35·79	—	—
4114	,,	,, 25	4 A.M. .	46 52	7 51	12·2	19·80	35·77	—	—
4115	,,	,, 25	noon . .	48 1	7 16	11·9	19·67	35·54	—	—
4116	,,	,, 25	11 P.M. .	49 45	6 47	11·2	19·62	35·45	—	—

TABLE II.—Chlorines and Densities used as Standards. The Densities in the Second Column are calculated from the Chlorines by Equation (2), page 76.

Cl.	${}_4S_{15}$ calc.	${}_4S_{15}$ found.	Difference.
19·517	26·30	26·29	+0·01
19·415	26·16	26·14	+0·02
13·335	26·05	26·12	−0·07
19·171	25·82	25·82	0·00
18·320	24·64	24·68	−0·04
17·040	22·87	22·90	−0·03
17·005	22·82	22·85	−0·03
16·277	21·80	21·75	+0·05
15·421	20·62	20·68	−0·06
14·220	18·95	18·97	−0·02
12·928	17·15	17·19	−0·04
12·628	16·74	16·75	−0·01
15·571	16·65	16·65	0·00
11·263	14·84	14·84	0·00
9·475	12·35	12·37	−0·02
7·067	9·01	9·03	−0·02

TABLE III.—Differences of the Monthly Means of Atmospheric Pressure and Temperature during 1896 and 1897, from the Averages for the Fifteen Years 1870–84.

Differences of Monthly Means of Pressure during 1896 from the Averages (millims.).

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sumburgh Head	+ 7·7	+5·9	−7·5	+0·1	+7·3	−0·5	+3·1	+2·3	−4·3	− 2·7	+7·1	+0·4
Stornoway	+ 9·6	+6·4	−7·1	+3·0	+9·1	−0·6	+3·2	+3·6	−5·0	− 1·4	+7·6	−2·2
Aberdeen	+ 9·3	+7·8	−6·3	+2·9	+8·5	−0·7	+3·2	+3·3	−5·3	− 2·8	+7·9	−1·6
Leith	+ 9·2	+8·1	−5·9	+1·4	+8·5	−1·0	+2·9	+3·3	−6·0	− 3·2	+7·9	−2·9
Spurn Head	+ 9·3	+9·1	−4·7	+5·2	+7·2	−1·4	+2·4	+2·3	−6·2	− 4·4	+7·0	−3·7
Yarmouth	+ 8·5	+8·9	−4·1	+5·3	+6·0	−1·4	+1·9	+1·8	−5·4	− 4·4	+5·9	−3·8
Holyhead	+10·3	+8·9	−3·8	+7·4	+8·7	−1·0	+2·6	+4·0	−6·2	− 3·1	+8·0	−4·4
Valencia	+10·5	+7·5	−2·6	+9·8	+9·3	−1·2	+2·7	+6·0	−6·0	− 0·8	+7·4	−5·2
Scilly	+ 9·0	+7·5	−1·7	+9·5	+7·0	−1·4	+1·9	+3·7	−5·4	− 2·8	+5·5	−5·5
Nantes	+ 6·2	+7·4	−0·4	+8·5	+2·4	−1·3	+0·5	+1·3	−2·1	− 3·4	+1·5	−2·7
Paris	+ 6·2	+7·9	−1·7	+7·4	+3·9	−0·9	+0·8	+1·0	−3·5	− 4·1	+2·6	−4·1
Moscow	+ 0·3	−1·0	+2·6	+2·7	−0·5	−0·1	−0·7	+1·1	+2·6	+ 4·2	−1·6	−3·6
St. Petersburg	− 1·1	+2·5	+2·2	+2·9	+1·8	+1·2	+1·8	+1·8	+1·3	+ 1·8	+2·6	+6·2
Archangel	− 3·2	+2·0	+8·5	+4·0	+2·1	+1·6	+2·3	+3·9	+2·3	+ 0·6	−0·3	−3·3
Haparanda	+ 3·4	−0·3	−2·8	−0·2	+1·8	+0·3	+2·2	+1·7	+0·3	− 2·0	+1·2	+4·5
Stockholm	+ 1·8	+5·5	−2·9	+0·4	+3·5	−0·4	+2·5	+0·5	−0·5	− 0·2	+5·8	+4·3
Copenhagen	+ 4·8	+8·0	−4·6	+1·6	+3·1	−0·1	+1·9	+0·5	−1·9	− 1·7	+8·9	+2·0
Skagen	+ 3·8	+7·2	−5·2	+0·4	+3·5	+0·1	+2·5	+1·2	−1·9	− 2·6	+7·0	+3·1
Bergen	+ 5·9	+7·9	−5·7	+0·3	+6·0	+0·4	+3·1	+0·7	−2·8	− 3·0	+7·3	+2·4
Christiansund	+ 5·2	+6·3	−5·4	−0·3	+6·2	+2·2	+4·4	+2·5	−2·2	− 0·6	+6·3	+4·1
Vardö	− 2·7	+0·4	+8·5	+1·6	+1·9	+3·7	+4·9	+4·3	+3·1	− 0·4	+0·9	+5·7
Thorshavn	+ 8·2	+3·5	−8·5	−1·3	+6·5	+2·0	+3·5	+2·2	−1·6	+ 1·9	+5·0	−1·5
Berufjord	+ 6·9	−2·2	−7·2	−3·5	+2·0	+3·2	−0·2	+3·4	−1·5	+ 6·9	+1·9	−4·4
Stykkisholm	+ 7·9	−5·4	−5·6	−3·9	+0·8	+2·2	−1·8	+4·3	+0·5	+10·9	−1·4	−8·0
Grimsey	+ 7·7	−3·8	−4·9	−0·7	+1·3	+3·0	−1·2	+4·2	−0·3	+10·2	−0·8	−6·7
Ivigtut	+ 7·2	−1·0	−1·0	+0·4	−0·4	+3·0	−2·9	+3·6	−1·4	+12·3	−2·2	−7·3
Jacobshavn	+ 8·0	+2·3	+0·5	+3·8	+0·3	+3·6	−1·9	+2·8	−0·2	+11·4	−0·9	−6·3
Upernivik	+ 7·4	+2·3	+0·9	+2·8	+0·2	+3·1	−1·9	+2·1	+0·2	+10·2	−0·7	−6·1
St. John's, N.F.	+ 2·0	−1·0	+8·4	+2·3	+5·6	+2·8	+2·3	+4·6	+4·8	+ 5·8	+6·6	+3·0
Halifax	+ 0·8	−3·3	−0·2	+5·3	+2·3	−0·2	+1·5	+1·5	+1·0	+ 0·5	+5·6	+3·0
Boston	+ 1·8	−5·0	−1·3	+4·8	+0·9	+0·4	+1·4	+0·5	−0·7	− 1·0	+3·1	+2·1
New York	+ 2·6	−2·9	−1·0	+1·7	+1·8	−0·1	+0·4	+0·8	−1·7	− 1·7	+1·8	+1·0

Differences of Monthly Means of Pressure during 1897 from the Averages (millims.).

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sumburgh Head	+ 5·4	-0·4	-7·3	- 1·9	-1·0	+1·9	+1·5	-2·2	-1·3	+6·7	+ 7·6	-1·1
Stornoway	+ 5·6	+0·5	-9·2	- 2·5	-0·3	+2·1	+2·0	-4·2	0·0	+6·1	+ 7·4	-3·2
Aberdeen	+ 3·7	+1·4	-9·0	- 1·4	-0·1	+1·9	+2·3	-3·0	-0·3	+7·4	+ 7·6	-1·8
Leith	+ 2·4	+1·5	-9·5	- 1·5	0·0	+1·2	+2·4	-3·7	-0·3	+6·9	+ 7·2	-2·5
Spurn Head	- 0·8	+2·3	-8·4	- 1·2	-0·3	+0·3	+2·2	-2·9	-0·5	+7·7	+ 7·3	-0·6
Yarmouth	- 2·4	+2·2	-7·2	- 1·3	-0·7	+0·4	+1·7	-2·5	0·0	+7·3	+ 7·3	+0·2
Holyhead	+ 0·3	+2·5	-8·7	- 1·4	+0·5	+0·7	+2·6	-3·9	+0·9	+6·5	+ 7·5	-2·3
Valencia	+ 0·2	+2·0	-8·7	- 2·2	+0·4	+0·7	+2·1	-5·2	+1·9	+3·9	+ 6·2	-4·2
Scilly	- 2·9	+3·0	-6·0	- 1·3	+0·2	+0·5	+1·8	-3·7	+1·4	+4·8	+ 5·8	-2·5
Nantes	- 6·5	+5·0	-3·1	0·0	-1·2	+0·7	+0·1	-1·5	+1·8	+4·9	+ 4·6	+0·2
Paris	- 6·6	+4·0	-3·3	- 0·1	-0·3	+0·9	+0·6	-1·3	+0·5	+5·3	+ 6·3	+0·8
Moscow	—	—	—	—	—	—	—	—	—	—	—	—
St. Petersburg	—	—	—	—	—	—	—	—	—	—	—	—
Archangel	—	—	—	—	—	—	—	—	—	—	—	—
Haparanda	+ 9·6	-6·5	+5·4	+ 4·0	+2·4	+0·4	+0·1	+2·2	-4·2	+4·9	- 1·8	+3·8
Stockholm	+ 4·9	-3·8	-1·4	+ 0·5	+2·0	+2·4	+0·7	+1·5	-2·6	+7·2	+ 4·6	+4·5
Copenhagen	- 0·3	+0·9	-5·1	- 0·2	-0·1	+3·0	0·0	+0·5	-0·8	+8·4	+10·3	+3·5
Skagen	—	—	—	—	—	—	—	—	—	—	—	—
Bergen	+ 4·6	-0·4	-5·8	- 0·5	-0·4	+2·8	+1·3	-1·2	-1·6	+7·6	+ 7·4	+1·2
Christiansund	+ 7·2	-2·9	-2·6	+ 0·9	+1·1	+3·9	+2·8	+0·2	-1·9	+7·7	+ 6·3	+3·0
Vardö	+12·2	-1·2	+8·7	+ 7·4	+3·9	+1·2	+0·8	+3·8	-2·4	+5·2	- 2·4	+6·4
Thorshavn	+ 8·7	-1·2	-5·5	- 3·6	-0·8	+3·9	+2·1	-3·5	-0·4	+6·6	+ 6·4	-3·0
Berufjord	+10·0	-2·7	-1·5	- 8·1	-2·3	+6·1	+1·1	-2·2	+0·2	+5·0	+ 4·2	-3·4
Stykkisholm	+11·4	-2·3	-1·5	-10·0	-0·1	+7·6	+0·4	-1·4	+1·5	+3·7	+ 1·7	-3·6
Grimsey	+10·3	-2·5	-0·3	- 9·3	-0·5	+7·3	+0·4	-1·0	+0·9	+5·2	+ 2·1	-3·5
Ivigtut	+ 8·0	+4·6	-0·6	- 2·8	+1·9	+7·6	-0·2	+3·5	-0·6	-1·1	+ 1·0	-2·6
Jacobshavn	—	—	—	—	—	—	—	—	—	—	—	—
Upernivik	—	—	—	—	—	—	—	—	—	—	—	—
St. John's, N.F.	+ 1·5	+2·5	+5·6	+ 3·3	+5·1	0·0	+1·8	—	+0·2	-0·5	+ 1·5	+0·2
Halifax	0·0	+2·0	+3·3	+ 5·1	+2·5	-0·2	+3·0	0·0	0·0	+3·0	+ 1·3	+0·2
Boston	—	—	—	—	—	—	—	—	—	—	—	—
New York	- 0·1	+1·1	+0·8	- 0·1	-1·0	-0·9	-0·5	-0·3	+1·1	+1·7	- 0·7	-0·7

Differences of Monthly Means of Temperature during 1896 from the Averages. ° C.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sumburgh Head	+0·3	+2·1	+1·0	+1·4	+1·5	+0·1	+0·2	−0·7	+0·1	−1·2	+0·7	+0·6
Stornoway	+1·2	+2·8	+0·6	+1·2	+2·4	+1·0	−0·2	−0·5	+0·2	−2·1	+1·2	+0·1
Aberdeen	+1·2	+2·1	+1·1	+2·0	+1·9	+0·6	−0·3	−1·1	−0·6	−1·8	−0·1	+0·8
Leith	+1·6	+1·7	+0·8	+2·6	+2·4	+0·3	+0·2	−0·4	−0·2	−2·1	+0·1	+0·3
Spurn Head	+1·4	+0·4	+1·4	+1·5	+0·4	+1·9	+0·6	−0·8	−0·1	−1·5	−0·6	+0·4
Yarmouth	+0·9	+0·2	+1·6	+0·9	0·0	+1·7	+0·5	−1·1	−0·2	−1·6	−1·4	+0·3
Holyhead	+0·7	+0·8	+0·9	+1·1	+1·2	+1·4	−0·2	−1·1	−0·6	−2·4	−1·6	−0·5
Valencia	+0·7	+1·4	+1·0	+0·7	+0·9	+0·7	+0·1	−0·8	−0·1	−3·0	−1·8	−0·8
Scilly	+0·9	+1·1	+1·8	+1·3	+1·8	+1·9	+1·2	−0·2	+0·1	−2·1	−1·6	+0·1
Nantes	−0·3	−2·8	+0·9	−0·9	0·0	+0·8	+1·4	−0·7	−0·4	−2·1	−2·8	+0·5
Paris	+0·7	−1·0	+2·7	−0·3	+0·1	+0·9	+1·0	−1·8	+0·1	−1·0	−3·4	+1·5
Breslau	−1·2	+0·9	+3·4	−1·3	−0·4	+1·9	+0·7	−0·9	+0·1	+2·4	−2·4	+0·6
Moscow	−2·7	−0·5	+0·5	+1·6	+0·4	+1·9	+0·6	+1·9	+1·6	+4·6	−2·8	−2·2
St. Petersburg	+1·8	−0·2	+1·3	+0·6	+1·3	+2·6	+1·9	−0·1	−0·3	+3·4	−1·7	−1·1
Archangel	+0·3	−1·5	+1·5	+1·4	+2·6	+0·3	−0·1	+0·2	+0·6	+2·8	−1·2	+2·8
Haparanda	+2·9	+5·0	+2·2	+1·1	+1·9	+0·1	+3·3	+0·1	+0·6	+0·1	+0·7	+1·6
Stockholm	+0·4	+2·8	+2·6	+0·7	+1·1	+4·1	+2·2	−0·4	+0·6	+1·7	−0·7	+0·8
Swinemünde	+0·6	+0·7	+2·7	−1·1	−1·3	+1·6	−0·8	−1·7	−0·5	+1·6	−2·1	−0·7
Copenhagen	+0·3	+2·3	+1·8	+0·3	+1·6	+3·8	+1·9	−0·5	−0·1	+0·6	−1·0	+0·2
Skagen	+1·1	+3·1	+1·0	+0·2	+1·3	+2·4	+0·6	−0·6	0·0	−0·1	−0·6	+0·4
Cologne	+0·1	−1·1	+2·0	−1·5	−0·4	+1·9	−0·4	−2·2	−0·5	−0·4	−2·7	−0·7
Hamburg	+0·1	+0·2	+1·8	−0·6	−0·3	+2·3	+0·1	−1·9	−0·2	+0·7	−2·3	−0·4
Bergen	+0·5	+3·0	+1·5	+1·0	+0·4	+1·1	−0·3	−1·3	+0·5	+0·5	+1·5	+1·1
Christiansund	+1·1	+2·7	+2·3	+1·9	+0·4	−0·6	−0·2	−1·1	+1·4	−0·9	+1·5	+0·8
Vardö	−1·8	+1·6	+1·6	+2·6	+2·3	+1·0	+1·1	+0·3	+1·1	−0·6	−1·1	+1·2
Thorshavn	+0·3	+2·6	+0·1	+0·9	+2·2	−0·4	+0·4	+0·1	−0·1	−2·1	+1·6	+1·7
Berufjord	+0·3	+3·5	+0·6	+1·6	+3·2	−0·7	+0·4	+0·7	+0·2	−3·0	+0·2	+3·1
Stykkisholm	+0·1	+2·4	+0·6	+1·1	+1·5	−0·9	+0·1	−0·4	−0·8	−2·1	−0·1	+2·3
Grimsey	—	—	—	—	—	−4·5	−3·1	−2·8	−2·2	−2·9	−0·9	+2·5
Ivigtut	0·0	−1·4	−1·6	−2·7	−2·9	−0·1	−0·6	0·0	−1·1	+1·2	+1·3	+6·7
Jacobshavn	−5·9	−9·7	−5·4	−9·8	−4·5	−0·3	+0·9	+1·4	+0·9	+2·3	−2·7	−2·9
Upernivik	−5·4	−6·2	−6·0	−8·1	−3·8	+0·4	+0·4	+2·6	+1·2	+3·1	−2·6	+0·7
St. John's, N.F.	+1·6	+0·2	+1·8	−1·4	−2·2	−1·1	+0·5	−1·3	+0·8	+1·6	−1·0	−1·9
Halifax	−0·4	+0·3	+1·6	+0·8	+0·7	+0·5	+0·4	−0·8	+0·3	+0·8	+1·7	−0·3
Boston	−2·4	−1·1	−2·2	+1·4	+2·1	−0·9	−0·3	−0·5	−0·9	−1·8	+2·7	−1·3
New York	−0·3	−0·2	−2·8	+0·8	+2·6	+0·3	+0·7	+1·3	−0·1	+2·2	+1·9	−1·3

Differences of Monthly Means of Temperature during 1897 from the Averages. °C.

	Jan.	Feb.	March.	April.	May.	June.	July.	Aug.	Sept.	Oct.	Nov.	Dec.
Sumburgh Head	−1·1	+0·1	+0·3	−0·5	−0·7	−0·4	+0·4	+1·7	−0·6	+1·1	+0·8	+1·6
Stornoway	−1·4	+0·4	+0·2	−0·8	−1·4	+0·2	+0·9	+1·6	−0·8	+1·1	+1·3	+0·3
Aberdeen	−1·3	+0·2	+0·7	−0·8	−1·0	−0·6	+0·3	+1·1	−1·0	+1·3	+2·1	+1·1
Leith	−1·4	+1·2	+0·6	−0·4	−0·9	−1·0	+0·3	+1·2	−0·3	+0·7	+2·3	+0·7
Spurn Head	−0·9	+1·1	+1·6	+0·1	−0·7	+0·4	−0·2	+1·2	−0·9	+1·2	+1·5	+1·2
Yarmouth	−1·4	+0·9	+1·6	−0·2	−0·7	+0·7	−0·2	+0·8	−1·2	+0·6	+1·1	+1·1
Holyhead	−1·7	+0·8	+0·3	−1·2	−0·9	−0·2	+0·2	+0·4	−1·3	+1·0	+1·3	+0·7
Valencia	−2·2	+1·7	−0·1	−0·7	−0·5	+0·2	+0·8	−0·1	−1·1	+1·7	+1·3	+0·9
Scilly	−1·2	+1·4	+0·9	−0·1	−0·2	+0·8	+1·2	+0·8	−0·8	+1·3	+1·7	+1·1
Nantes	−0·1	+2·2	+1·1	0·0	−1·4	+1·4	+1·2	−0·2	−1·0	−0·6	+0·7	+0·8
Paris	+0·4	+3·2	+2·8	−0·4	−0·9	+1·8	+0·6	+0·3	−0·9	+0·2	−0·4	+1·2
Breslau	−1·8	+1·3	+3·4	+1·1	+0·8	+1·9	−0·6	+1·4	−0·2	−0·5	−1·2	+1·4
Moscow	—	—	—	—	—	—	—	—	—	—	—	—
St. Petersburg	—	—	—	—	—	—	—	—	—	—	—	—
Archangel	—	—	—	—	—	—	—	—	—	—	—	—
Haparanda	+1·0	−0·6	−4·9	+3·1	+5·6	+0·5	0·0	0·0	+1·6	+2·1	+3·8	+3·2
Stockholm	−1·9	−1·5	+1·0	+1·4	+3·3	+1·6	+0·5	+2·2	−0·2	+0·3	+0·2	+3·5
Swinemünde	−2·5	−1·3	+1·9	+0·1	−1·9	0·0	−1·5	+1·0	−0·7	−0·5	−0·1	+1·9
Copenhagen	−2·2	0·0	−0·9	+0·5	+1·6	+2·3	−0·1	+2·1	−0·4	−0·8	+0·7	+2·6
Skagen	—	—	—	—	—	—	—	—	—	—	—	—
Cologne	−2·1	+0·8	+1·3	−0·6	−0·2	+1·9	−0·7	+0·7	−1·1	−0·7	−0·7	+0·6
Hamburg	−3·5	−0·6	+1·2	+0·2	+0·1	+1·8	−1·2	+1·3	−0·8	−0·9	−0·1	+2·3
Bergen	−2·6	+0·8	+1·6	+0·7	+0·5	−0·1	+0·3	+0·8	−1·2	+1·4	+0·7	+3·1
Christiansund	−1·4	+1·2	+1·2	+1·8	+1·4	−1·5	−0·5	+1·1	0·0	+1·4	+1·5	+2·3
Vardö	+1·9	−1·0	−1·4	+4·2	+1·2	+0·4	+0·9	0·0	+1·3	+1·8	+0·7	+0·5
Thorshavn	−1·4	−0·2	+0·2	+0·2	−0·7	−0·5	+0·3	+0·6	−0·5	+0·8	+0·9	+1·8
Berufjord	+0·9	+0·6	+0·5	+1·4	+0·1	+0·7	+1·2	+0·9	−0·1	+0·9	+0·2	+2·3
Stykkisholm	+1·3	−0·4	+1·6	+1·2	−0·6	−0·7	+0·1	−0·4	0·0	+1·4	+0·7	+2·2
Grimsey	+1·7	−0·4	+2·4	+1·3	−1·8	−3·2	−1·9	−3·2	−2·5	+0·5	−1·0	+2·8
Ivigtut	+1·1	+0·3	+1·1	−6·4	−2·1	+1·4	−0·8	−0·8	+0·7	+0·5	—	—
Jacobshavn	—	—	—	—	—	—	—	—	—	—	—	—
Upernivik	—	—	—	—	—	—	—	—	—	—	—	—
St. John's, N.F.	+0·6	−2·1	−1·2	+0·9	+2·3	−3·1	−1·6	—	−0·9	−1·6	−1·2	−5·5
Halifax	+0·5	+0·1	+0·6	+1·6	+0·7	−1·1	+0·6	−0·5	+0·2	+0·7	+1·0	−3·2
Boston	—	—	—	—	—	—	—	—	—	—	—	—
New York	+0·3	+0·5	+1·7	−0·2	−0·5	−1·0	+0·2	−0·3	−0·2	+3·7	−0·2	+0·9

APPENDICES.

Appendix I.—List of Observers.

Ship.	Observer's Name.	No. of Boxes supplied.
SS. Ethiopia	Captain J. Wilson, R.N.R.	18
R.M.S. Teutonic	,, J. G. Cameron, R.N.R.	25
R.M.S. Para	,, W. H. Milner	4
Sch. Traveller	,, A. Simpson	7
H.M.T.S. Monarch	,, T. Alford	3
R.M.S. Moor	,, E. J. Griffin, R.N.R.	1
SS. Loughrigg Holme	,, J. W. Millican	14
SS. Otra	,, Christopherson	1
SS. Longhirst	,, O. E. Anderson	3
SS. Laura	,, F. P. Christiansen	16
SS. Wydal	,, J. H. Gibson	1
SS. Active	,, T. Robertson	5
SS. Balaena	,, ,, ,,	5
SS. Eclipse	,, W. F. Miln	15
SS. Aldgate	,, G. H. Cheshire	1
SS. Castor	Mr. Barentz (mate)	(*a*)
SS. Frolic	Captain T. Bryant	3 (*b*)
SS. Hercules	,, J. Wilson	1 (*b*)
SS. Capricornus	,, W. Carrington	3 (*b*)
SS. Jamesia	,, A. Neale	1 (*b*)
SS. China	,, A. Christiansen	1 (*b*)
SS. America	,, C. Venables	1 (*b*)
S. Thorwaldsen	,, Jensen	5
H.M.S. Thyra	,, Garde	1 (*c*)
SS. Corean	,, W. S. Main	7
SS. Siberian	,, ,, ,,	5
SS. California	,, G. Mitchell	13
SS. Granuaile	Mr. R. M. Barrington	1
S.Y. Otaria	Sir G. Baden-Powell	2
SS. Minia	Captain Trott	1
		Total 164

(*a*) Lost with all hands, October, 1896.
(*b*) Through the kindness of Mr. C. M. Mundahl, Grimsby, owner.
(*c*) Royal Danish Navy.

APPENDIX II.—Set of Forms supplied.

A.

INSTRUCTIONS.

(*a*.) Fill one of the bottles about half full with the sample in the bucket, shake it, and throw away the contents. Then fill the bottle almost but not quite full with the sample, and cork *as tightly as possible.*

Note the number on the bottle, and opposite the same number fill in the particulars required in Sheet B.

(*b*.) On reaching England send the box to Mr. DICKSON, Chemical Laboratory, University Museum, Oxford, unless it contains enough empty bottles for another outward and homeward voyage. (Send by passenger train, and do *not* pay carriage.)

The filled up sheets, with request form C, should be *posted* to Mr. DICKSON as soon as possible after arrival.

N.B.—It is requested that samples be collected at least once daily, at the same hour each day (noon if possible); but only in the Atlantic north of 40° N. lat. The collection should be made from a point as far forward as possible, well clear of all discharge pipes. Samples which have been contaminated by water from the ship are of no value.

B.

Sample of Surface Water collected on board SS. ______________________

Captain ______________, during voyage from ______________________

to ______________________.

No. of Sample.	Date.	Hour.	Lat.	Long.	Tempera-ture.	Remarks.
1						
2						
3						
4						
5						
6						
7						
8						
9						
10						
11						
12						
13						
14						
15						
16						
17						
18						
19						
20						
21						
22						
23						
24						
25						
26						
27						
28						
29						
30						

______________________ Observer.

C.

SS. ....

....

Dear Sir,

Please send..............................*boxes of bottles for samples of sea water to me here not later than*..

Yours faithfully,

....

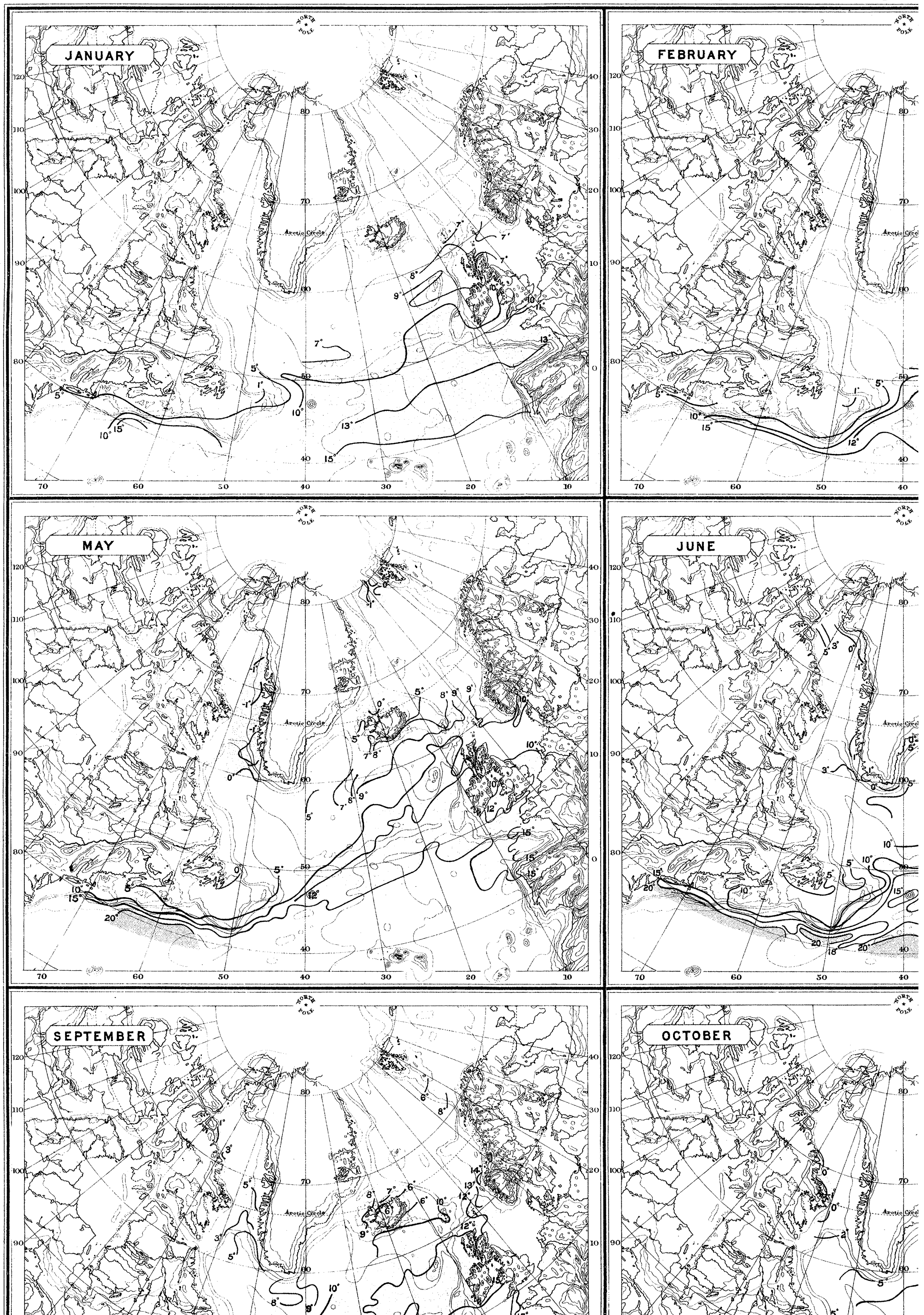
Commander.

APPENDIX III.—Numbers of the Samples in Table I., which contain less than 17 grammes of chlorine per litre, and of which the densities have been determined.

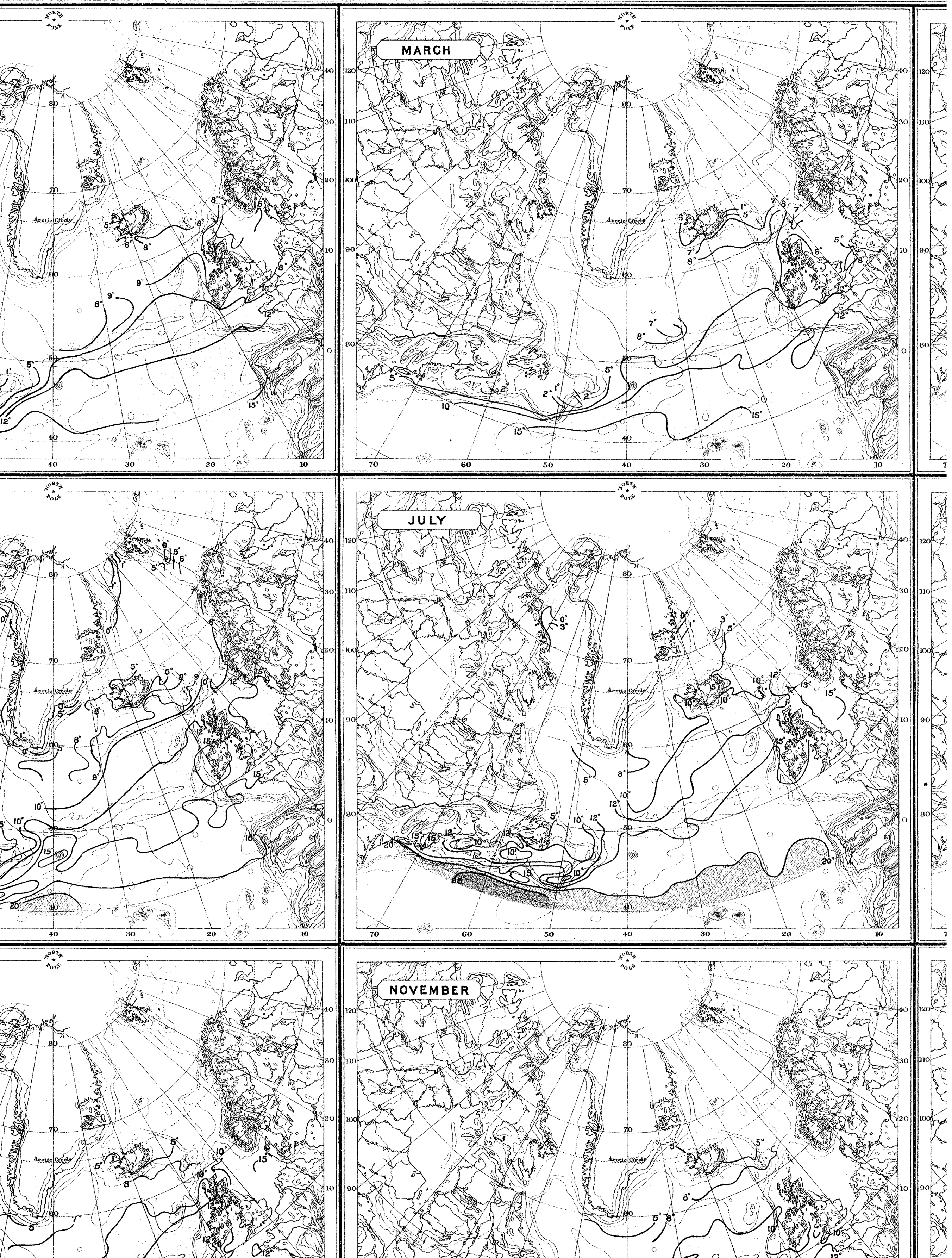
266, 267, 282, 1109, 1135, 1136, 1283, 1293, 1775, 1776, 1777, 1778, 1787, 1790, 1791, 1792, 1793, 1794, 1795, 1796, 1797, 1798, 1799, 1800, 1801, 1803, 1805, 1809, 1817, 1830, 1832, 1833, 1834, 1840, 1841, 2520, 2833, 3107, 3321, 3367, 3435, 3698, 3699, 3719, 3723, 3726, 3730, 3733, 3738, 3742, 3752, 3786.

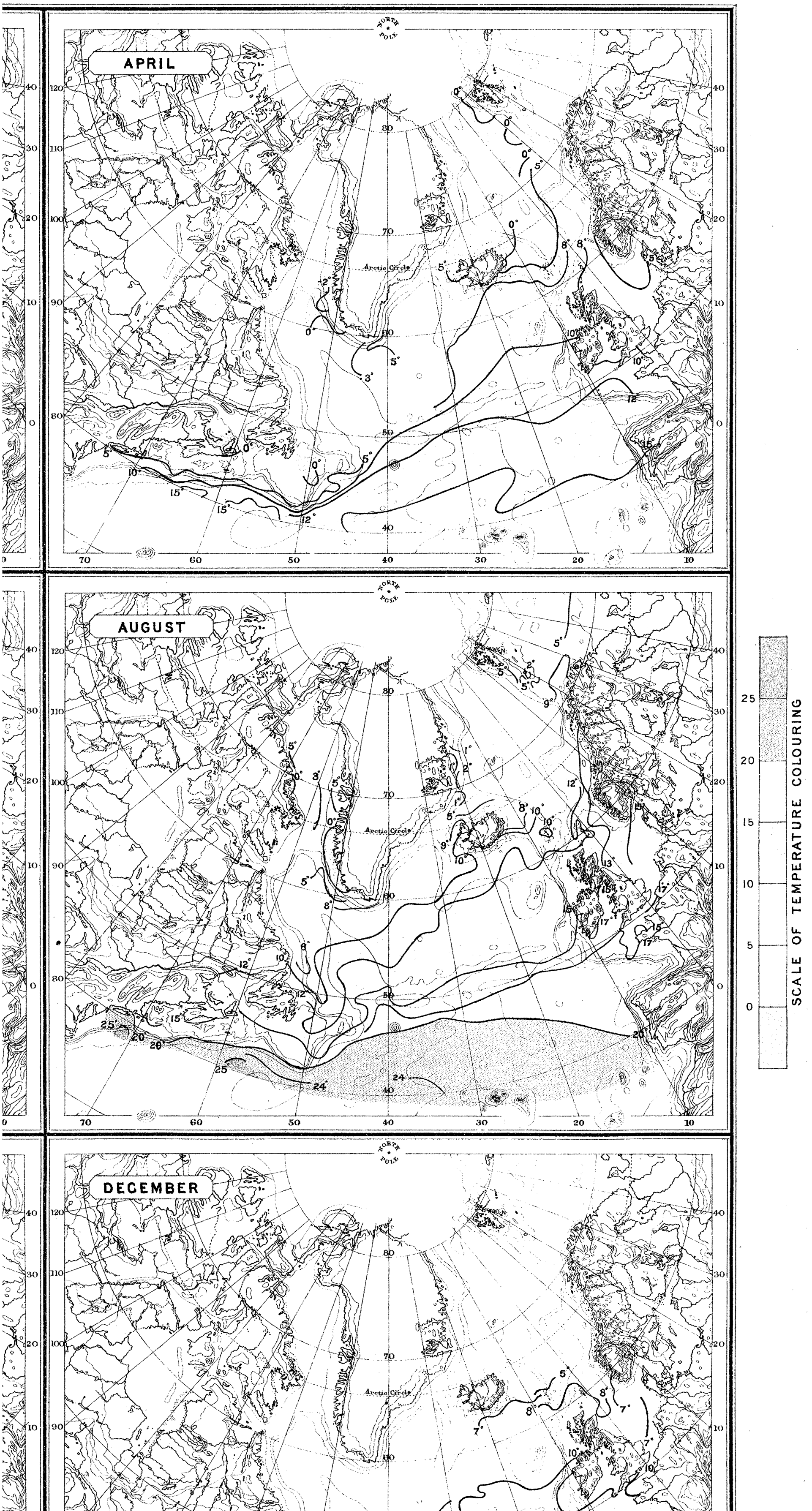
H.N.Dickson.

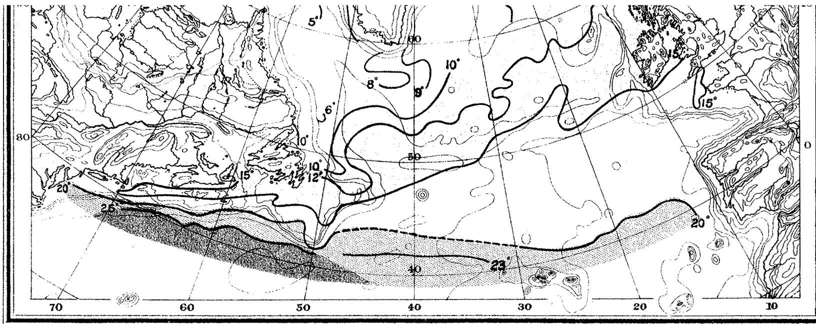
DISTRIBUTION OF TEMPERATURE

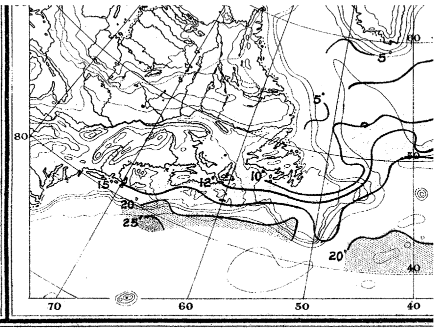


ATURE IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 18

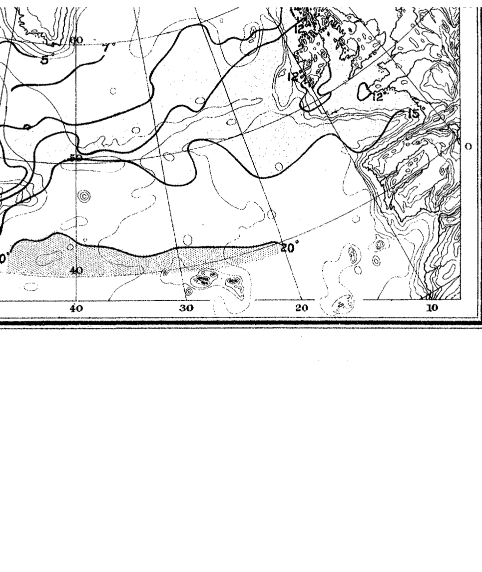


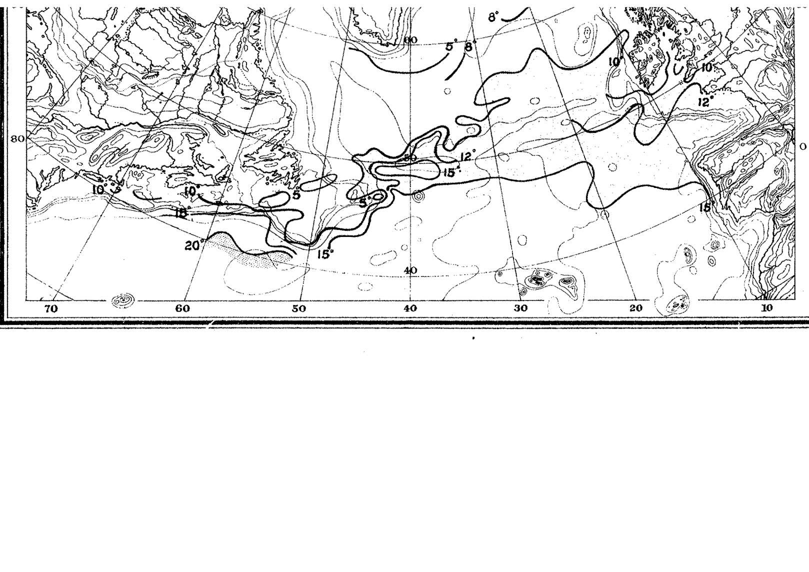

APRIL
AUGUST
DECEMBER
NORTH POLE
Arctic Circle
SCALE OF TEMPERATURE COLOURING
0
5
10
15
20
25





The Edinburgh Geographical Institute


5°
7°
60
12°
12°
12°
15
50
20°
40
40
30
20
10
0


8°
5°
8°
60
10°
10°
12°
80
12°
15°
10
10
5
8°
15°
20°
15°
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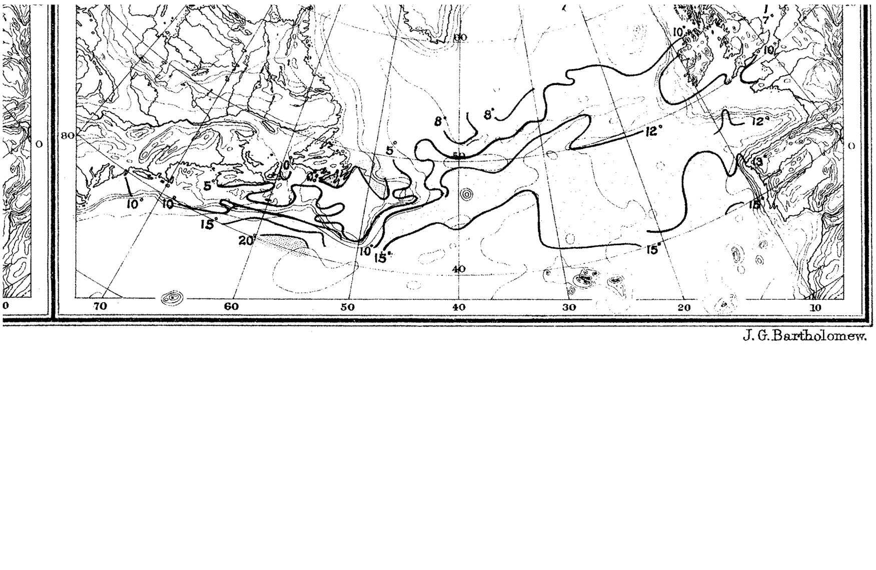
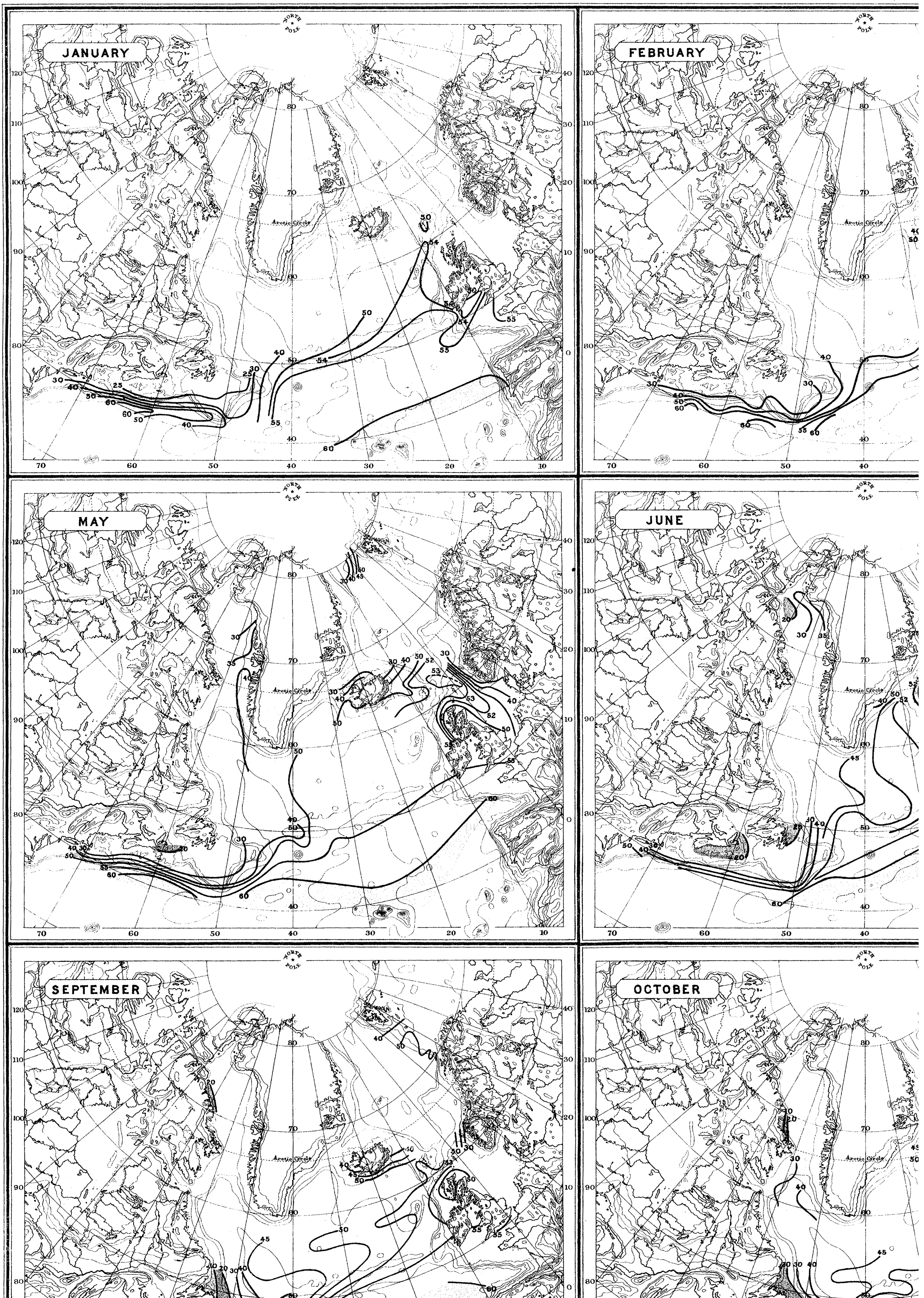
50
40
30
20
10
0



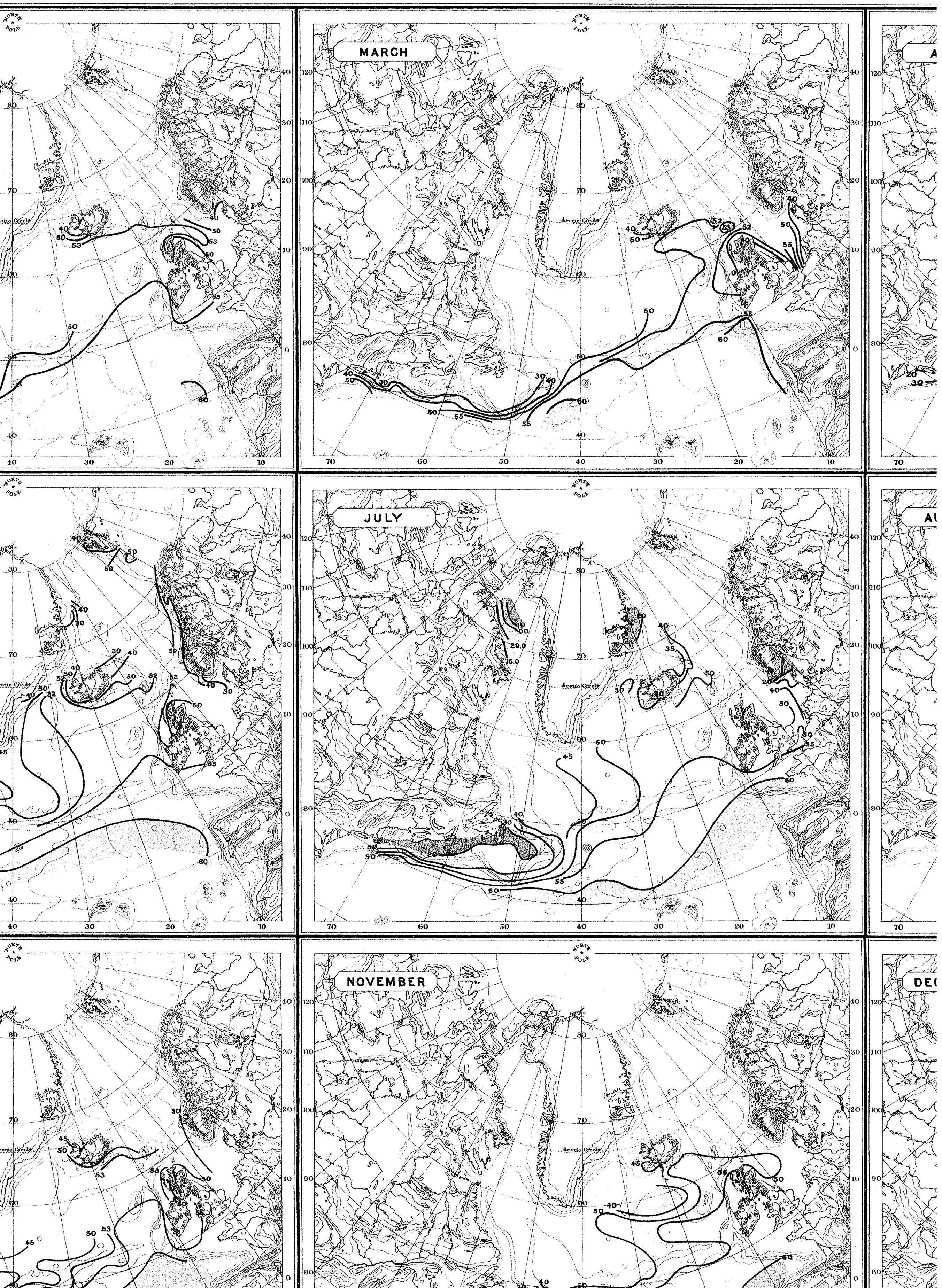
J. G. Bartholomew.

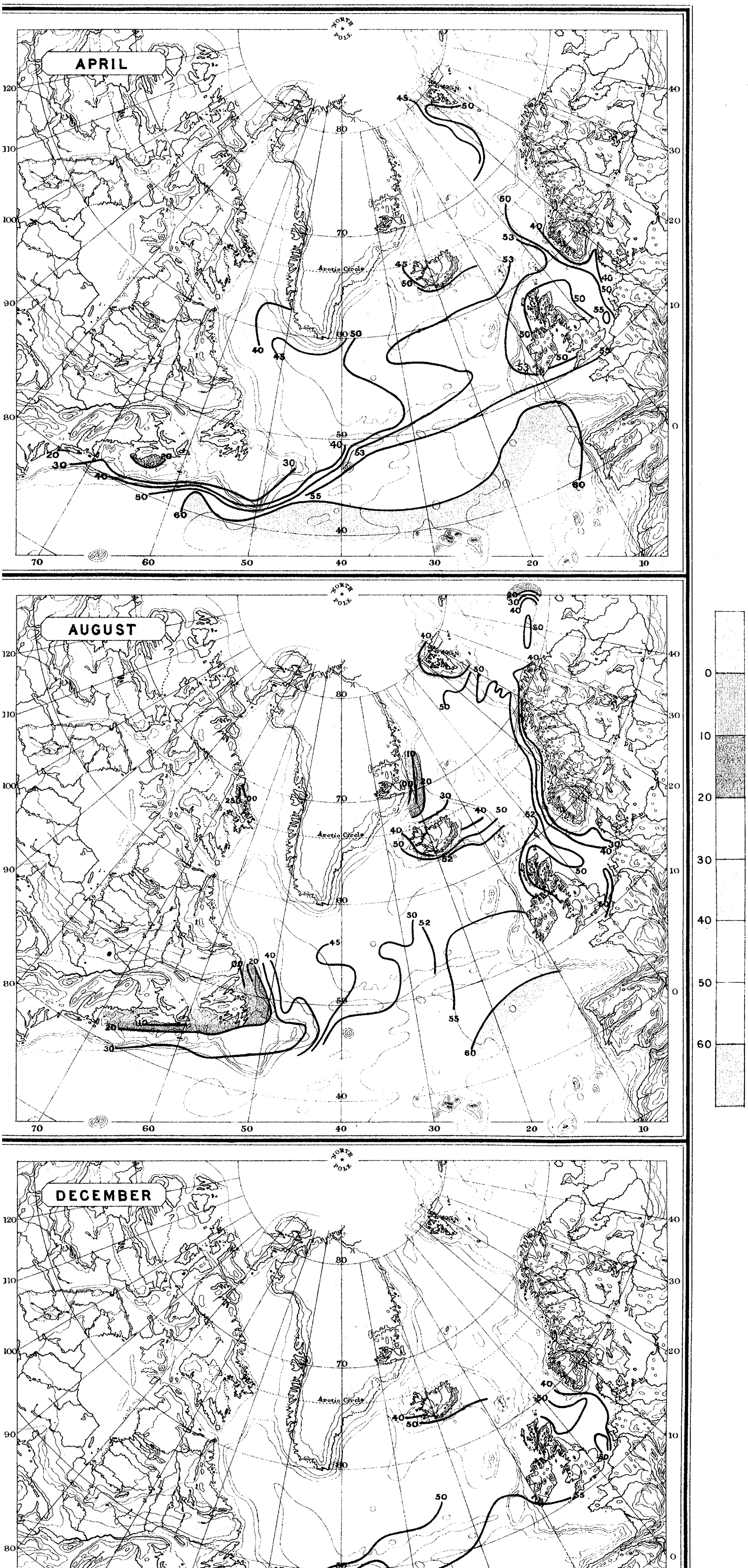
H.N.Dickson.

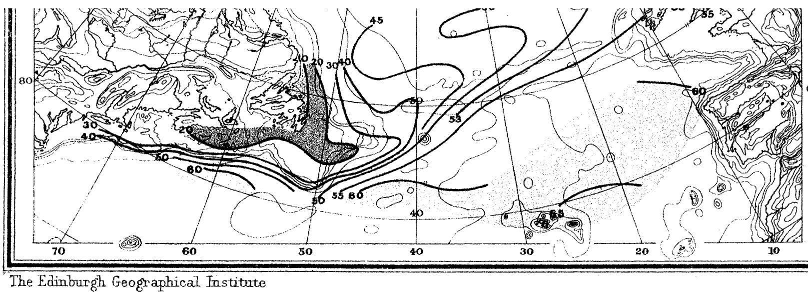
DISTRIBUTION OF SALINITY IN T

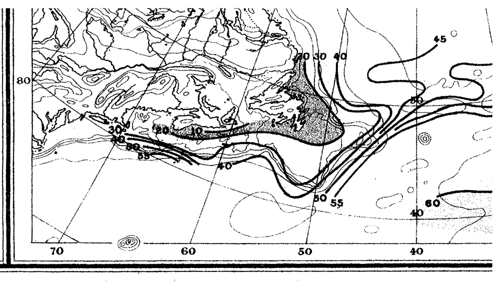


Y IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1896.




APRIL
AUGUST
DECEMBER
Arctic Circle
SCALE OF SALINITY COLOURING
0
10
20
30
40
50
60





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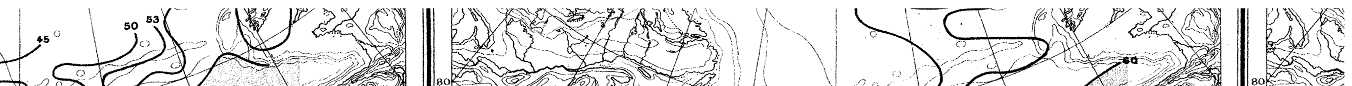
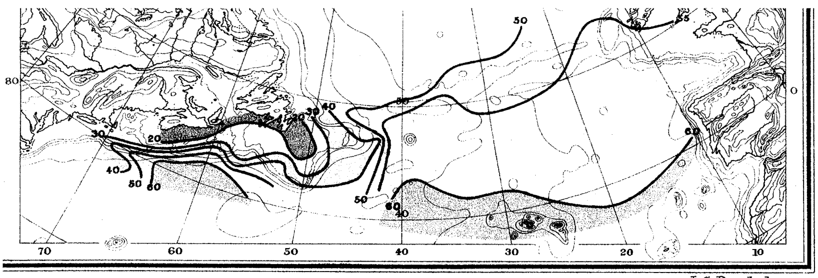
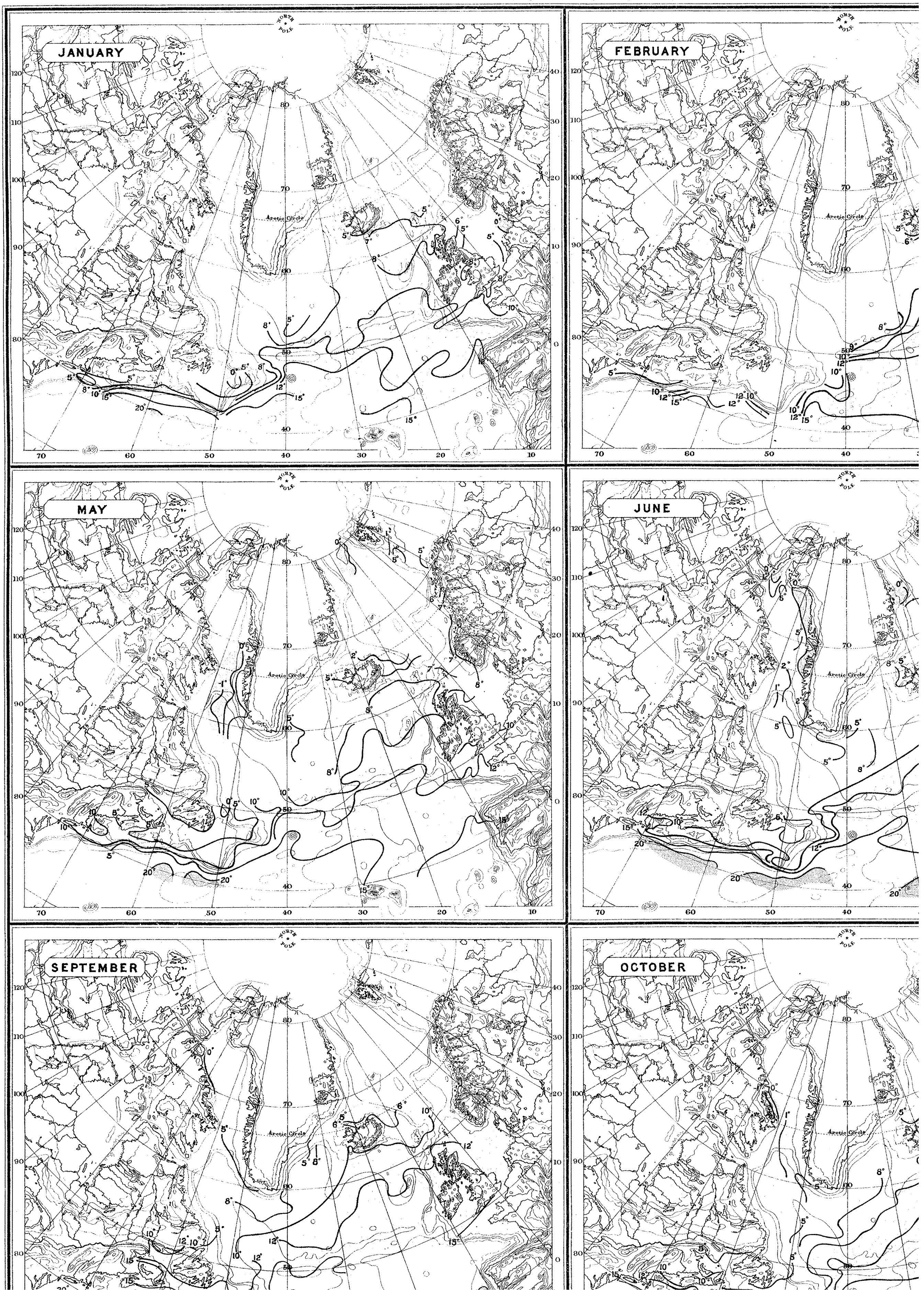




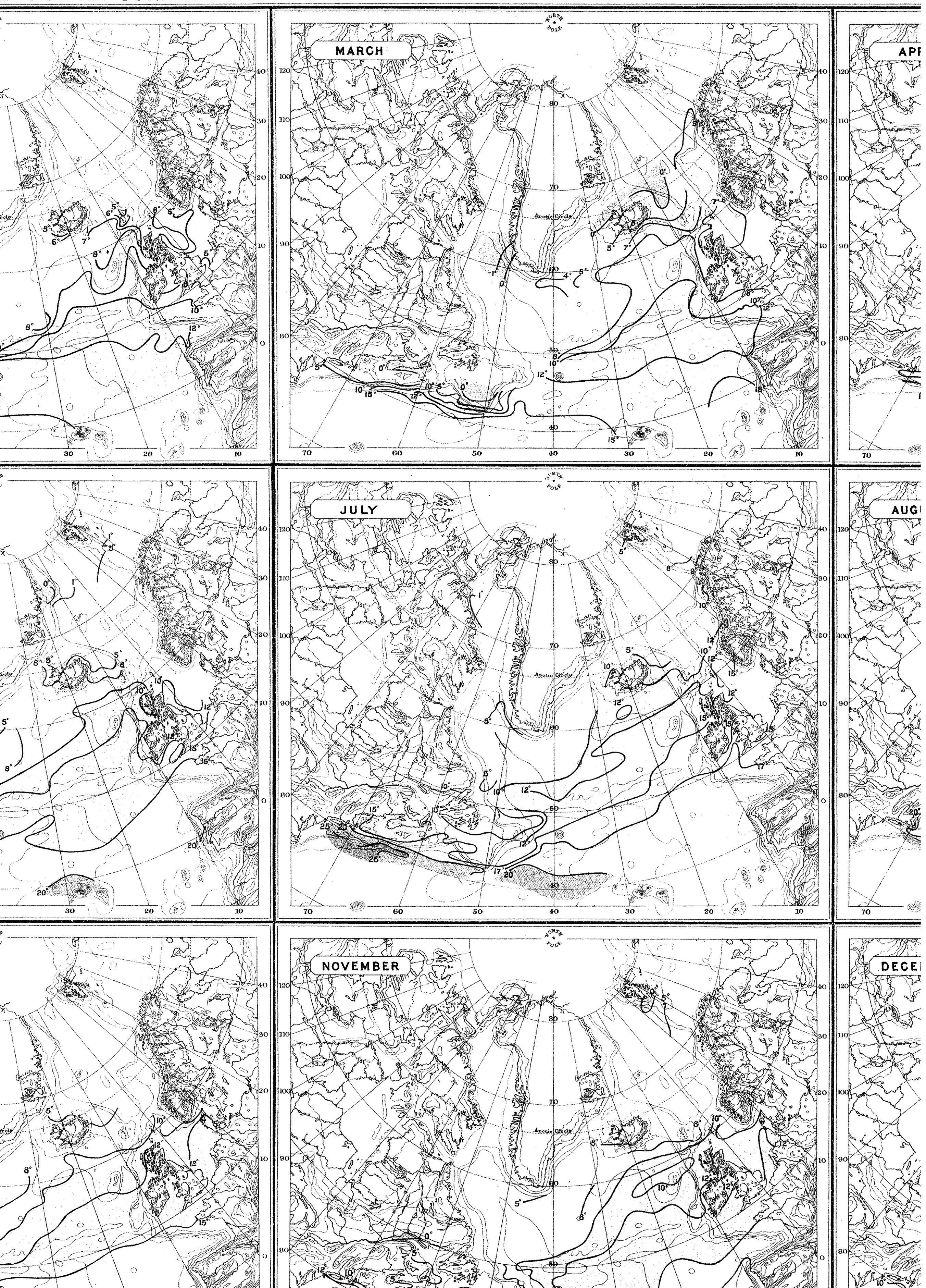
J. G. Bartholomew

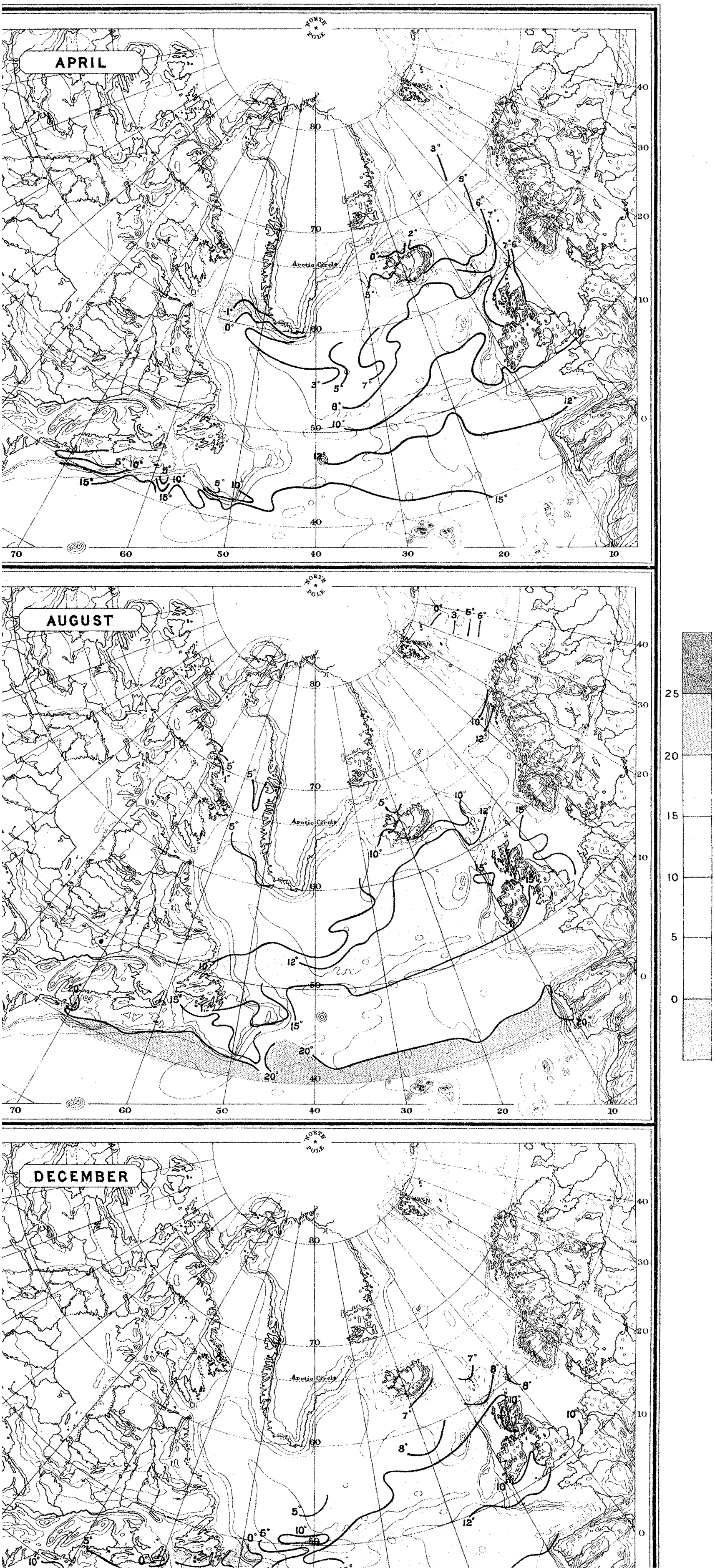
H. N. Dickson.

DISTRIBUTION OF TEMPERATURE IN



E IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1897.




APRIL
AUGUST
DECEMBER
NORTH POLE
Arctic Circle
SCALE OF TEMPERATURE COLOURING
25
20
15
10
5
0

The Edinburgh Geographical Institute

15
0
20°
30
20
10
80
0°
5°
12°
10°
15°
12°
15°
20°
5°
10°
15°
50
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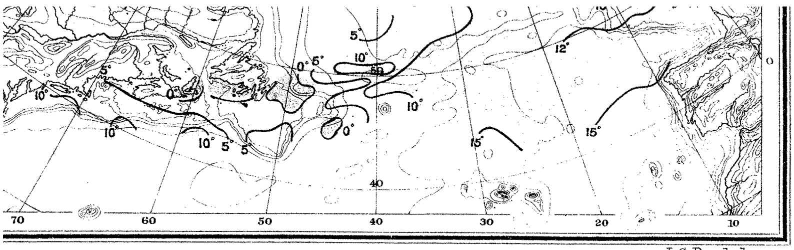

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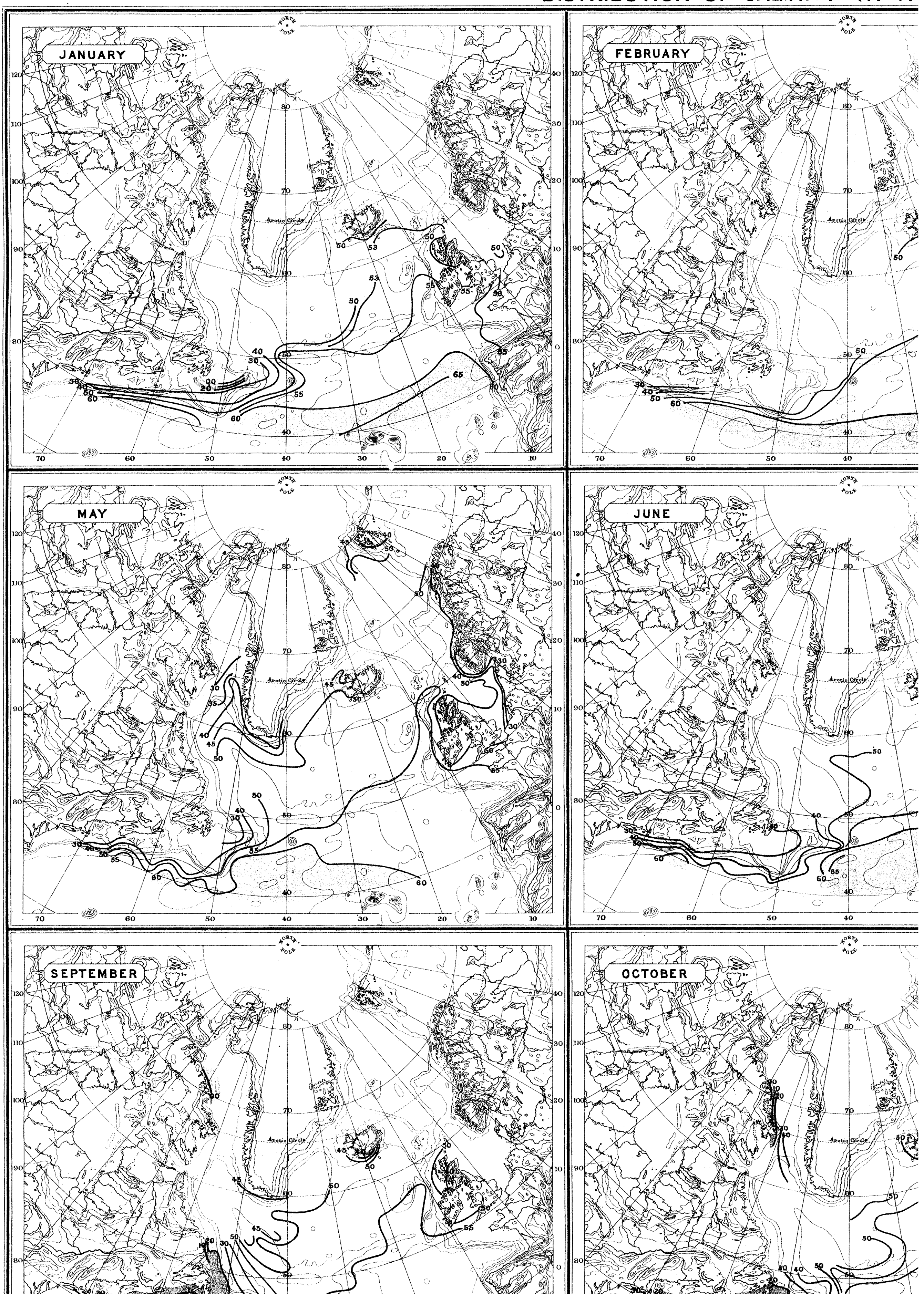
JANUARY
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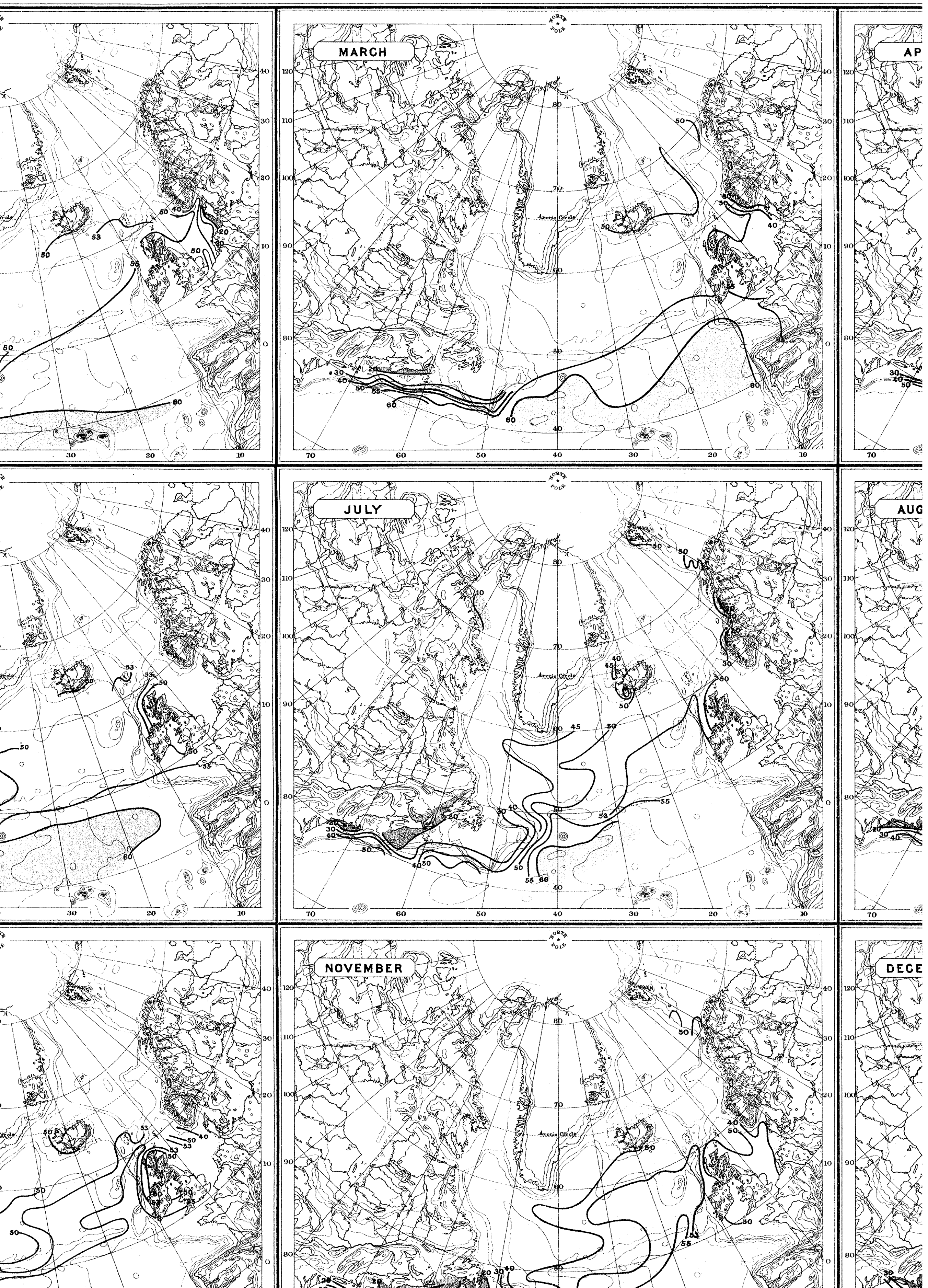
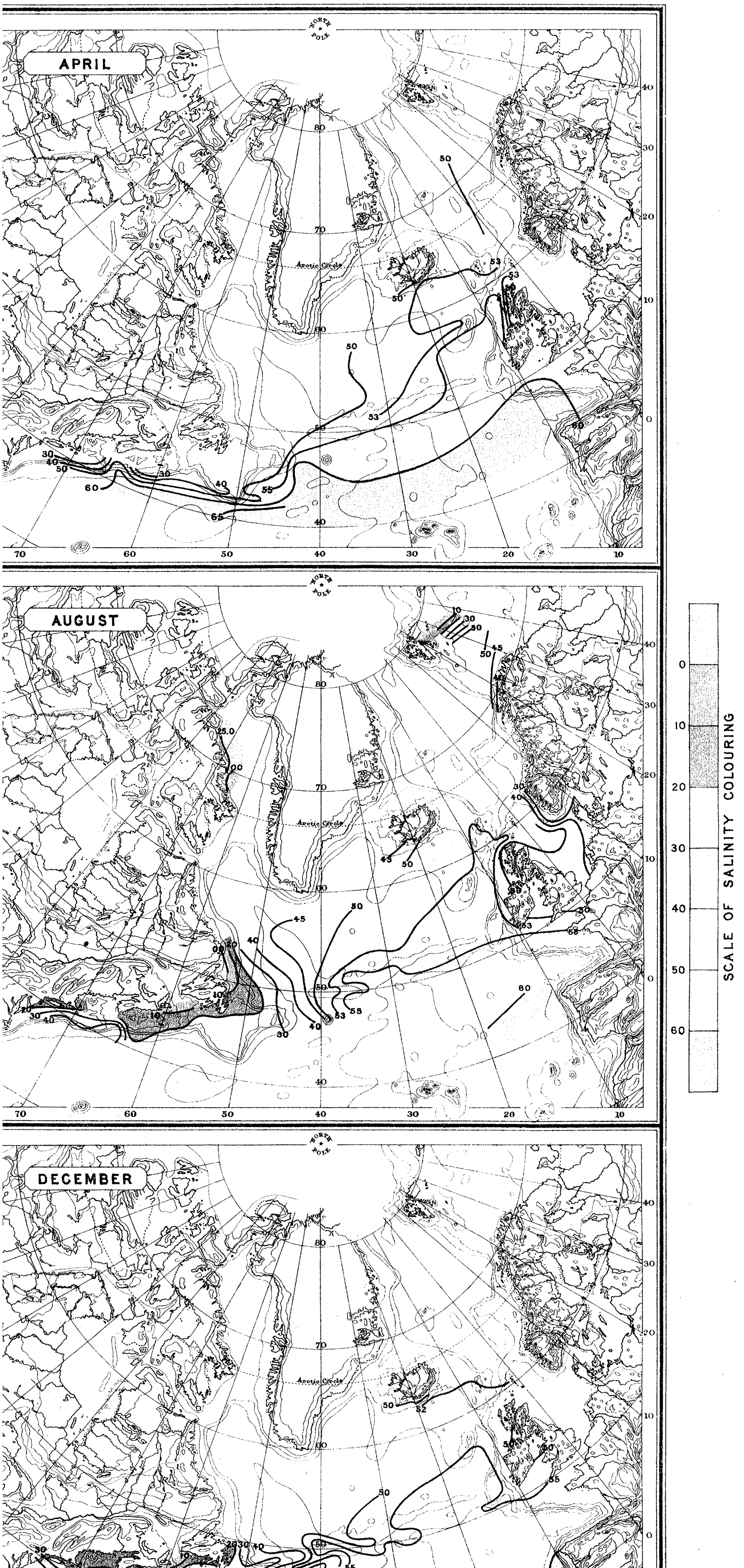
OCTOBER
NORTH POLE
Arctic Circle

IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1897.




APRIL
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NORTH POLE
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SCALE OF SALINITY COLOURING
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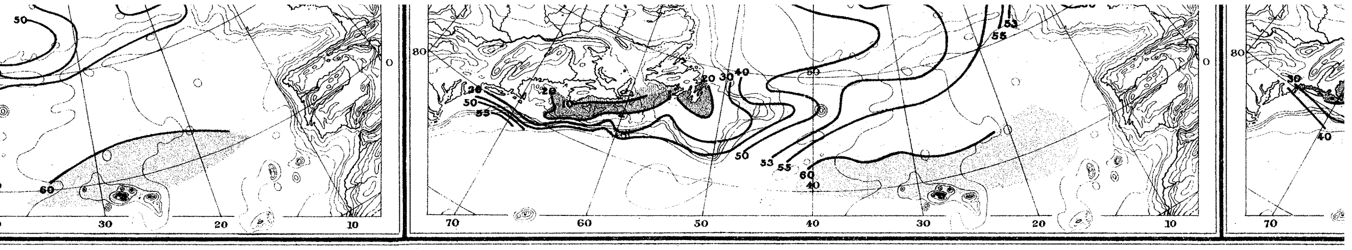
The Edinburgh Geographical Institute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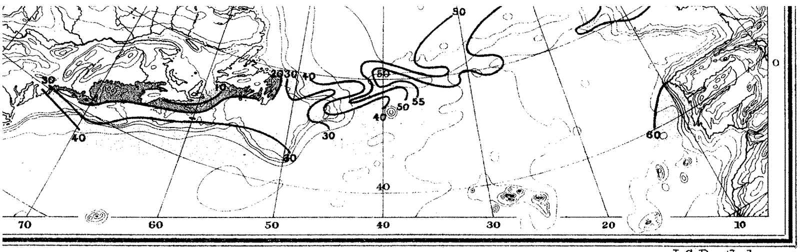

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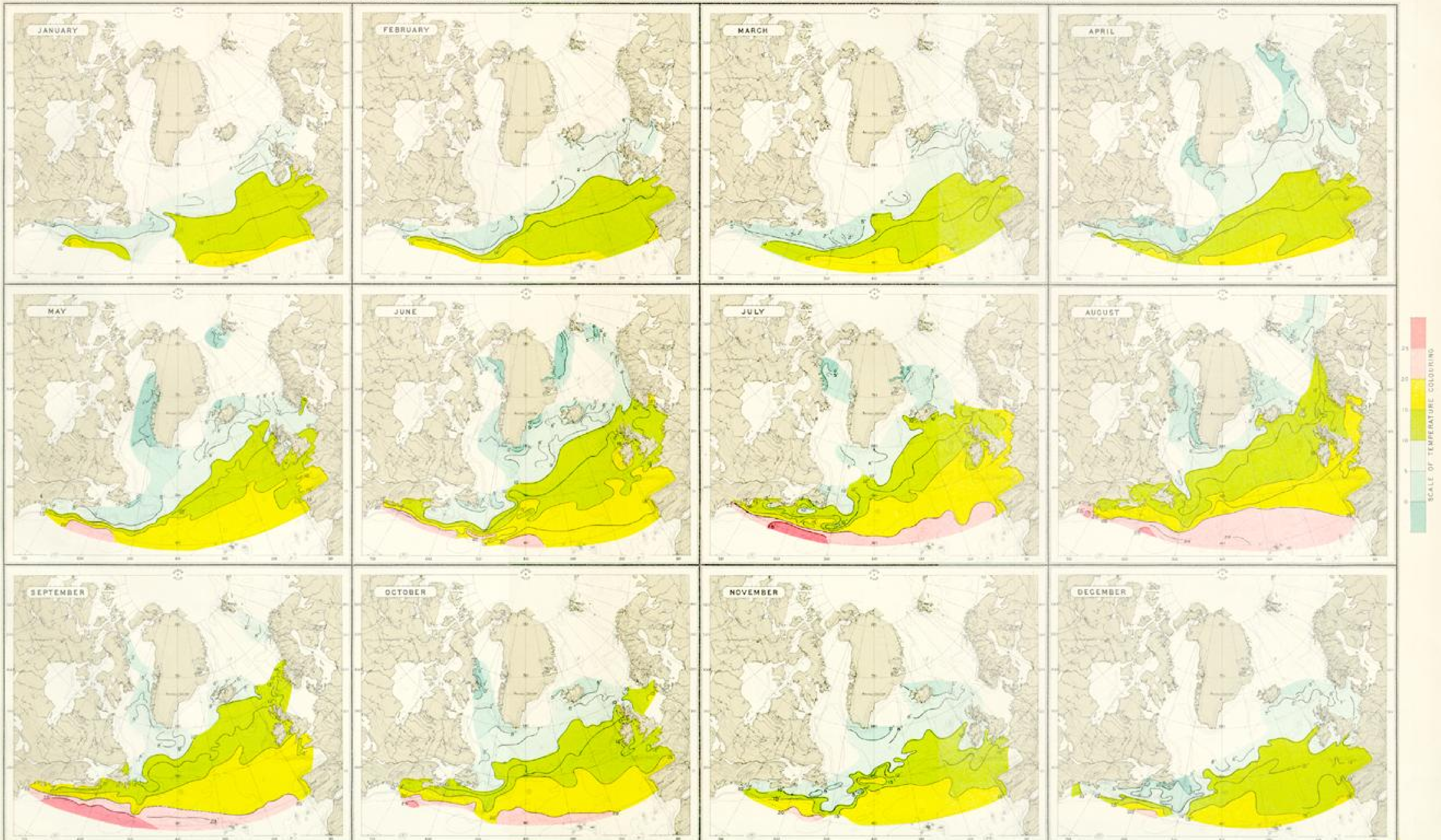
JANUARY
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SCALE OF TEMPERATURE COLOURING
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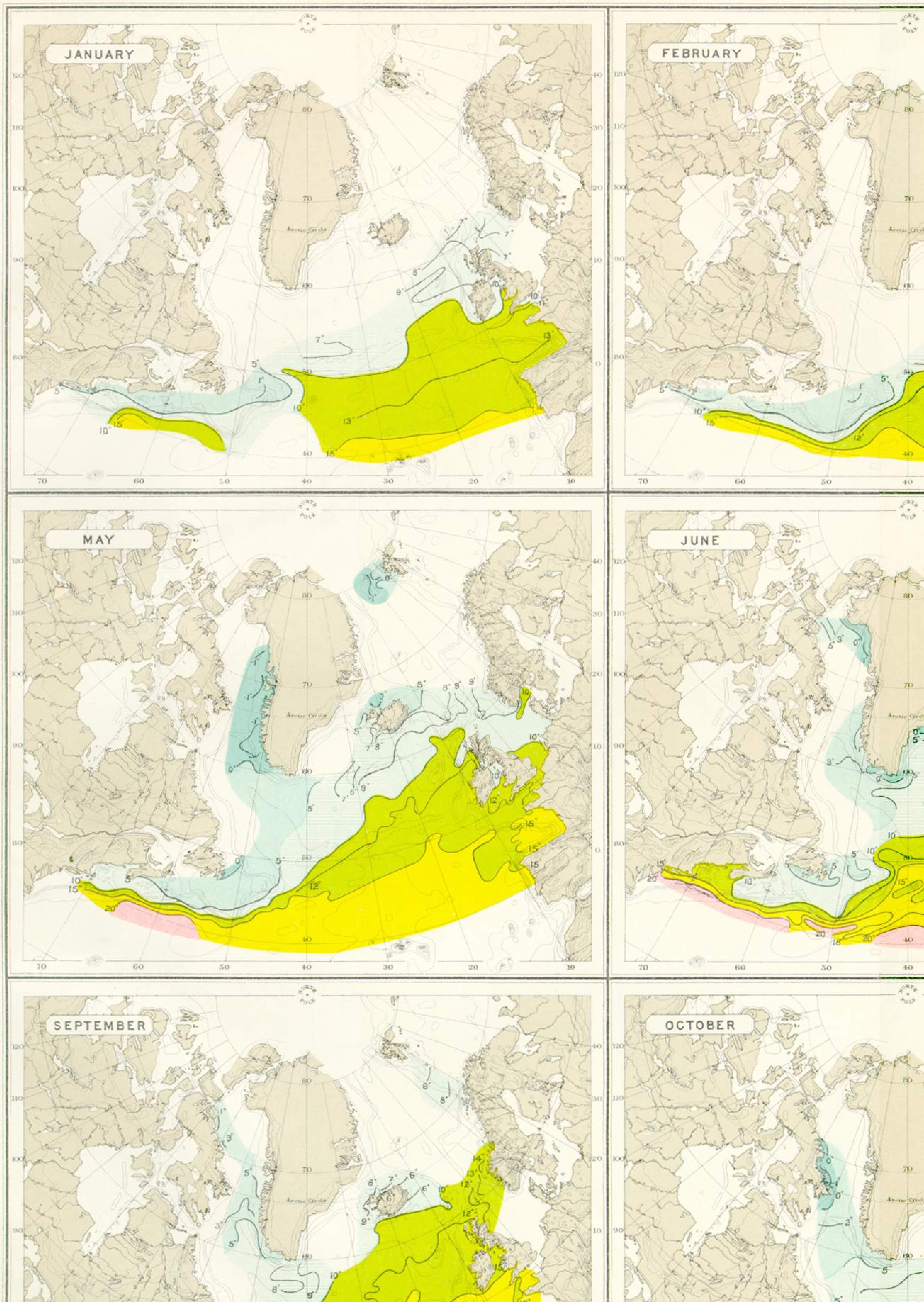
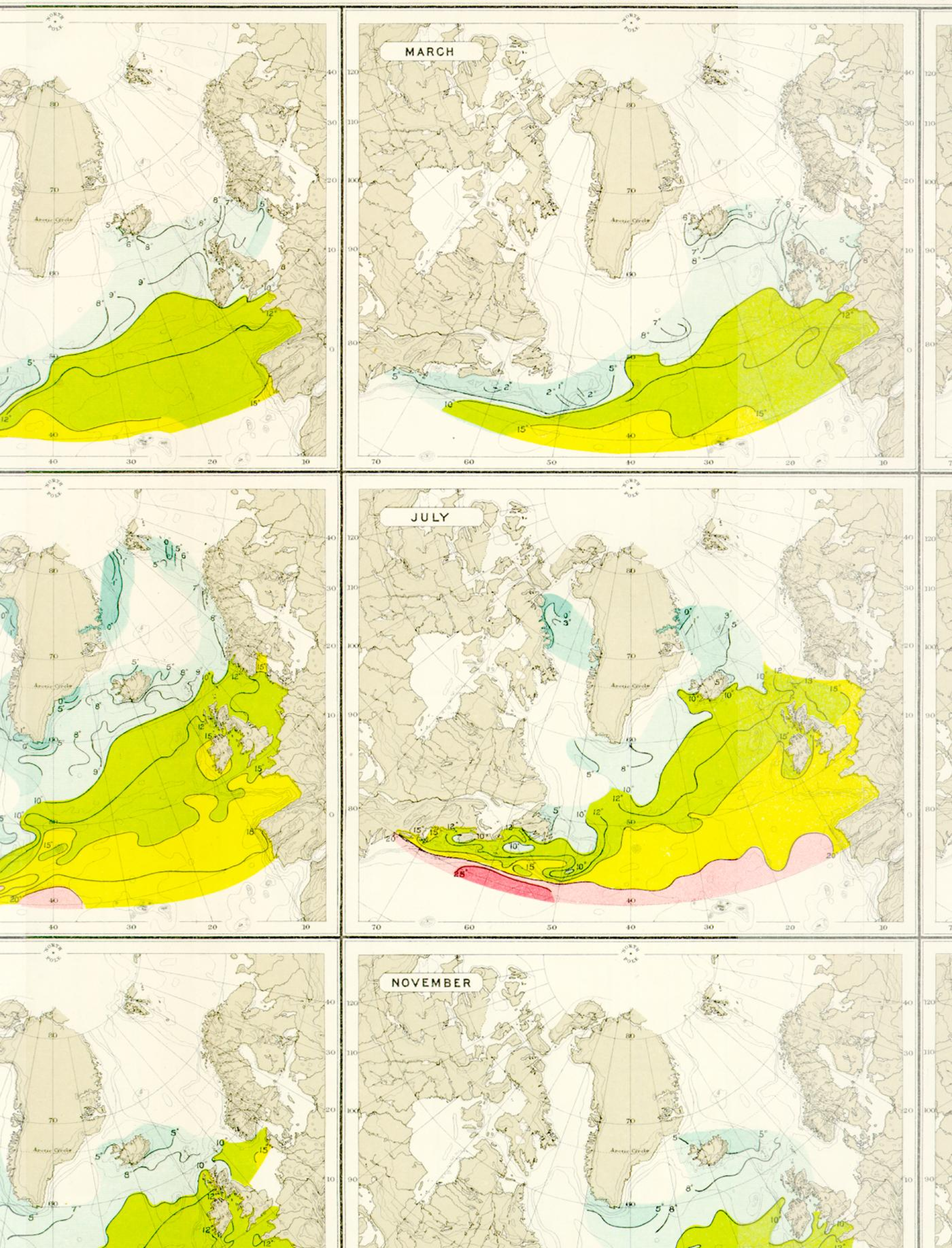
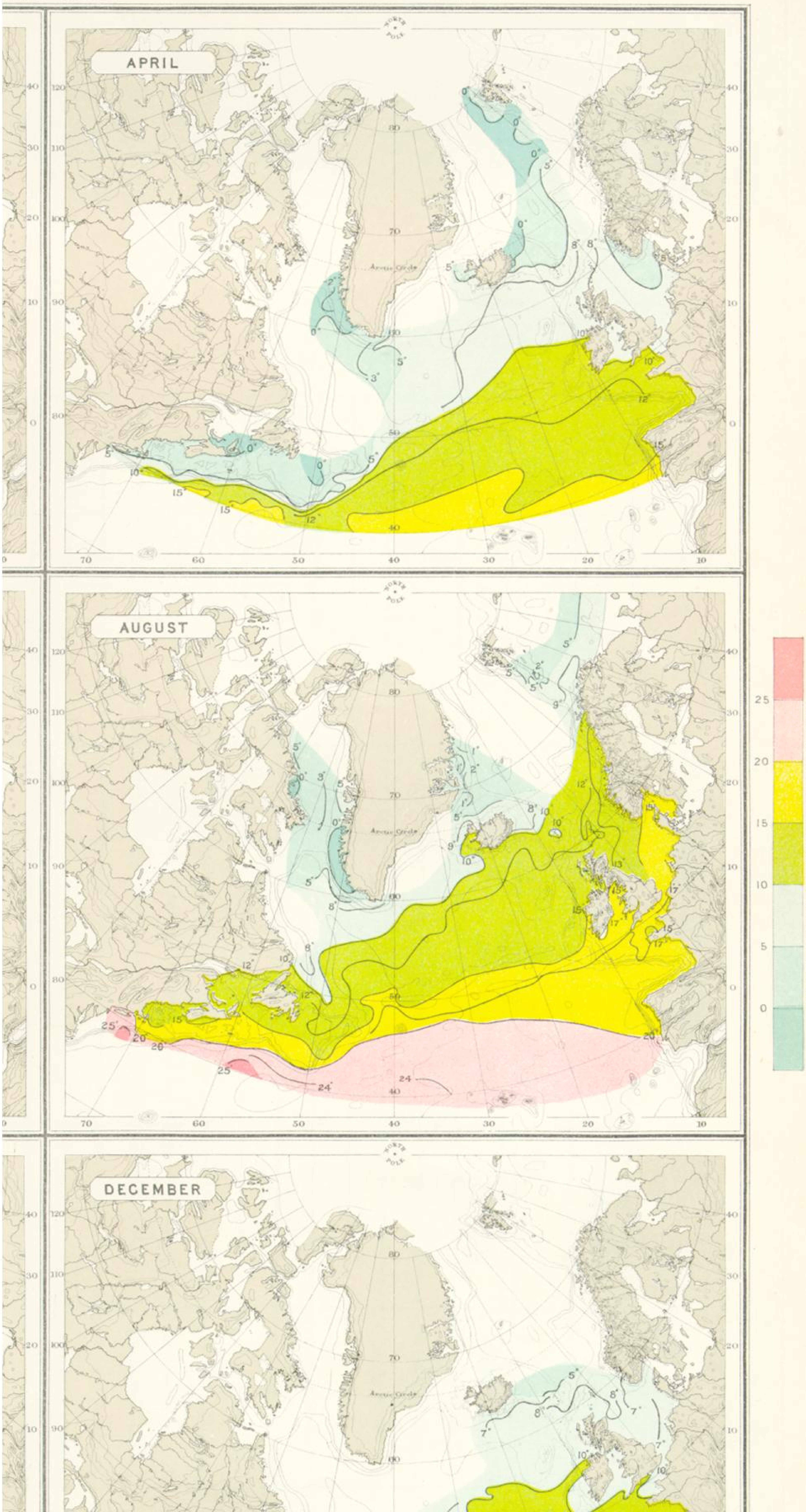
H. N. Dickson.

DISTRIBUTION OF TEMPERATURE



ATURE IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 18

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Arctic Circle
SCALE OF TEMPERATURE COLOURING
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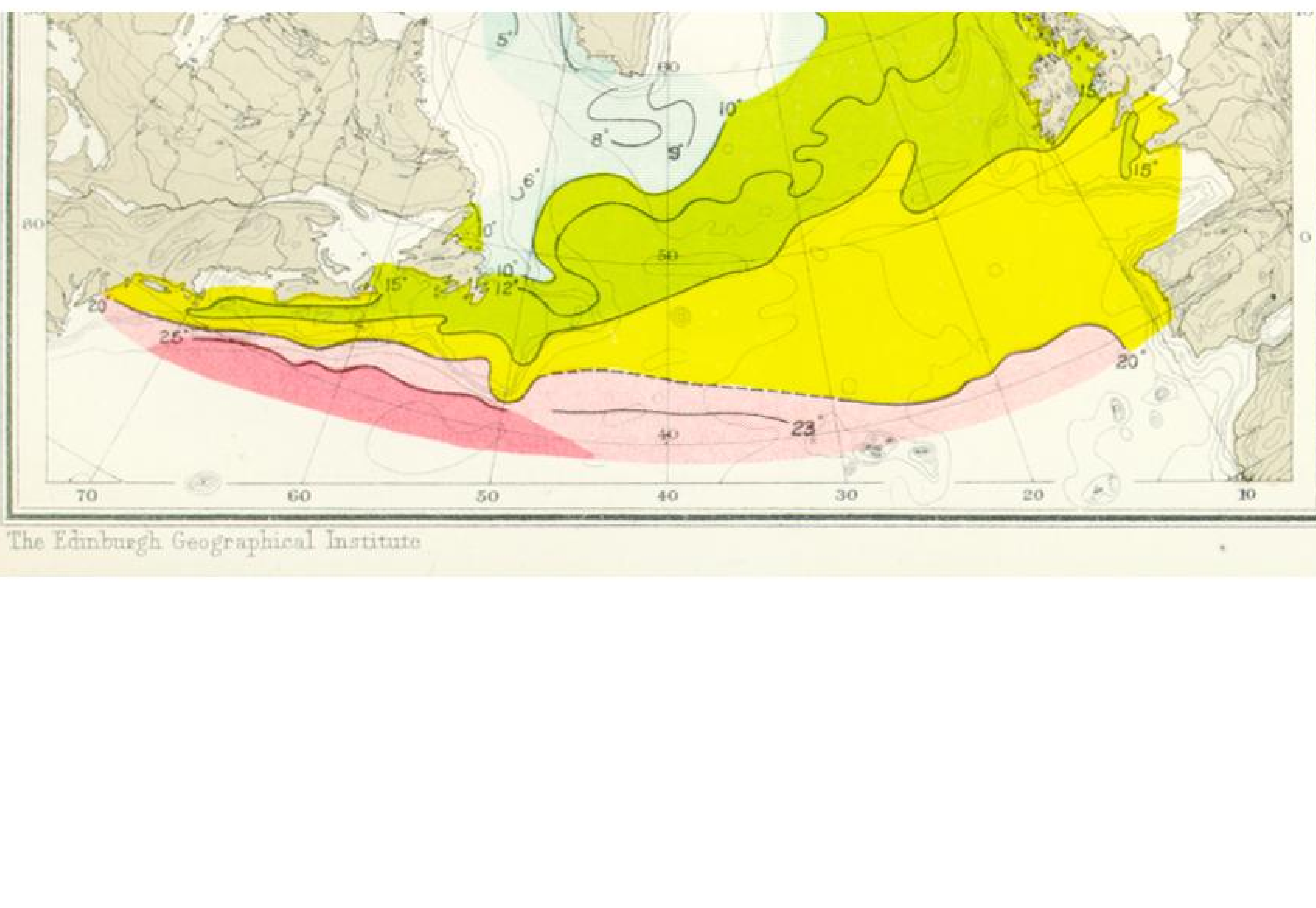

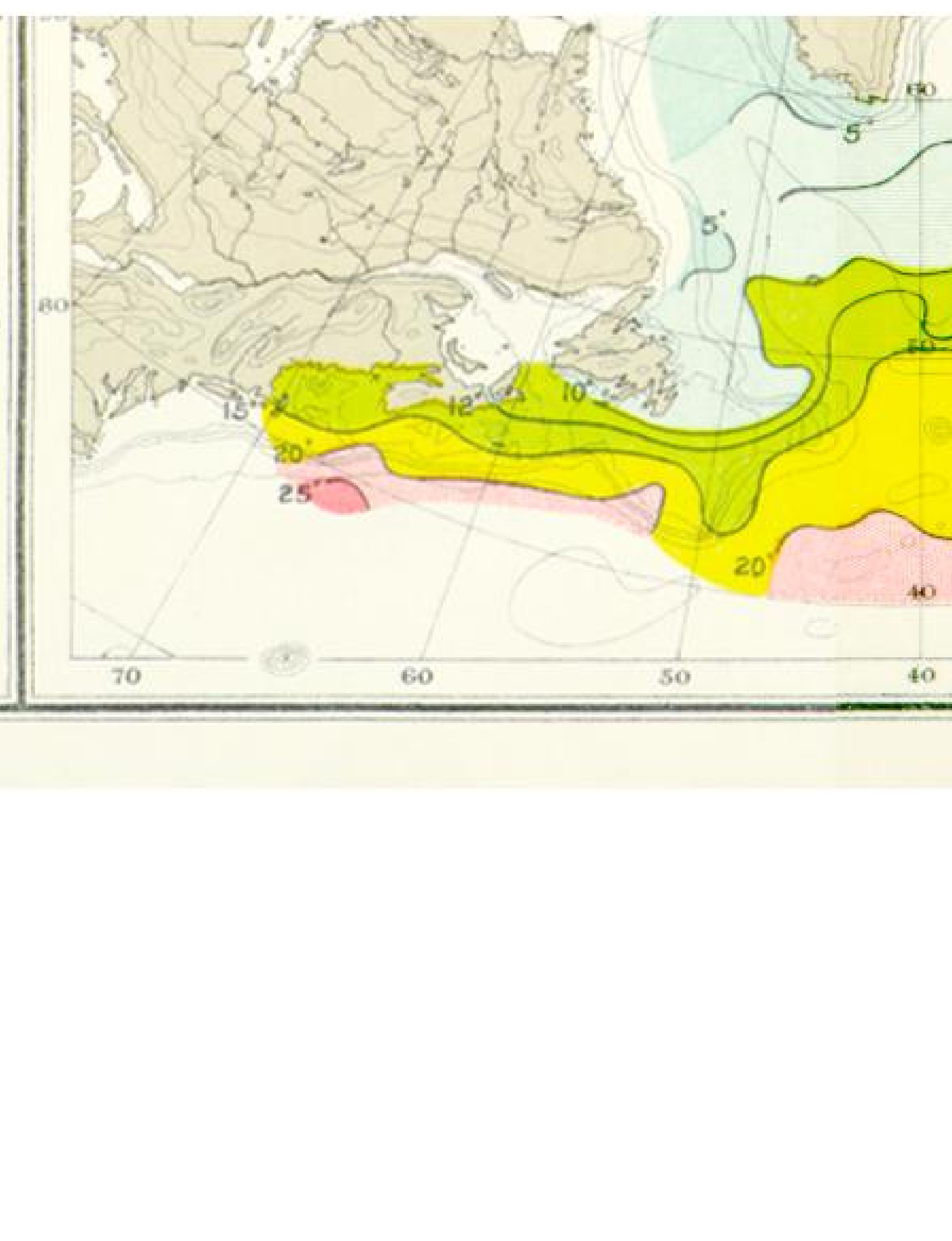

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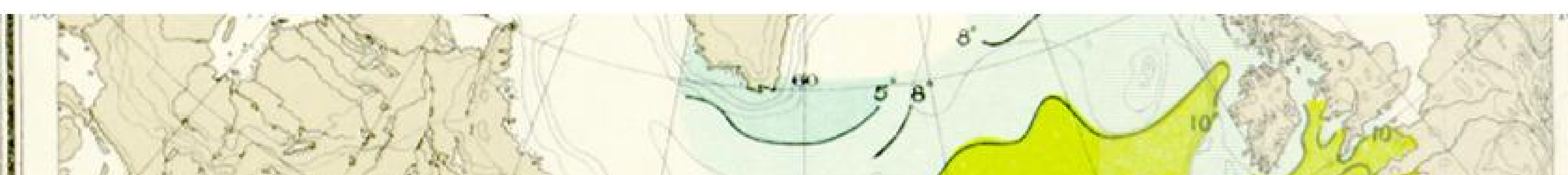
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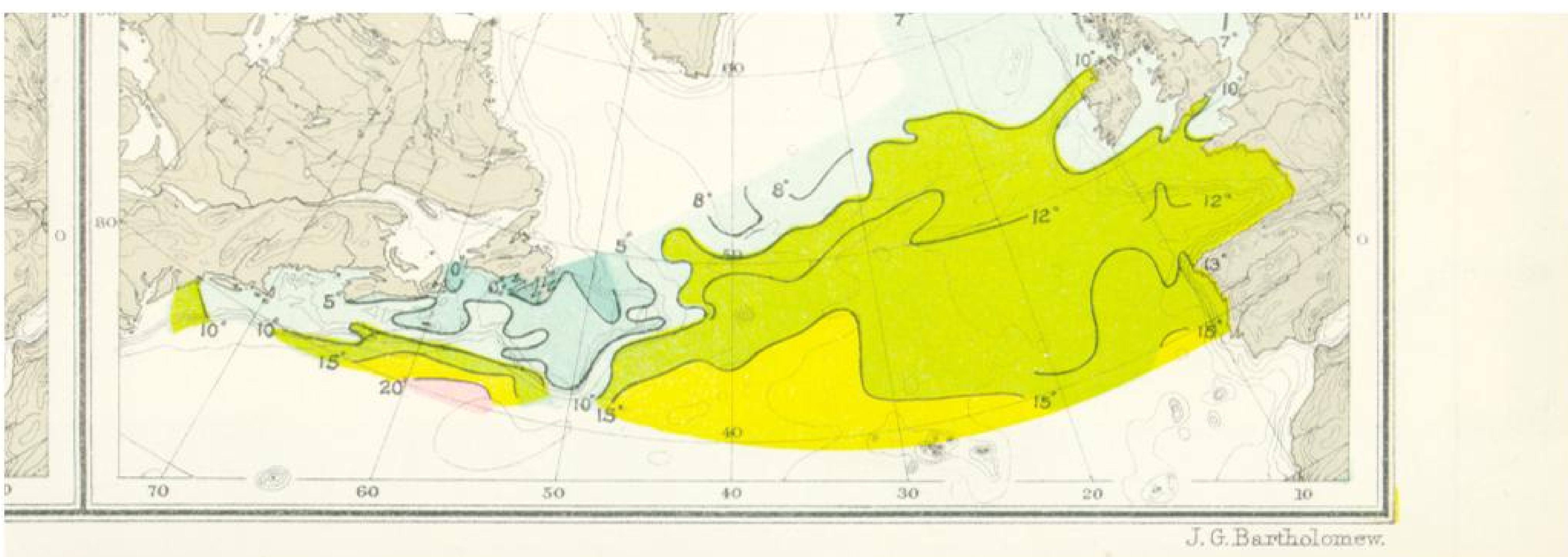

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J. G. Bartholomew.

DISTRIBUTION OF SALINITY IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1896.

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DISTRIBUTION OF SALINITY IN T

Y IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1896.


APRIL
AUGUST
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NORTH POLE
Arctic Circle
SCALE OF SALINITY COLOURING
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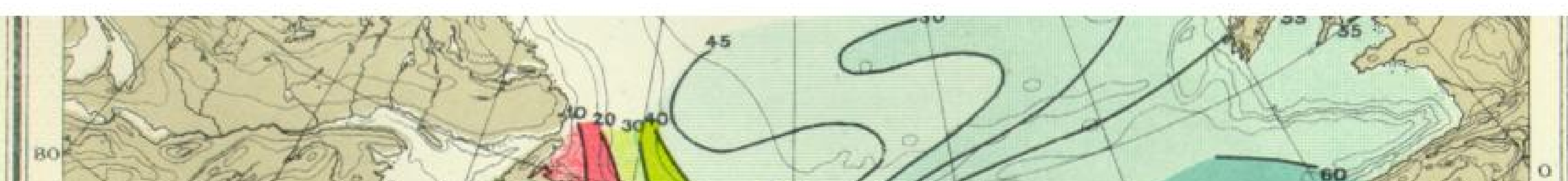

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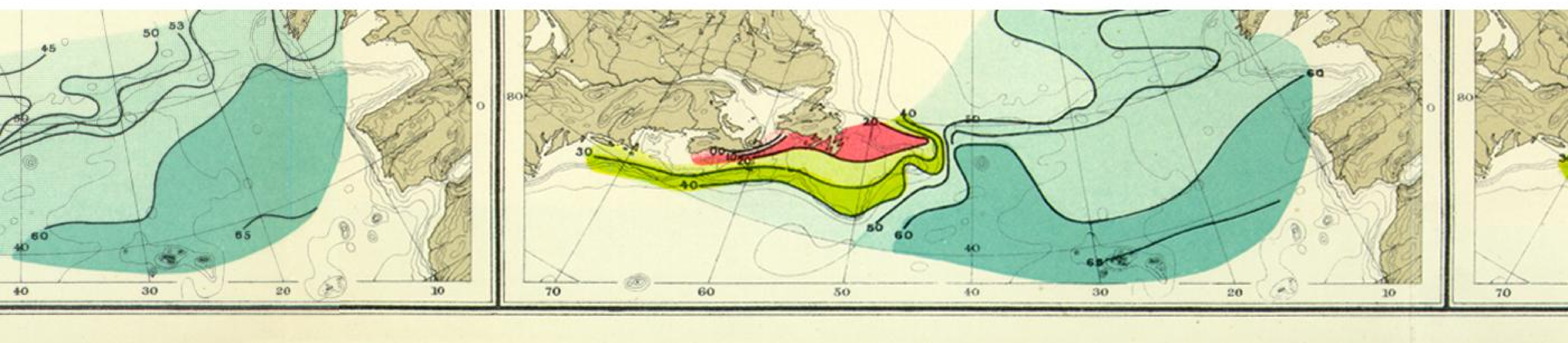

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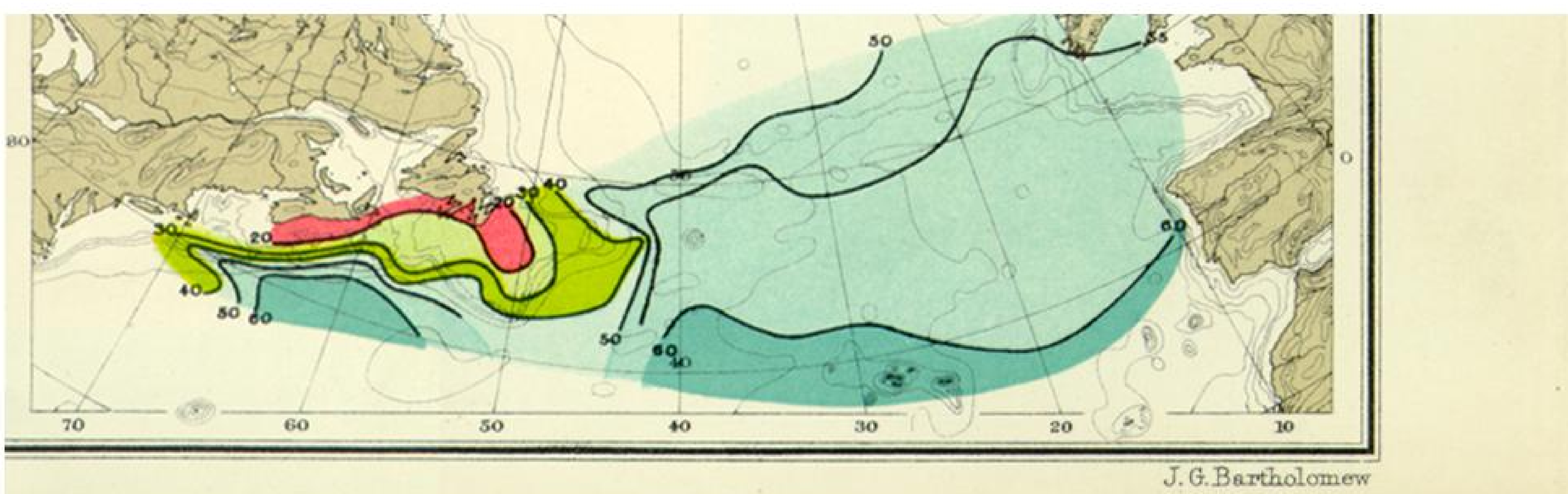

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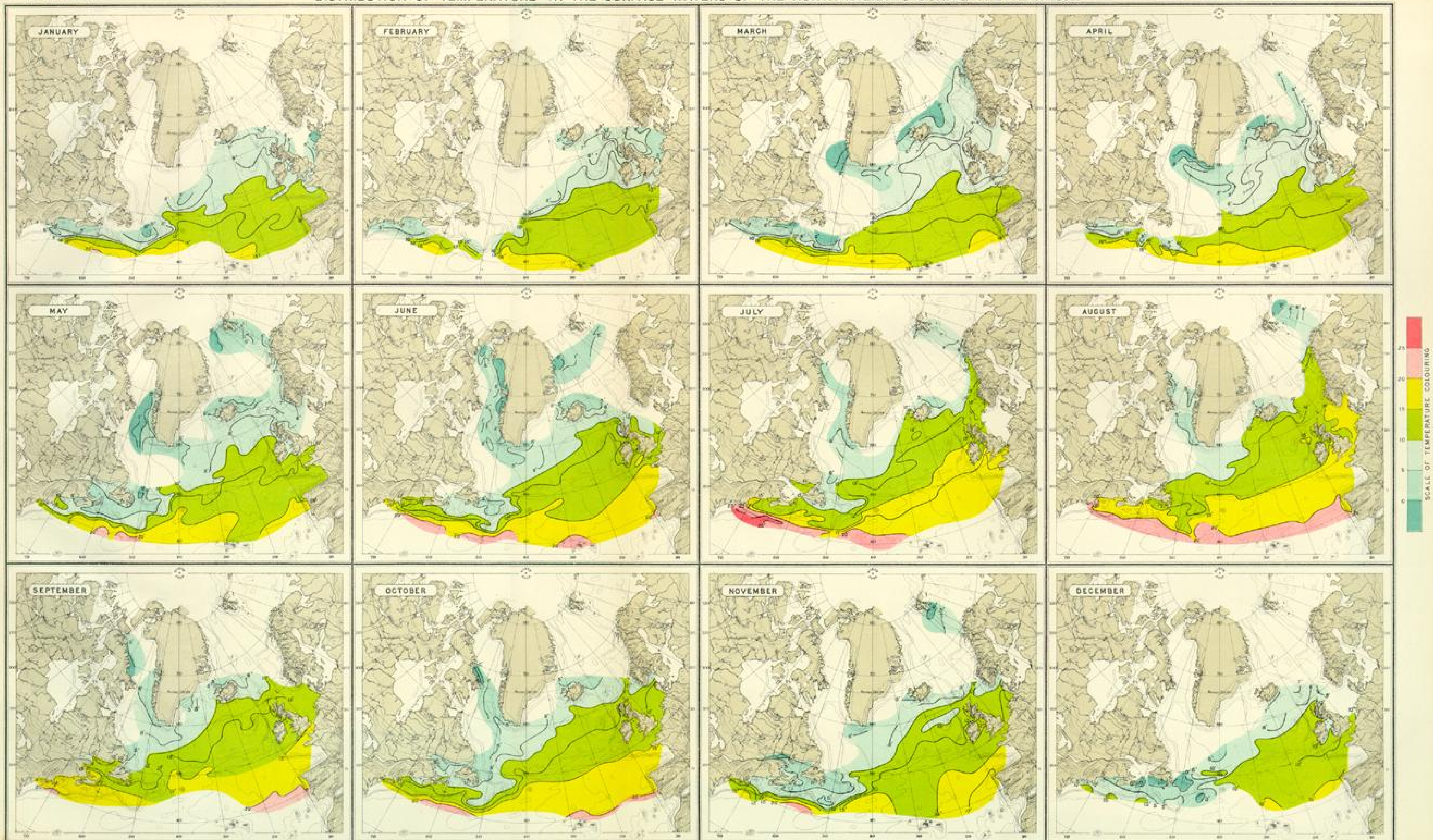
J. G. Bartholomew



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DISTRIBUTION OF TEMPERATURE IN

E IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1897.


APRIL
AUGUST
DECEMBER
SCALE OF TEMPERATURE COLOURING
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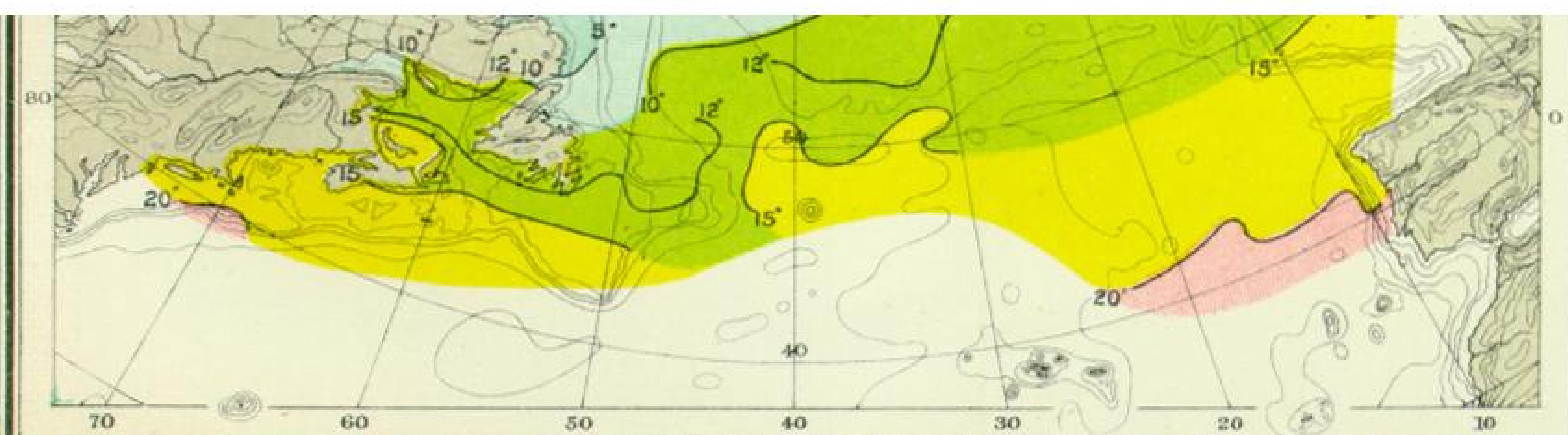

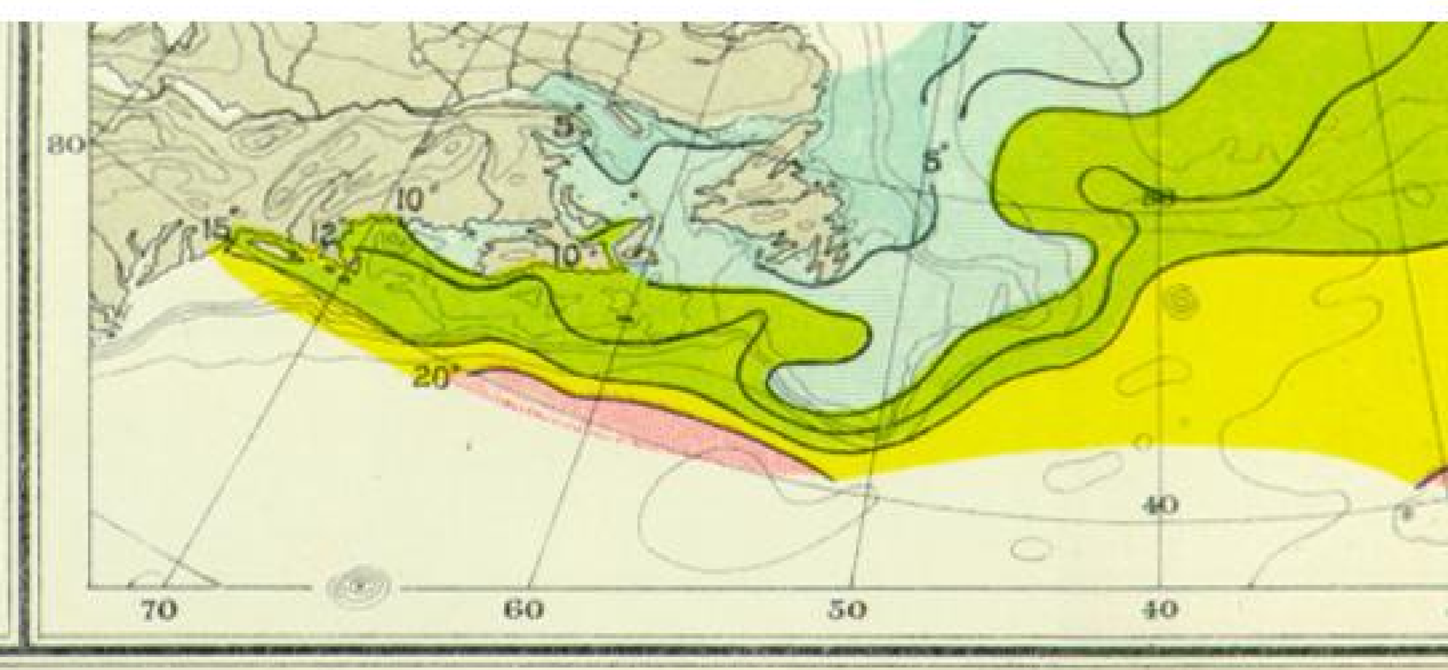

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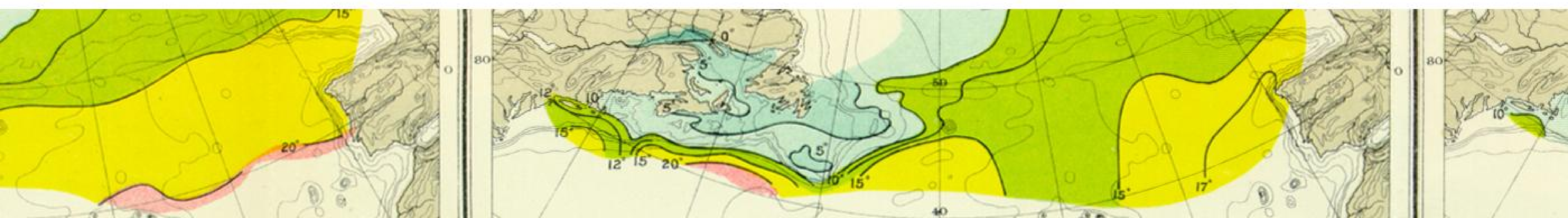
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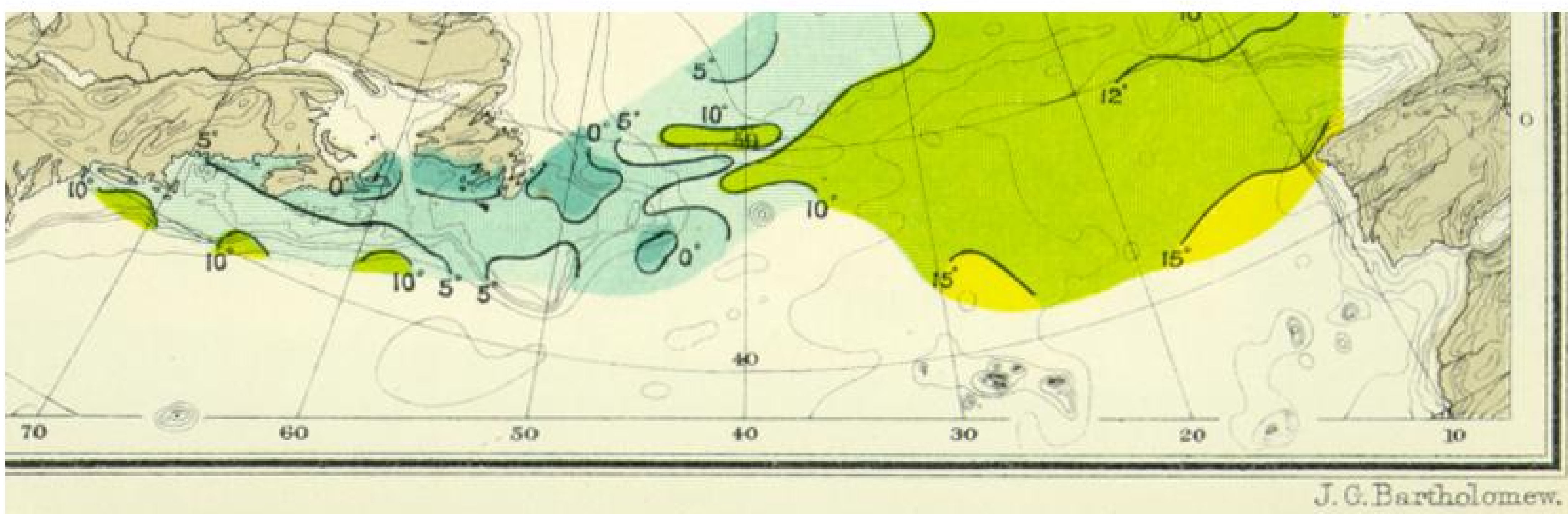

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DISTRIBUTION OF SALINITY IN TH

IN THE SURFACE WATERS OF THE NORTH ATLANTIC DURING THE YEAR 1897.


APRIL
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DECEMBER
NORTH POLE
Arctic Circle
SCALE OF SALINITY COLOURING
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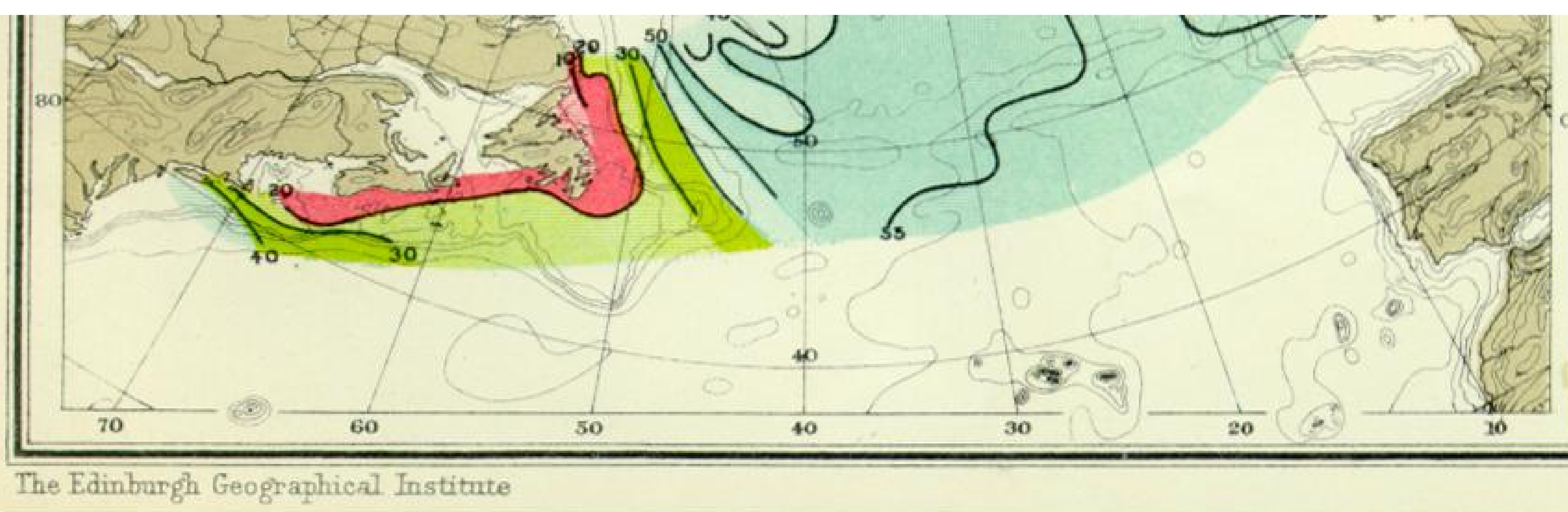

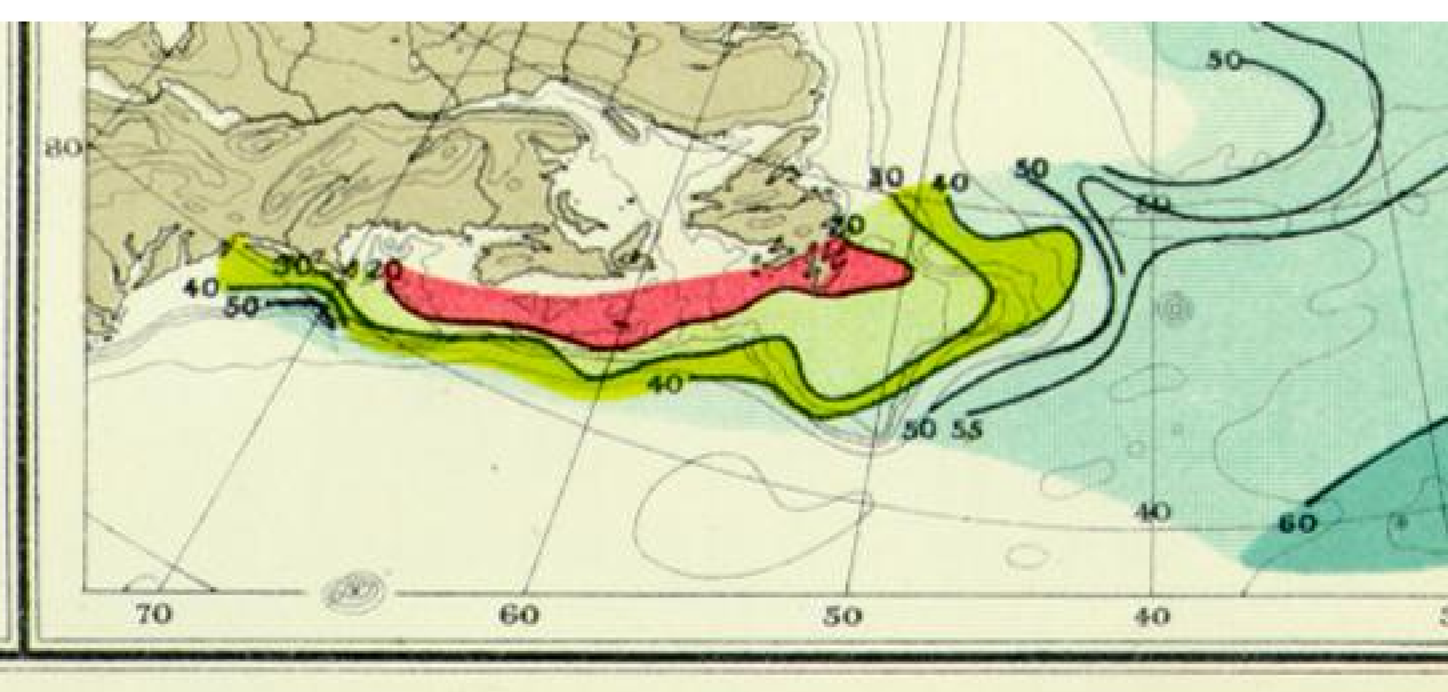

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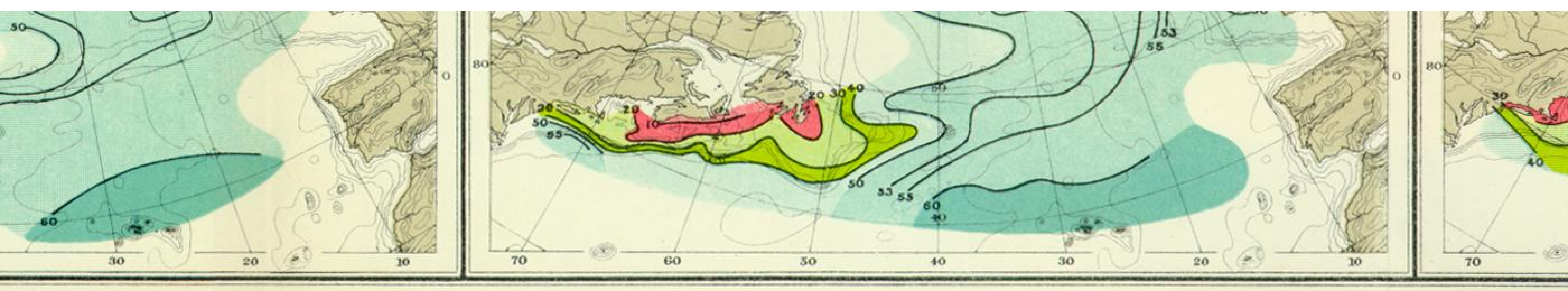

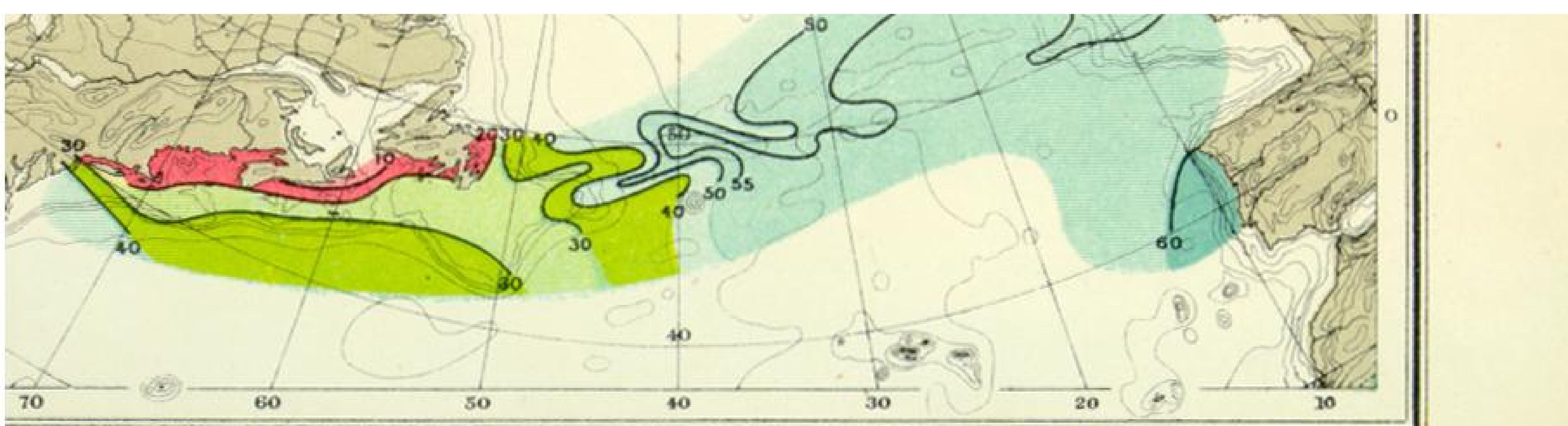

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