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Temperature of the Surface Waters of the Atlantic Ocean

Vol. VI, No. 1

PUBLICATIONS OF THE DIRECTORATE OF WEATHER
HEADQUARTERS ARMY AIR FORCES

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TEMPERATURE OF THE SURFACE WATERS OF THE ATLANTIC OCEAN

Vol. VI, No. 1

TRANSLATED FROM THE GERMAN
AND ADAPTED BY THE OCEANOGRAPHIC SECTION
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PREFACE

This paper is the first of a series of important oceanographic reports to be translated and reproduced by the Oceanographic Section of the Weather Directorate, Headquarters Army Air Forces. The material presented in this series will be of considerable usefulness to the technical services of the Army Air Forces.

The present paper has been translated and adapted from Günther Böhnecke's "Die Temperatur," issued in 1938 as Part II of *Temperatur, Salzgehalt und Dichte an der Oberfläche des Atlantischen Ozeans*, which is Volume V of a series of fifteen volumes on the scientific results of the German Atlantic Expedition of the Research and Survey Ship *Meteor* (1925-27). These reports were originally edited by A. Defant and published under the auspices of the Notgemeinschaft der Deutschen Wissenschaft by Walter de Gruyter and Company, Berlin.

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Washington, D. C.,
December 1, 1942.

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THE TEMPERATURE OF THE ATLANTIC OCEAN

1. Introductory Remarks on the Charts and the Formation of the Two-Degree Field Averages

The ideal objective in a description of the surface conditions of an entire ocean would be to treat the various phenomena such as temperature, salinity, density, and drift collectively in order to reveal their relationships.

Such a direct procedure, however, is impossible in the science of oceanography because of the great differences in the accuracy and numbers of observations of the individual components of the data. For example, the ratio of available observations of temperature to those of salinity in the Atlantic Ocean is about 19:1. (See plates I, II, III, IV.)

For this discussion of temperature there were drawn, besides a chart of the annual average (plate V), 12 charts for each monthly average (plates VI–XVII), similar ones for the annual anomaly (plates XVIII, XIX), and in addition the monthly anomalies for several months (plates XX–XXIII). The monthly charts, which are to form the foundation of this report, were drawn on the basis of the monthly averages for the one-degree fields. In drawing the isotherms, all observations, insofar as the surface unit of the one-degree field and the distribution of the material allowed, were taken into consideration as strictly as possible. For this reason, the appearance of the charts, differs from other presentations of the surface temperature, such as the charts of the North Atlantic Ocean, published by the Conseil Permanent,[1] or the Atlas for the North Sea,[2] which Zorell [3] has treated critically. This procedure in drawing the isotherms was based on the fact that all descriptions which use synoptic material from partial areas, such as the temperature charts of Church [4] for the Gulf Stream area, or the surface charts in the Bulletins Hydrographiques and the Bulletins of the Ice Patrol Service, show a much more active and complicated configuration than the average charts. Even though the arrangement of bodies of water of varying temperature, as it is shown on these monthly charts, does not everywhere completely correspond to reality, nevertheless, the character of the temperature distribution is brought out better by them than by strongly generalized illustrations.

The charts for the annual average and for the anomalies, however, were treated differently. Since these values are to be regarded as "abstract" in the sense in which Zorell uses the word, the drawing of the isotherms for them could take a more equalized (adjusted) form than for those of the monthly charts. In addition, both the annual average and the anomalies were calculated not from the one-degree field averages, but from averages for fields of two degrees of longitude and latitude. The reasons for this procedure were as follows: Even if observations had been on hand for every one-degree field through all 12 months and the annual averages from the various areas consequently of equal value, it would still have been impossible, considering the available data, to carry out calculations for annual averages and the anomalies for each one-degree field. Therefore, the temperature values for the intersecting points of every second degree of longitude and latitude were interpolated with the assistance of the data in the Dutch atlases. These temperature values are valid for a field of an area of 4 one-degree squares. By analogy to the ten-degree field, which consists of 10 times 10 one-degree squares, this unit was called a two-degree field. These two-degree field values, which appear in Appendix I, form the foundation for further treatment of the temperature. They are more equalized than the one-degree field values and can be regarded as independent of the number of observations. From them the annual average was obtained by forming arithmetical means. Attention was given to the number of fields provided with values.

These values were likewise used for the purpose of forming the averages for the zones of 2 degrees of latitude for the individual months as well as for the year. (See Appendix II.) These zonal averages [5] may be subject to slight inaccuracies, which are fully discussed in "Das Beobachtungsmaterial und seine Aufbereitung," part I (untranslated) of *Temperatur, Salzgehalt und Dichte an der Oberfläche des Atlantischen Ozeans.* In the high north and south latitudes, where observations are lacking, the averages are more or less uncertain, since in places where no material whatever was available, extrapolation had to be relinquished. The monthly and annual surface temperature anoma-

[1] O. und V. G. Pettersson, *Cartes synoptiques de l'eau de surface de l'Ocean Atlantique du Nord.* Cons. Perm. 1931.

[2] *Atlas de la temperature et salinité moyenne de l'eau surface de la Mer du Nord et de la Manche.* Cons. Perm. Intern. Kopenhagen, 1933.

[3] F. Zorell, *Ein neuer Atlas für Temperatur und Salzgehalt im Oberflächenwasser der Nordsee.* Ann. d. Hydrogr. Bd. LXII. Berlin, 1934.

[4] Phil. E. Church, *Surface Temperatures of the Gulf Stream and its Bordering Waters.* The Geogr. Review. Vol. XXII, No. 2, New York, 1932. S. a. International Ice Observation and Ice Patrol Service in the North Atlantic Ocean. U. S. Treasury Department. Coast Guard. Bulletin No. 26. Washington, 1938.

[5] The expression "zonal average" is, strictly speaking, not adequate, since on the coasts, for example, where the two-degree field is partly obscured by land, the temperature value was regarded as valid for the whole field. Considering the small size of the unit of area in proportion to the whole zone, this neglect seems justified.

lies for the Atlantic Ocean were obtained by taking the differences between the average temperature of the two-degree zones and the averages of the two-degree field for each month and for the year. By interpolating the two-degree field averages from the annual curve of the five-degree averages, which Krümmel [6] indicates for the combined oceans (*Weltmeer*), the annual anomaly of the Atlantic Ocean compared with that of the combined oceans for these two-degree zones was derived. Finally, the two-degree field values also served to ascertain the annual course of the temperature.

2. Temperature Distribution

A survey of the distribution of the temperature on the surface of the Atlantic Ocean (plate V) and for the individual months (plates VI–XVII) will show that the main features of the distribution coincide with those found on earlier charts.[7] In the south, extending in front of the Antarctic Continent, is a large area with low temperatures between 0° and —1.5° C. North of this area at about 50° S., there lies a zone which has a sharp rise in temperature. The annual chart, drawn according to the two-degree field values, shows this sudden rise less clearly than the monthly charts based upon one-degree field values. This zone of strong temperature gradients extends to about 40° S. Farther north, the rise in temperature takes place more slowly, and at the same time the isotherms are oriented, not approximately west-east, as on earlier charts, but southwest-northeast. Special influences, such as the Falkland Current, Agulhas Current, and plankton areas in the various regions, which cause deviations from these main features, will be discussed in a later section of this report. The highest temperatures of 26° to over 27° are reached in a zone which extends between 5° N. and 15° N. from the Gulf of Guinea to the Yucatán Sea. The absolute maximum of the annual average, 27.8°, lies in the two-degree field 80° W., 17° N. The slightest temperature gradients appear in this warmest zone of the ocean, which is enclosed on both sides by the 26° isotherm, and which, like the meteorological equator, extends northward of the geographical equator. Over great stretches, the temperature of the annual average in a north-south as well as in a west-east direction changes by only a few tenths of a degree.

In the middle latitudes of the northern hemisphere, the temperature again decreases rather equably, and the isotherms run in a northwest-southeast direction. This gradual decrease is suddenly interrupted on the west side of the ocean from 35° N. to 40° N. by a zone of sharp temperature increase; north of this area lies one of uniformly low temperatures. It is the counterpart of the antarctic cold water area, the so-called "Cold Wall." As a result of the well-known effect of the Gulf Stream and its offshoots, the eastern half of the northern North Atlantic Ocean deviates from this pattern. Here the relatively warm water, which cools off gradually, advances far to the north and displaces the transition zone between the cold arctic water and the water south as far as the coast of Greenland.

This short survey of the temperature distribution is supplemented by Appendix II, which contains the zonal averages of the surface temperatures for zones of two degrees of latitude for each month and for the year. When Krümmel's [8] comparison of values for the Atlantic Ocean and the combined oceans is studied (fig. 1),[9]

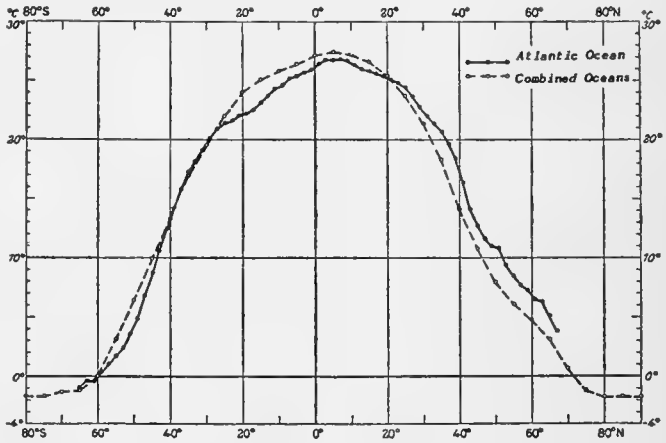


FIGURE 1.—Annual averages of surface temperature according to two-degree zones for the Atlantic Ocean and according to five-degree zones for the combined oceans.

it becomes clear that the South Atlantic Ocean is colder than the combined oceans up to a latitude of 40° S. Between 40° S. and 25° S., a small excess of warmth is produced, which does not, however, exceed 0.2° C. The whole tropical zone as far as 20° N. exhibits considerably lower temperature values than those calculated for the whole ocean. The differential between 25° S. and 20° N. is not more than 2° C. From 20° N., the North Atlantic Ocean shows a great excess of warmth, which is ascribed both to the displacement of the meteorological equator to the northern hemisphere and to the Gulf Stream and its offshoots. This excess increases up to about 3° C. In comparisons, such as are made in Appendix II and table 1, the varying density of the material observed in the oceans must always be taken into consideration. When other values are added, the position of the isotherms,

[6] Krümmel, *Handbuch der Ozeanographie.* Bd. I, S. 401. Stuttgart, 1907.

[7] G. Schott, *Geographie des Atlantischen Ozeans*, Hamburg, 1926. Attention is also called to a work which appeared after the publication of the present discussion: G. Slocum, *The Normal Temperature Distribution of the Surface Water of the Western North Atlantic Ocean.* Monthly Weather Review, Vol. 66, No. 2., Washington, D. C., February 1938; also Phil. E. Church, *Temperatures of the Western North Atlantic from Thermograph Records.* Association d'Océanographie Physique, Union Géod. et Géophys. Internat. 1937, and G. Roux, *Isothermes mensuelles provisoires de l'eau de mer à la surface au large des côtes du Maroc.* Annales de Physique du Globe de la France d'outre-mer, 5. Jahrg. Nr. 25. Paris, 1938.

[8] O. Krümmel, *Handbuch d. Ozeanographie.* Bd. I, S. 401 Stuttgart, 1907.

[9] The averages for two-degree zones are treated in Figure 1 and Table 1 as latitude temperature in Krümmel's sense of the term.

especially in the higher latitudes, and also the value for the zone average may change considerably. Table 1 shows the values calculated from the curves for every fifth degree of latitude and for the differences between these values.

TABLE 1.—*Annual average of the surface temperature for every fifth degree of latitude of the Atlantic Ocean (t_A) and of the combined oceans (t_W).*

Northern hemisphere				Southern hemisphere			
Latitude	t_A	t_W	t_A-t_W	t_A	t_W	t_A-t_W	Latitude
70	4.0	0.7	+3.3	------	−1.3	------	70
65	5.1	3.1	+2.0	−1.0	−1.2	+0.2	65
60	6.8	4.8	+2.0	0.0	0.0	0.0	60
55	8.5	6.1	+2.4	1.7	+3.1	−1.4	55
50	10.9	7.9	+3.0	4.3	6.4	−2.1	50
45	12.7	10.8	+1.9	8.7	9.9	−1.2	45
40	17.3	14.1	+3.2	13.3	13.3	±0.0	40
35	20.6	18.3	+2.3	17.2	17.0	+0.2	35
30	22.4	21.3	+1.1	19.6	19.5	+0.1	30
25	24.4	23.7	+0.7	21.4	22.0	−0.6	25
20	25.3	25.4	−0.1	22.1	24.0	−1.9	20
15	25.8	26.6	−0.8	23.1	25.1	−2.0	15
10	26.5	27.2	−0.7	24.5	25.8	−1.3	10
5	26.7	27.4	−0.7	25.4	26.4	−1.0	5
0	26.2	27.1	−0.9	26.2	27.1	−0.9	0

Figure 2 shows the two-degree zonal averages for 4 selected months—February, May, August, and November. These averages clearly indicate the excess of warmth of the North Atlantic Ocean.

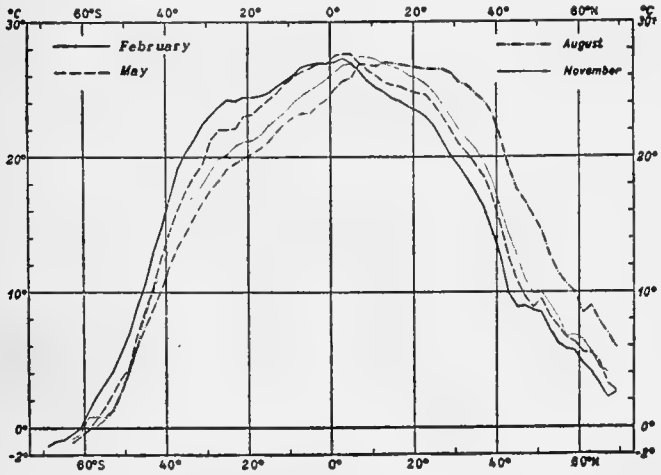


FIGURE 2.—Two-degree zonal averages of surface temperatures of the Atlantic Ocean for the months of February, May, August, and November.

The South Atlantic is warmer only in the southern summer (February). Even in the zonal averages, the influence of the Labrador Current, as well as that of the "Cold Wall," is clearly recognizable. The average temperature of the whole ocean, calculated on the basis of the zone values with regard to the number of two-degree fields supplied with observations for 70° N. to 60° S., is 16.8° C.

It is necessary to relate the main features of the horizontal temperature to the scheme of the synthesis of the ocean on the basis of the vertical distribution of the temperature and of the saline content. This scheme, which Defant [10] has outlined, provides for the introduction of boundary strata (*Grenzschichten*), especially between the troposphere and the stratosphere, and has proved extremely fruitful. It has already been used several times, most recently by Sverdrup [11 12] and Deacon [13 14] in the treatment of the data of the *Discovery* Expedition." It also served in the treatment of the synthesis of the hydrosphere of the Atlantic Ocean within the limits of this present work as a basis for classification. [15 16] The most outstanding of these boundary strata is the one between the troposphere and the stratosphere. Although its position cannot be established accurately everywhere, especially in the higher latitudes, because of the lack of clear criteria, nevertheless, its sectional plane with the surface of the ocean stands out clearly at many points. Its course is distinctly reflected in the distribution of the surface temperature wherever the latter, from the point of view of the poles, increases quickly in a sharp gradient. This process occurs in the South Atlantic Ocean at about 50° S. and in the Drake Passage at about 60° S. Between these two positions lies the antarctic polar front, and the antarctic convergence, or Meinardus Line, as Schott [17] called it. Because of the lack of observations, the exact positions for a similar rise in temperature in the north cannot be followed, but it begins approximately at about 35° N., runs eastward parallel to the American coast, and curves northward at Newfoundland and on the east coast of Canada. Not until it reaches the east coast of Greenland is it found again, and then between the cold East Greenland Current and the offshoots of the Gulf Stream. As a result of the complicated distribution of water and land, the polar front is not so uniformly built up in the north as it is in the south where it crosses the ocean diagonally in an east-west direction. This difference is well expressed in figure 3, which

[10] A. Defant, *Die systematische Erforschung des Weltmeeres.* Zeitschr. d. Ges. f. Erdkunde. Berlin. Jubil.-Sonderband. Berlin, 1938.

See also current charts by H. H. F. Meyer in G. Wüst, *Der Ursprung der Atlantischen Tiefenwässer;* also A. Defant, *Dynamische Ozeanographie.* Berlin, 1929. See also H. Thorade, *Die Stratosphare unde Traposphäre des Atlantischen Ozeans.* Annalen d. Hydrographie. Berlin, 1937.

[11] H. U. Sverdrup, *On Vertical Circulation in the Ocean Due to the Action of the Wind With Reference to Conditions Within the Antarctic Circumpolar Currents.* Discovery Rep. Vol. VII, Cambridge, 1933.

[12] H. U. Sverdrup, *Wie entsteht die antarktische Konvergenz?* Annal. d. Hydrogr. Bd. 62. Berlin, 1934.

[13] G. E. R. Deacon, *A General Account of the Hydrology of the South Atlantic Ocean.* Discovery Rep. Vol. VII, Cambridge, 1933.

[14] G. E. R. Deacon, *Die Nordgrenzen antarktischen und subantarktischen Wassers im Weltmeer.* Annal. d. Hydrogr. LXII. Hamburg, 1934.

[15] A. Defant, *Die Troposphäre des Atlantischen Ozeans.* Wiss. Ergebnisse d. Deutsch. Atlant. Expedition a. d. Forschungs- und Vermessungsschiff *Meteor* Bd. VI. Teil I. Berlin, 1936.

[16] G. Wüst, *Die Stratosphäre des Atlantischen Ozeans.* Wiss. Ergebnisse d. Deutsch. Atlant. Expedition a. d. Forschungs- und Vermessungsschiff *Meteor.* Bd. VI. Teil I. Berlin, 1936.

[17] G. Schott, *Geographie des Atlantischen Ozeans.* 2. Aufl. Hamburg, 1926.

illustrates the temperature gradients between the annual zone averages for two degrees of latitude which were taken from Appendix II. It is obvious that in the South Atlantic Ocean the steepest gradients were reached at 50° S., so that the polar front which separates the cold antarctic water from warmer water of low latitudes and which is commonly found here, makes itself distinctly felt even in the zonal averages. In the north, the situation is not so simple, although the boundary line for the Cold Wall at 40° N. stands out clearly. As a result

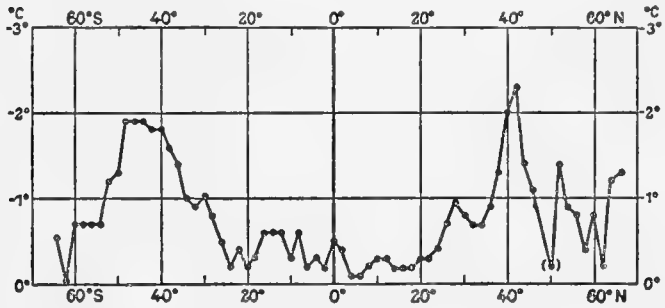


FIGURE 3.—Temperature gradients in degrees C. between the annual zonal averages of 2° lat. between 70° N. and 70° S.

of the manifold interweaving of arctic, subarctic, and Gulf Stream water which disturbs the more or less zonal, smoothly running boundaries of the water masses observed in the south, the gradient rises and falls irregularly. Therefore, it is at first impossible to draw a clear zonal boundary line between arctic and warmer water. The drawing of such a line must be postponed to a later treatment of individual areas.

The further course of the curve shows to a certain extent additional boundaries which are designated by temperature. The charts of the temperature distribution indicate decreases in temperature from certain latitudes. Such transitions are shown in figure 3 at 40°N. and 40°S., where the curve takes a sharp bend. It may be assumed that these latitudes are the boundaries between the temperate and subtropical water masses, insofar as they are expressed in the temperature. It is scarcely possible to establish the scope of the tropical zone any more accurately from these gradients toward the south, since the transition to the low gradients is not clearly discernible here. In the equalization of the curve of figure 3, its southern boundary might be set at about 10°S. The northern boundary can be more easily designated. It is at 20°N., from which point the curve moves more or less horizontally toward the equator.

It becomes clear that after this first survey we can divide the ocean into certain "climatic zones" which are conditioned by the distribution of the surface temperatures. In the south, the polar front at 50°S. and the southern boundary of the subtropical water at 40°S. stand out clearly, while in the north only the boundary between the Gulf Stream and the Cold Wall, likewise at 40° N. can be recognized. The polar front in the north, on the other hand, is not so clearly expressed, as a result of the partly meridional course of the isotherms in this consideration of annual zonal averages. The extent of the tropical zone can be placed between 10°S. and 20°N.

3. The Demarcation of Zonal Areas on the Basis of Surface Temperatures

The survey of the temperature distribution made in section 2 of this report made possible a general division of the ocean into climatic zones. An attempt will now be made to establish the position of these fronts, that is, of the boundaries of bodies of water of oceanic climatic zones of the surface stratum, by means of the surface material at present available.[18] This first attempt should be regarded merely as preliminary treatment. Because of the lack of data on the broad expanses of the ocean, it will be impossible to classify the water masses as Köppen,[19] for example, classified the atmosphere.

Not only material for classification, but also the principles of classification are lacking. Köppen was able to construct his climatic system, which was made principally for the atmosphere over the land surfaces, on the basis of the two factors of temperature and humidity or precipitation "which obtrude themselves most upon human beings and can be most easily expressed in comparable figures." However, such a perfect system for the water of the ocean does not exist. Schott [20] has made a classification according to "natural regions" in his well-known geographies of the oceans, but these "natural regions" are, in his own words, "strongly subjective" and in addition suffer from the lack of a uniform system of nomenclature. In fact Schott used terminology from the most widely differing systems; for example, Brazilian Region, geographic; Equatorial Region, climatological; Sargasso Sea, biological; Gulf Stream, oceanographic. In a work devoted exclusively to classification by "natural regions," Schott [21] adds further to the structure of his system by giving special attention to the surface of the ocean and the climatological relationships above it. Even this procedure is not free from subjectivity, for it is not based on definite, comparable values for the factors used in its construction. Too, it is not quite consistent in nomenclature. To name one example of inconsistency—the region corresponding to the North Atlantic Trade Region (Passat-Region) is not a South Atlantic Region, but an Ascension Region.

[18] Cf. footnotes 10–16.

[19] W. Köppen, *Grundriss der Klimakunde.* 2. Aufl. Berlin, 1931.—See also W. Köppen, *Das geographische System der Klimate.* Handbuch d. Klimatologie. Bd. I, Teil 2. Berlin, 1936.—Since Köppen, especially in the latter work, gives a very detailed review of the other climatic systems, previously developed by other authors (Penck, Hettner, Passarge, and others), they are not further discussed at this point.

[20] G. Schott, *Geographie des Atlant. Ozeans.* 2. Aufl. Hamburg, 1926.
—*Geographie des Indischen u. Pazifischen Ozeans.* Hamburg, 1935.

[21] Schott, *Die Aufteilung der drei Ozeane in natürliche Regionen.* Petermanns geogr. Mitteilungen. Jahrg. 82, Heft 6. Gotha, 1936.

A further attempt to classify the whole ocean has been made by G. Wüst.[22] In projecting upon the surface of the sea the general forms of the sea bottom, that is, the limits given by the undersea topography, he uses purely geographical designations, such as Angola Sea, Newfoundland Sea, etc. Without questioning the value of this nomenclature, it must be said that it does not suffice for the treatment of many questions, especially that of the classification of the surface of the ocean. The surface of the water is so intimately related to the climatic phenomena that the latter must not be neglected in the classification of the ocean. In a manner similar to that in which the classification of the solid surface of the earth according to geography and geology takes into account the atmosphere above the earth, a classification of the ocean should be based on a principle that is adapted to the phenomena on the boundary stratum between air and water. It is obvious that these boundaries cannot be established in the sense of Wüst's claim. But what climatic boundaries (for example, the snow or tree boundaries) are established or form sharply defined lines? An attempt will be made to classify the ocean into natural regions on the basis of temperature, because there is more information available on this phenomenom than on other phenomena. Besides the salinity and other factors, the active processes of the water and the air must also be considered. How much importance Köppen attributed to them is clear from the fact that he devised for the surface of the water a special system of regions based upon the winds.

An attempt was made first of all to determine the zonal boundaries exactly. The method consisted in establishing along several lines running mostly in a north-south direction the gradients of the surface temperatures. In order that the procedure might be possible and that the original values from the one-degree field charts be used, the average values of the temperature for the 2 one-degree fields adjacent to these lines were recorded in a system of coordinates with the abscissa "Geographical Latitude" and the ordinate "Temperature." To eliminate accidental errors connected with these observations, the points of intersection of the isotherms taken from the monthly charts were likewise recorded with these lines, and a curve plotted through these points. On this curve, which showed the average temperature along such a line, the change of temperature was then read off from one degree of latitude to another and entered in tables. Table 2 gives as an example the temperature gradients for such a profile through the Drake Passage.

TABLE 2.—*Temperature gradients for latitude differences of 1° at 65° W. long. (Drake Passage)*

SOUTHERN LATITUDE

Month	64°	63°	62°	61°	60°	59°	58°	57°	56°	55°
I	0.5	1.1	1.3	**2.1**	0.7	0.5	0.1	0.4	0.8	
II	0.6	0.8	0.9	1.1	**1.3**	1.0	0.3	0.3	2.0	
III	0.7	0.8	1.0	**1.1**	**1.1**	1.0	0.3	0.4	1.3	
IV	0.8	0.7	0.5	0.4	0.6	**1.5**	0.9	0.6	1.2	
V	0.4	0.5	0.6	0.7	0.9	**1.1**	**1.1**	0.9	0.5	
VI	0.9	0.9	0.7	0.5	0.6	0.5	(**0.9**)	0.8	0.6	
VII	-----	-----	0.7	**1.3**	0.9	0.6	0.6	0.9	1.3	
VIII	-----	0.3	0.5	0.9	1.2	**1.5**	1.2	0.5	0.3	
IX	0.4	0.8	0.9	**1.0**	0.9	0.7	0.2	0.0	-----	
X	-----	-----	-----	0.4	0.7	1.8	**2.1**	1.1	0.5	
XI	-----	-----	0.4	0.6	**1.6**	1.4	1.1	0.4	0.3	
XII	0.6	0.7	0.9	1.3	**1.3**	1.0	0.5	0.5	0.4	

Figures in boldface indicate maxima.
Figures in parentheses indicate that the maximum is not well established.

[22] G. Wüst. *Die Gliederung des Weltmeeres. Versuch einer systematischen geographischen Namengebung.* Petermanns Geogr. Mitteilungen. Jahrg. 82, Gotha, 1936.

a. South Atlantic Ocean

This procedure was followed for five surface profiles of the South Atlantic Ocean: 1. through the Drake Passage along 65° W; 2. through the longitudinal axis of the Falkland Current, beginning in the north at 35° S. 53° W. through 47° S. 55° W. and 54° S. 48° W. to 60° S. 47° W; 3. at 30° W. from 30° S. to 55° S; 4. at 5° W. from 30° S. to 55° S; and 5. through the Agulhas Current at 21° E. from 35° S. to 55° S. Because of lack of observations, the position of the fronts in the higher south latitudes could not be established on profiles 4 and 5 for every month.

As table 2 shows, the gradients along 65° W., for example, increase to the south, except for some which are influenced by the land at 55° S. From 58° S. to 61° S., they increase from 0.5° C. to between 1.0° and 2.1° C. Farther south, they drop again to about 0.5° C. The other profiles show similar differences in the gradients. This increase of the gradients is brought about by the meeting of water masses of varying temperature and denotes the presence of the polar front. It can be seen that within certain limits the zone of maximal gradients fluctuates further. This further fluctuation is due principally, according to the general conditions, to the irregular distribution of the few observations. In order to eliminate these irregularities, the gradients were recorded in a system of coordinates, and an equalized curve plotted through the points. Then the average position of the front was read from these curves, as is shown in tables 3 and 4.

The temperature prevailing at the momentary position of the front in the month in question was then established from the charts and transferred to the tables. Since these zones of maximal gradients are subject to certain fluctuations, as shown by table 2, and since the surface unit for the temperature value is the one-degree field, the position of the fronts was indicated only in whole degrees of latitude[23] and the temperature denoting the kind of water in half degrees centigrade.

[23] It remains uncertain whether there is any justification whatever for giving such boundaries with any greater exactitude in researches covering such huge spaces as, for example, Deacon (1932) does. He designates the position of the front at 10 minutes of latitude.

TABLE 3.—*Average position of the southern polar front and monthly averages of the water temperature at the front*

Month	65° W.		48° W.		30° W.		5° W.		21° E.	
	S. lat.	t°	S. lat.	t°	S. lat.	t°	S. lat.	t°	S. lat.	t°
I	61	2.5	56	3.5	47	4.0	----	----	51	4.0
II	61	3.5	56	4.0	48	(8.0)	49	4.0	----	----
III	60	3.5	55	3.5	49	5.0	49	3.5	52	2.0
IV	59	2.5	55	3.0	50	3.0	----	----	----	----
V	59	2.0	55	1.0	49	4.0	----	----	----	----
VI	58	3.0	54	2.5	49	5.5	50	4.0	49	3.0
VII	60	0.5	54	2.75	50	5.0	51	3.5	----	----
VIII	59	1.0	54	2.5	(46)	5.5	----	----	----	----
IX	60	2.0	54	2.0	48	4.5	----	----	----	----
X	59	−0.5	55	0.0	47	5.0	----	----	48	3.5
XI	59	2.0	55	4.0	47	6.5	51	1.0	----	----
XII	60	3.0	55	2.5	47	7.0	52	1.5	50	2.0
Year	60	2.1	55	2.6	48	5.3	(50)	(3.0)	(50)	(3.0)

Parentheses indicate that the data have not been well established.

TABLE 4.—*Average position of the subtropical boundary and its average monthly temperatures*

Month	55° W.		30° W.		5° W.		21° E.	
	S. lat.	t°	S. lat.	t°	S. lat.	t°	S. lat.	t°
I	37	19.0	37	18.0	37	17.0	41	17.5
II	38	19.0	37	19.0	37	18.0	41	18.0
III	38	12.5	38	17.0	38	16.0	40	19.0
IV	39	15.5	39	17.0	38	15.0	40	18.5
V	39	10.0	40	14.0	39	13.0	40	17.5
VI	38	10.0	40	13.5	39	12.0	41	15.0
VII	38	9.0	39	12.5	38	12.0	41	14.0
VIII	37	7.0	38	13.0	38	11.0	40	16.0
IX	37	11.0	38	13.0	38	11.5	40	15.0
X	36	12.5	38	13.5	37	13.0	40	16.0
XI	36	15.0	38	14.5	37	15.0	42	14.5
XII	37	17.5	38	16.0	37	17.0	41	17.0
Year	37	13.2	38	15.1	38	14.2	41	16.5

The tables show that in the treatment of the meridional change of temperature, two zones of especially steep temperature gradients of from 1° to 2° become apparent. The most southerly of these zones lies where Meinardus and Schott previously suspected a boundary line within the west wind drift. It is most commonly designated today as the Antarctic Convergence or Polar Front. In the western part of the ocean, in the Drake Passage, it is encountered at 60° S. At 50° W. it goes north to 55° S.,[24] and then at about 50° S. runs farther eastward. Since in the east the data on temperature are very scanty, they are to be regarded as merely approximate values (table 3 and fig. 4).

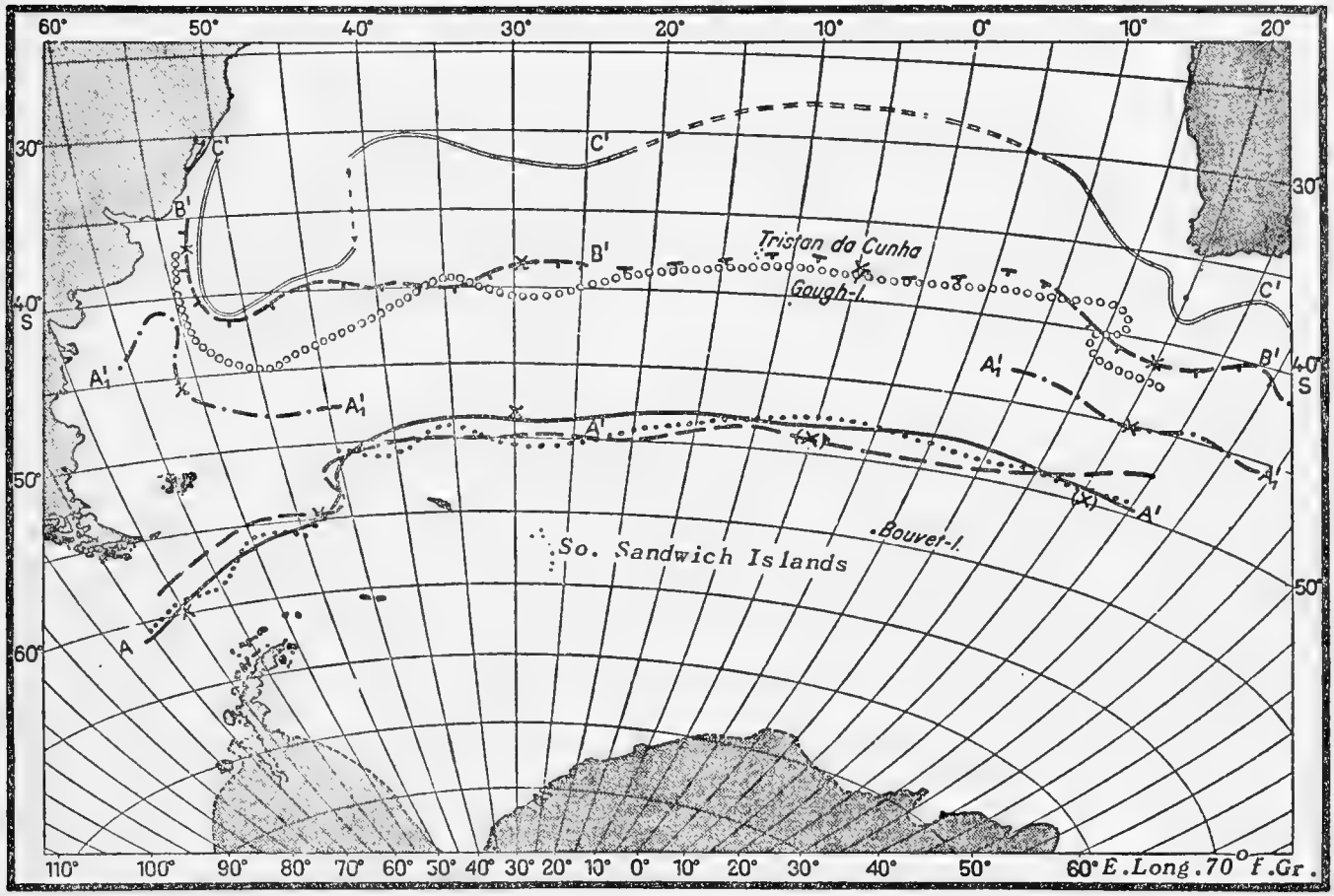
The temperatures met with in this area lie on the average between 2° and 5°. Their origin is well explained by the previously cited works. According to Sverdrup, the convergence is caused by an interaction of wind and thermohaline circulation. South of the convergence, the water transport to the north, which is caused by the wind, is obviously at work, while the thermohaline circulation conducts water to it from the north. The thermohaline circulation in itself, however, cannot be decisive, for the maximum of density, which would be caused by it—at least in the summer—lies considerably farther to the south than the convergence. Plate XXIV depicts the distribution of the surface density in the southern summer as calculated from the average of the months December, January, and February. It shows that although a density maximum is really present, it lies 4° to 5° of latitude farther south than the polar front, as can be deduced from the increases in temperature.

Since the orientation of the details of the active processes in the high southern latitudes are unknown, direct comparisons with this zone of steeper temperature gradients cannot be made. The only sources of information are the vertical sections, such as were published and discussed after the *Discovery* Expedition by Deacon and Sverdrup, 1933.[25] They show that the polar front is to be found where the water masses sink down to the subantarctic intermediate current and that this sinking corresponds, even in individual cases, with its average position, which was established on the basis of temperature distribution. According to the definition introduced by Defant, the polar front forms the common northern boundary for polar and subpolar water. In the interests of uniformity, this definition is being used, although in reality subantarctic water can be encountered, at least at the surface, even north of the polar front. The concept of the oceanic polar front with its effects upon the circulation below the surface has, however, permeated the literature on oceanography so thoroughly that it seems inadvisable for purely practical reasons to suggest changes. Accordingly, the polar front includes polar and subpolar water and at the same time forms the pole-side boundary of the temperate zone. Even in the temperature sections of the *Meteor*, this sinking at the front can be clearly seen.[26] Thus profile Va (fig. 5) through the Drake Passage shows the position of the front between Stations 107 and 108, where the thermograph at 59° S. records a temperature increase of 2° to 5.5°. Figure 6, on which the hourly values from the registered temperature curve are entered, clearly repeats this sudden rise of the surface temperatures. The course of the curve indicates by its fluctuations that individual warm and colder bodies of water are separated in the vicinity of the convergence as a result of vortex formations. Even on profile Vd south of Africa (fig. 7) after a rise

[24] On the current chart by H. H. F. Meyer, shown as Tafel XXXV in G. Wüst, *Der Ursprung der Atlantischen Tiefenwässer.* Zeitschrift d. Gesellschaft für Erdkunde, Jubil.-Sonderband Berlin, 1928, the western part of the polar front has, as Deacon points out, obviously been confused with the subtropical convergence lying farther to the north.

[25] Cf. footnotes 11 and 13.

[26] G. Wüst, *Die Stratosphäre des Atlantischen Ozeans.* Bd. VI.



A = Polar front on the basis of temperature distribution at the surface.

= Polar front according to G. Wüst.

= Polar front according to Deacon.

A'_1 = Fragments of the front of the West Wind Drift (secondary polar front) on the basis of temperature distribution.

B' = Subtropical boundary on the basis of temperature distribution.

B' = Doubtful position of subtropical boundary.

= Subtropical convergence according to Deacon.

= Subtropical convergence (also convergence area) on the basis of current displacements.

= Doubtful position of subtropical convergence.

X = A point plotted from temperature gradient profile.

(X) = A point which could not be established for every month.

FIGURE 4.—Average position of the fronts and boundaries in the South Atlantic Ocean.

of temperature from 2.5° to 3.5° at 52° S., the *Meteor* had to pass again through colder water of about 3° before the front was encountered at 50° S. with a rapid rise in temperature to 5°.

The corresponding vertical section (fig. 8) likewise shows this body of water of somewhat higher temperature beyond the real front.

A consideration of the summary of the average findings recorded in table 3, of the individual results from the sections, and of the grouping of the isotherms on the monthly charts establishes the Antarctic polar front A′ as it is drawn in figure 4. In an investigation of the subantarctic intermediate current (Volume VI of

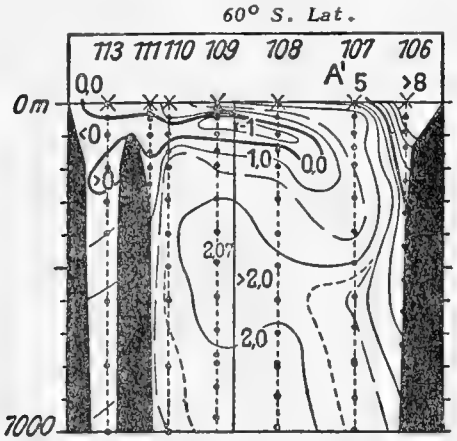


FIGURE 5.—Vertical section of the temperatures through the Drake Passage (profile Va.). A′=polar front.

the work on the Expedition), G. Wüst found the zone in which the "intermediate water" sinks beneath the surface by another means, namely, calculating the mixing proportions (*Mischungsverhälthisse*). Even the boundary discovered in this way (fig. 4) deviates slightly, as did Deacon's, from the average position established from the meridional gradients, so that the line indicated on the chart may now be accepted with some certainty as indicating the boundary of antarctic and subantarctic water in contrast to the warmer water of the west wind drift—in other words, the polar front.

The question of whether it is permissible to refer to a pronounced fluctuation of the front cannot be answered with certainty. According to table 3, the front swings about its average position from one to two degrees of latitude in the individual months. This amount results from the fact that, as was previously explained, the one-degree field had to be chosen as a surface unit for the temperature averages. In addition, the unperiodic influences, and especially those of the wind, are very great in these areas and probably obscure the periodic ones.

Another of these zones of high temperature gradients, which were mentioned previously, lies, as table 4 and figure 4 show, farther north, in fact in the middle of the ocean at about 38° S. to 40° S. Only in the east, south of the Agulhas Current, and in the west, south of the Brazil Current, does it reach 41° S. Off the mouth of the La Plata, it turns north approximately parallel to the coast. In this zone, the temperature reaches 13° to 16°. This boundary area, which is to be designated as subtropical boundary, coincides approximately with the line which was discovered by Deacon and called subtropical convergence. In places, however, it is in contradiction to the line C′, which is given on the chart by H. H. F. Meyer [27] as subtropical convergence in the month of February. In order to clear up this question, the course of the currents for all 12 months in this area was investigated. Charts of current displacements in the Dutch atlases [28] were used, and the position of the convergence C′ for the annual average was determined (fig. 4). The results showed that the subtropical boundary established from the temperature B′ and the convergence resulting from the current displacements C′ were in agreement only in the area between the Falkland and the Brazil Current. From 40° W. to 5° E. the convergence lies about 10° farther north and in the vicinity of the African Continent 3° to 5° more. Greater rises in temperature were not found here in C′. Even in the area of the Agulhas Current, with its involved structure, which was rather closely investigated by G. Dietrich,[29] the two boundaries, B′ and C′ can be clearly differentiated, as the following descriptions and figures 9 through 11 also show.

Thus it is proved that the two boundaries, insofar as their causes are concerned, have nothing to do with each other and that Deacon's conception must be corrected.

There arises the question regarding the cause of this subtropical boundary. Purely climatic influences

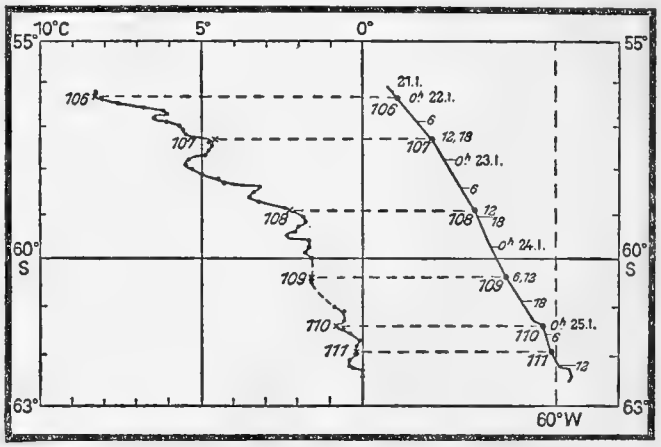


FIGURE 6.—Surface temperatures of profile Va according to the hourly values taken from the recording.

might first be considered, for, according to Angot, the amounts of warmth radiated to the earth [30] reach their greatest increase precisely between 40° S. and 50° S. In addition, an important fact is that the decrease in

[27] Cf. footnote 24.

[28] *Oceanogr. en Met. Waarnemingen i. d. Atlant. Oc.* Koninkl. Nederl. Met. Inst. No. 110.

[29] G. Dietrich, *Aufbau und Dynamik des südlichen Agulhas-Stromgebietes.* Veröff. d. Inst. f. Meereskde. Berlin. N. F. Reihe A, Heft 27. Berlin, 1935.

[30] Hann-Süring, *Lehrbuch der Meteorologie.* Leipzig, 1926.

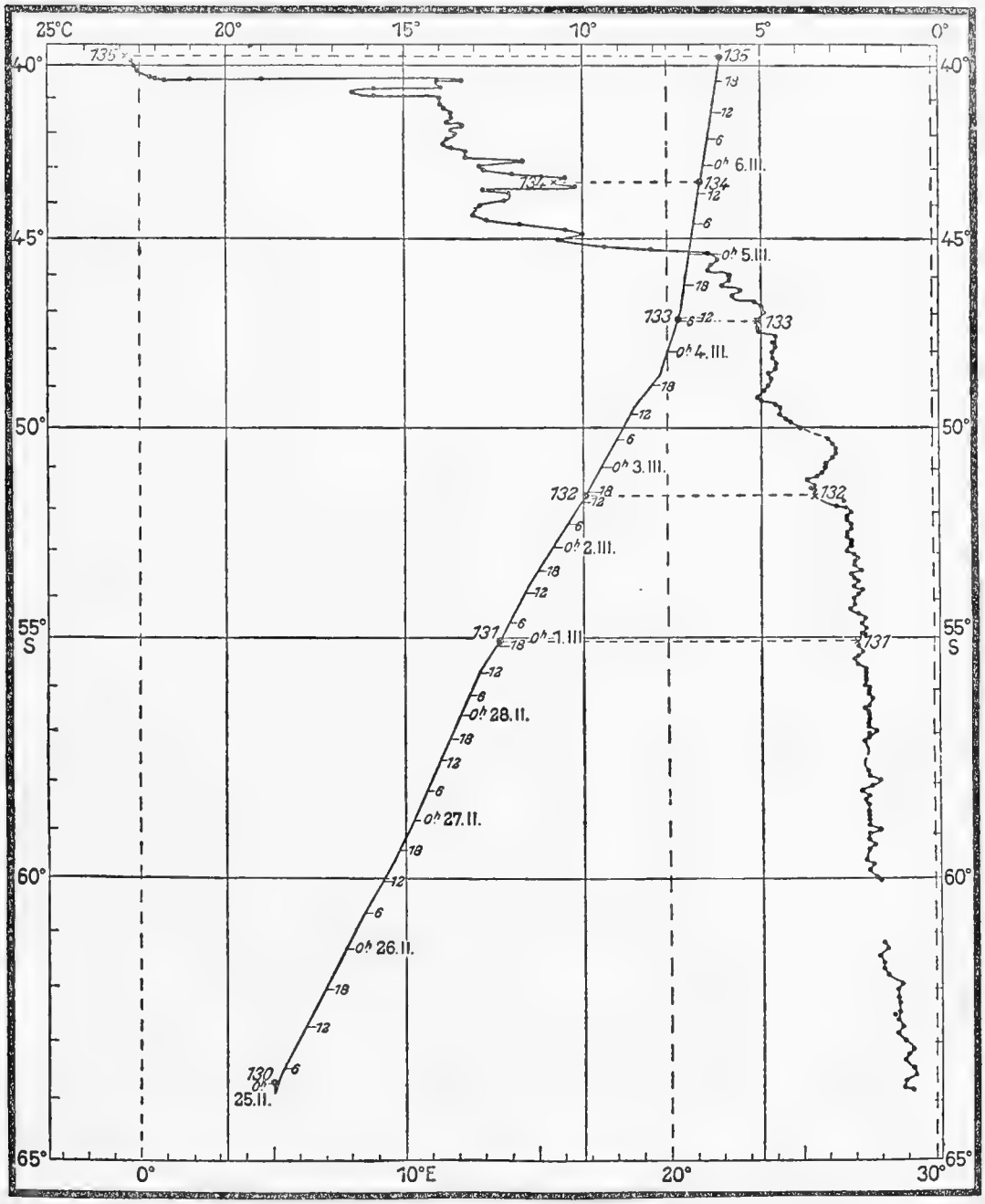


FIGURE 7.—Surface temperatures of profile Vd (south of Africa) according to the hourly values taken from the recording.

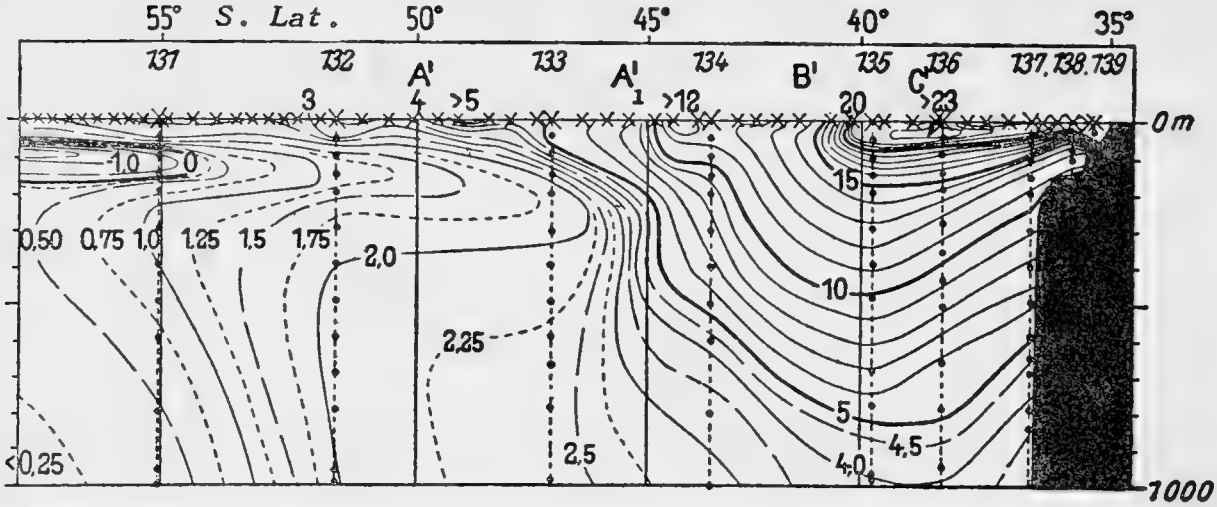


FIGURE 8.—Vertical section of the temperatures south of Cape Town (profile Vd).

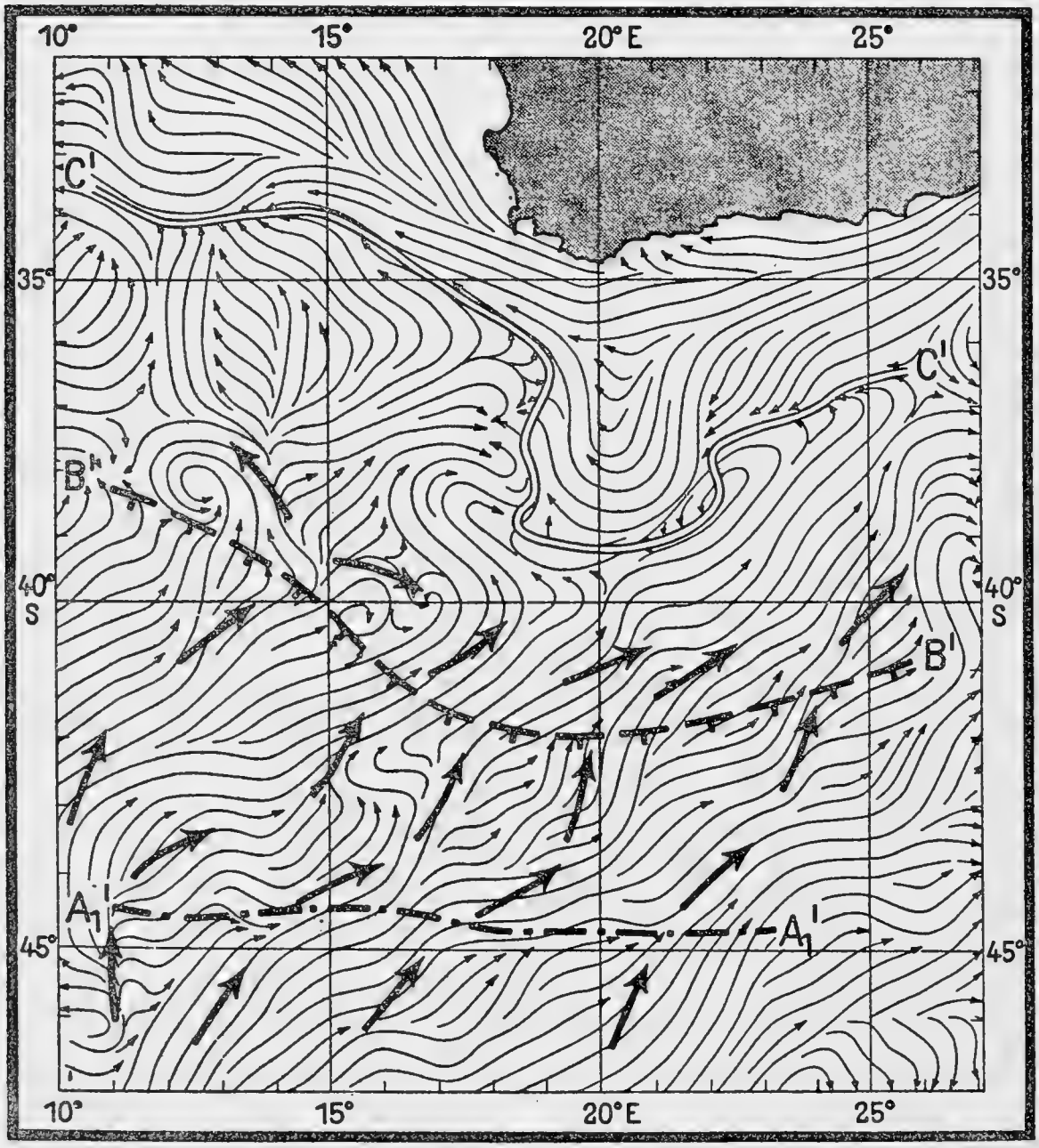


FIGURE 9.—Surface currents south of Africa in January, drawn on the basis of the Dutch current displacements by A. Merz. Designation of the fronts is the same as in figure 4.

clouds (Bewölkung) in both these latitudes might increase the effect of radiation. It is questionable whether these factors in themselves suffice to form such a relatively narrowly limited belt of rapid temperature increase in a northerly direction. It appears rather that the activity processes at the surface of the sea have an equally large share in the formation of this zone of large temperature gradients B′. In figures 9, 10, and 11, which show the currents south of Africa according to A. Merz [31] and M. Willimzik in the months of

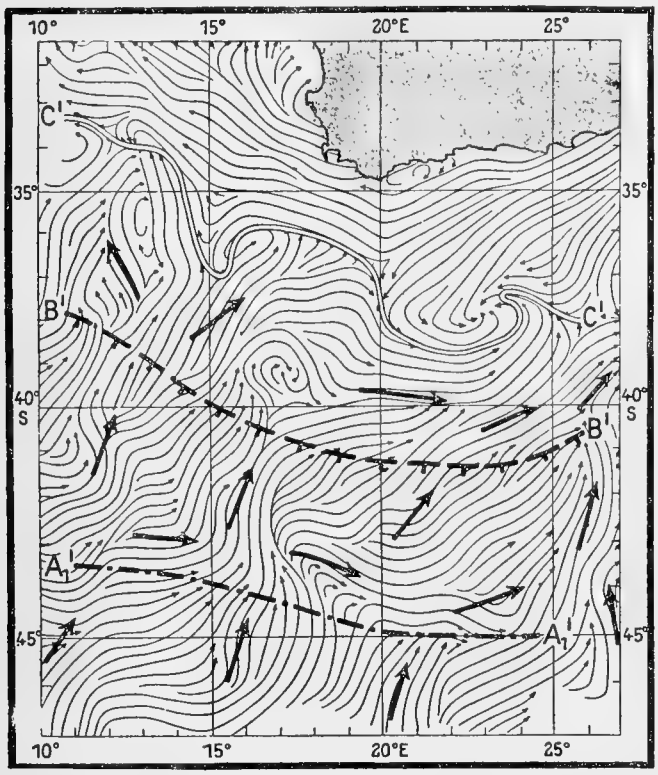


FIGURE 10.—Surface currents south of Africa in May, drawn on the basis of the Dutch current displacements by A. Merz. Designation of the fronts is the same as in figure 4.

January, May, and October, the doubtful boundaries are entered, and the chief directions of activity emphasized by the heavy arrows. It is clear that the subtropical boundary coincides with a marked change of direction in the current. South of the line B′, north-south components predominate, and north of it, east-west components. In the latter case, local convergences also occur in part. These phenomena obviously cause a certain accumulation of the water masses transported here from the south and therewith form the strip of especially high temperature gradients, which previously has been called the subtropical boundary.

A current system can be drawn approximately corresponding to a convergence-divergence line given by Sandstrom and Bjerknes,[32] without doing violence to the observed current displacement. Figure 12 pictures a mirror-image modification of Bjerknes' convergence-divergence line and probably explains sufficiently in what way the origin of the temperature gradients at this line B′ can be considered.

The name "subtropical boundary," which marks the limit of the oceanic subtropical area toward the south and toward the pole-side, has been chosen to distinguish it from the subtropical convergence, which runs within the subtropics. The chart on the color of water by Schott (see Plate XXV) [33] shows divergence phenomena which are connected with the upwelling of water from deeper strata. Along 40°, areas of green water are indicated, which, according to E. Hentschel, are connected with an abundance of plankton. Wattenberg discovered that the food material necessary for

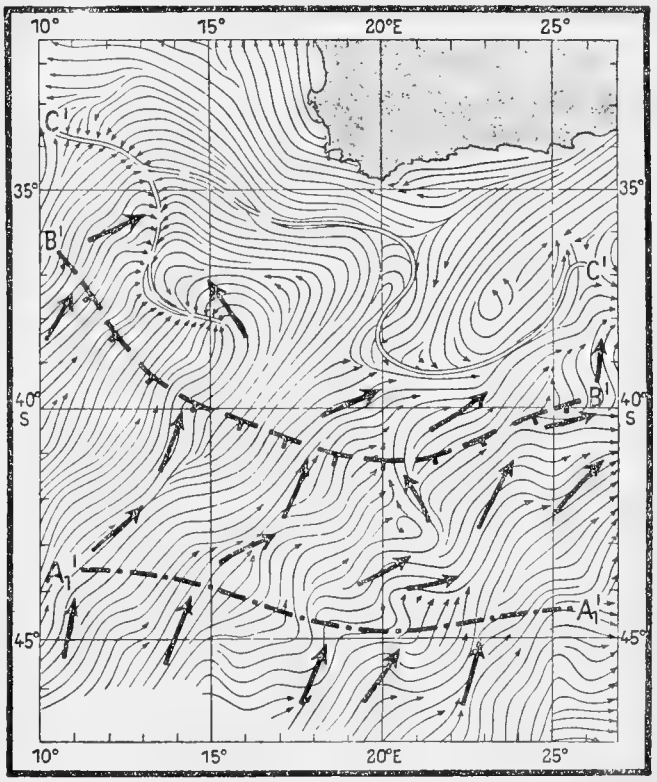


FIGURE 11.—Surface currents south of Africa in October, drawn on the basis of the Dutch current displacements by A. Merz. Designation of the fronts is the same as in figure 4.

the growth of the plankton comes from the deeper strata at these points.

The real subtropical convergence, which is clearly revealed in the current displacements, is indicated very slightly in the temperature distribution, since masses of water of approximately equal warmth are conducted to it from the north and south. The temperature differences north and south of the line C′ are

[31] A. Merz, *Die Deutsche Atlantische Expedition auf dem Vermess.—u. Forschungsschiff Meteor.*—Sitzgs.-Ber. Preuss. Akad. d. Wiss. XXXI. Berlin, 1925.

[32] V. Bjerknes, *Dynamische Meteorologie und Hydrographie.* Braunschweig, 1910 u. 1913.

[33] Tafel VII from G. Schott, *Geographie des Atlant. Ozeans.* Hamburg, 1926.

thus smaller than in the case of B′ at 40° S. Unfortunately, the material on current displacements in the Dutch atlases for two-degree fields is not adequate to show in a similar manner the structure of the currents in the middle area of the ocean. Even here a similar change of direction in the vicinity of the boundary can be revealed in some places from the arrows indicating current directions for the two-degree fields in the Dutch publications; for example, the changes occurring in February for the area from 2° E. to 14° W. and 45° S.

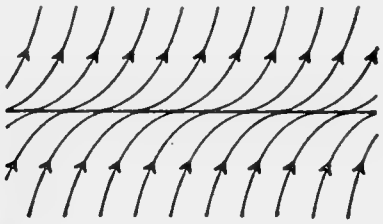


FIGURE 12.—Diagram of a convergence-divergence line according to Bjerknes.

to 35° S. (fig. 13) such as those that can be recognized south of Africa in figures 9 through 11.

In the west, off the Brazilian coast, the situation differs. The Falkland and the Brazil Currents meet, causing the space between the subtropical front and the boundary to narrow to such an extent that they practically coincide. The dynamic influences are, therefore, stronger than the climatic ones. However, because of lack of enough observations for all the months of the year, the presentation of an exact picture of the front is impossible. The portrayal of this area in figure 4 has, then, necessarily been generalized. As examples of the formation of the front in the individual months, the isotherms in figures 14 and 15 are recorded with the boundaries, and the currents with the fronts of December and February. Despite the complicated aspect of these individual cases, the further result at this point is that from the Brazilian coast seaward, the thermal boundary and the dynamic front are at first almost identical. A separation does not take place until they reach 40° W., where the water masses of the Brazil Current, turning off eastward, interrupt the subtropical convergence. The subtropical boundary remains essentially south of these stream lines, and the sub-tropical convergence north of them. In examining figures 14 and 15, it should be noticed that the isotherms were drawn from one-degree fields. The current pattern is thus more generalized than the temperature distribution, and this generalization explains the fact that the two diagrams do not coincide perfectly.

Finally, in this study of the thermal gradients in the area between the polar front and the subtropical boundary, which is chiefly controlled by the west wind drift, more fragments of a further boundary at about 45° S. were found. This boundary, which seems at least in places to separate these zones—perhaps most appropriately called temperate—into a north and a south zone, is shown in figure 4 as A′ and can be recognized in the area of the Falkland Current and south of Africa. In addition to the convergence-divergence line (cf. figs. 14 and 15), another cause of its formation can be assumed to be a turning of the current from a north-south to an east-west direction. This fragment of a further boundary and front within the west wind drift also becomes visible on the monthly charts of the temperature by means of an increased assembling of the isotherms and is expressed, as is the subtropical boundary, in Profile Vd, which was traversed by the *Meteor*, as well as in surface temperatures registered at the time. In figures 7 and 8 at A_1' between Stations 133 and 134, it can be seen that the temperature suddenly jumps from 6° to 13.5° at 45° S. lat., and at B′ between

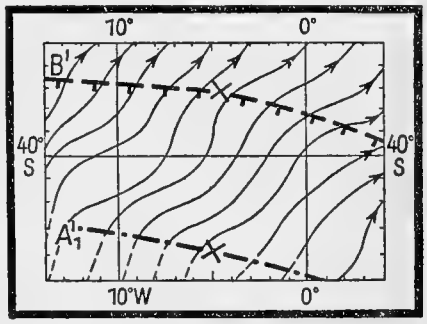


FIGURE 13.—Surface current in the middle South Atlantic Ocean in February. Designation of the fronts is the same as in Figure 4.

Stations 134 and 135 from about 14° to more than 21° C. at 41° S. lat.

The *seasonal fluctuations* of the subtropical boundary are slight, similar to those of the antarctic convergence. They lie within the limits of error of the research methods set up on the basis value of the one-degree field average. Table 4 gives the average monthly position of the subtropical boundary and shows that the average fluctuations are not greater than +1 degree of latitude. Even the seasonal displacements of the convergence, which can hardly be followed otherwise than according to the two-degree field values of

TABLE 5.—*Position of the southern subtropical convergence according to current displacements in degrees of latitude*

Month	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Year
Long. 30°W	32	31	31	32	32	30	30	31	32	31	32	32	31°S.
Long. 20°E	38	37	40	40	39	39	38	38	38	38	38	37	38°S.

the current displacements, do not reach large amounts. Table 5 gives information on these fluctuations at 30° W. and 20° E.

The only exception to this fluctuation is the area immediately off the Brazilian coast. Here the front is displaced from the mouth of La Plata in the southern summer to a point almost as far as 25° S. in the southern winter. Because of these large movements, the boundaries in figure 4 are not carried out as far as the coast.

A short summary of the fronts of the South Atlantic Ocean is as follows: on the basis of the temperature distribution, two boundary zones can be established, the polar front and the subtropical boundary. The polar front at about 50° S. corresponds to the dynamic processes and is located where the so-called "intermediate water," which is, according to Defant and Wüst, antarctic and subantarctic water, sinks below the surface. The subtropical boundary at about 40° S. coincides with the subtropical convergence only in the western part of the ocean, where the Falkland and Brazil Currents meet. This convergence, already well-known from the currents, is located from 40° W. to 10 degrees of latitude farther north. If the polar front separates antarctic water from water of the west wind drift, then, as can be deduced from the temperatures established at the fronts, the subtropic boundary forms the dividing line between the west wind and the subtropical areas, and is thus the pole-side boundary of the subtropics. The subtropical convergence, on the other hand, lies within the subtropics and forms no pronounced "climatic boundary." Finally, the boundary A_1' partly divides the belt of temperate water masses of the west drift into a northern and a southern zone.

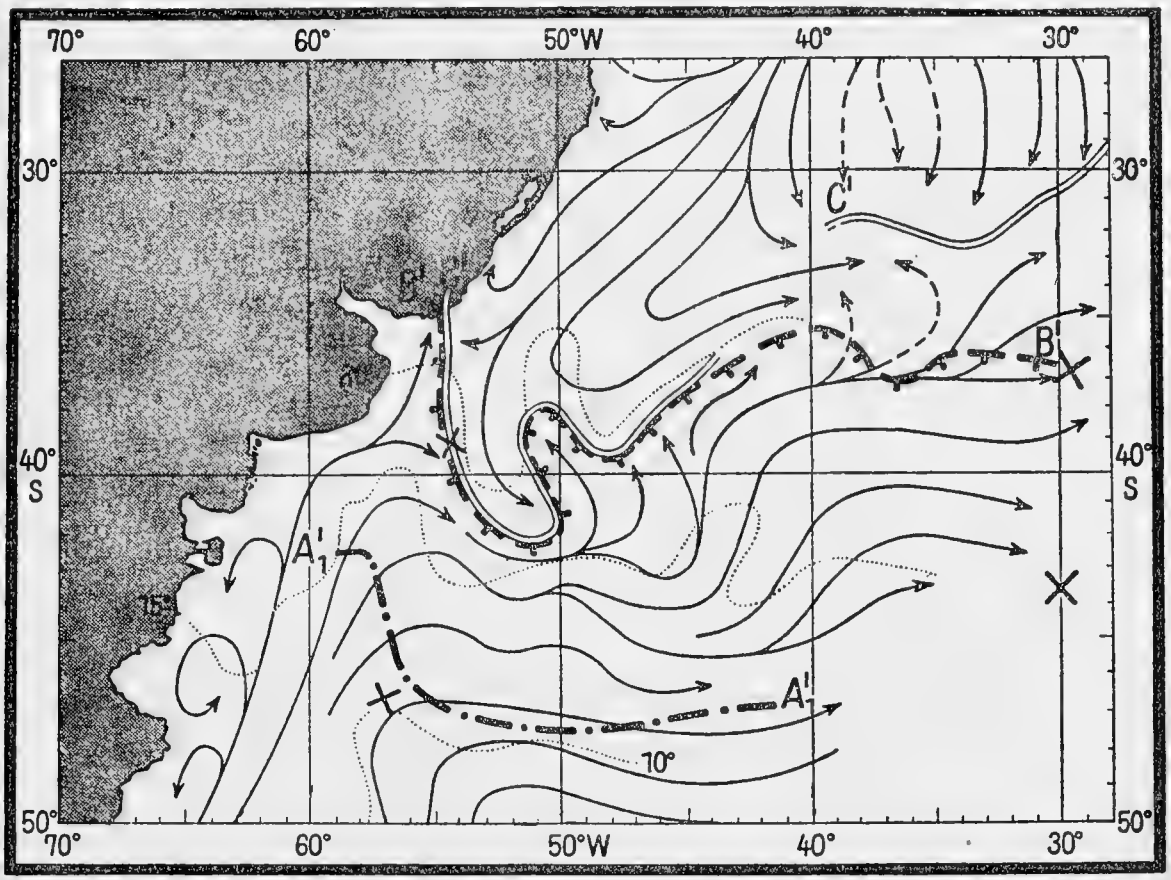


FIGURE. 14—Surface currents and temperature distribution in the area of the Falkland and Brazil currents in December. Designation of the fronts is the same as in figure 4.

b. North Atlantic Ocean.

Because of the complicated distribution of water and land and the influence of the Gulf Stream, conditions in the North Atlantic are not so simple as in the South Atlantic. The most striking phenomenon in the north is the band of extraordinarily steep temperature gradients of about 5° C. per degree of latitude off the North American coast near Labrador (cf. plates V–XVII). It extends on the average, for example, at 50° W., from 39° N. with a temperature of 21° to 44° N. at a temperature of 6°, and thus separates subtropical water from predominantly arctic. This strip, hemmed in on the one hand by the Gulf Stream and on the other by the so-called "Cold Wall," encloses the temperate zone, which with its breadth of 5 degrees of latitude, is only half as wide as the temperate zone of the South Atlantic. Here also, as the current charts of P. M. van Riel and

O. H. Felber[34] show, the dynamic boundary runs between these types of water (fig. 16).

Like the subtropical boundary and subtropical convergence in the boundary area between the Falkland and

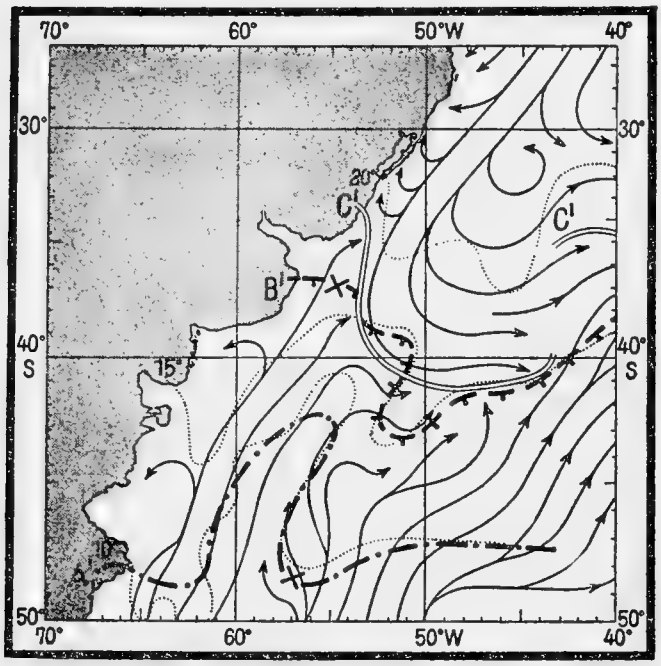


FIGURE 15.—Surface currents and temperature distribution in the area of the Falkland and Brazil currents in February. Designation of the fronts is the same as in figure 4.

Brazil Currents, polar front and subtropical boundary coincide. This coincidence is characteristic of the area off the east coast of North America to about 45° W. At this longitude, the isotherms begin to radiate in the form of a fan from southeast to northeast.

TABLE 6.—*Average position of the fronts and boundaries and average temperatures in the North Atlantic Ocean at 30° W. long.*

Month	B		A_1		A	
	N. Lat.	t°	N. Lat.	t°	N. Lat.	t°
I	43	15	51	9.5	(61)	(8)
II	43	14	52	9	(62)	(6)
III	43	14	52	9	64	6
IV	44	14.5	52	9	65	5
V	44	15.5	53	10	65	7
VI	45	16.5	53	11	65	8
VII	47	17.5	52	13	65	9
VIII	47	18	53	15	65	10
IX	46	18	53	13	65	9
X	46	17.5	53	12	65	8
XI	45	15	52	11	65	6
XII	45	13.5	51	10	64	5
Year	45	16	52	11	65	7

Parentheses indicate that the data have not been well established.

[34] P. M. van Riel, *Surface Temperature in the Northwestern Part of the Atlantic Ocean.* Kon. Nederl. Met. Inst. Nr. 102. Medd. en Verh. Nr. 35. 's Gravenhage, 1933.

See also O. H. Felber, *Oberflächenströmungen des Nordatlantischen Ozeans zwischen 15° und 50° N. Br.* Archiv d. Seewarte. Bd. 53, Nr. 1. Hamburg, 1934.

In order to establish whether boundaries such as those which are found in the south are also present in the eastern half of the North Atlantic, and if so, where they are to be found, the meridional course of the temperature and of the gradients along 50° W., 30° W., and 12° E. was investigated according to the method previously indicated. The results showed that three boundaries are apparent through rather large temperature gradients; of the three boundaries, however, the two southern ones could be recognized only up to about 38° W. (table 6). At 46° W., 45° N., the polar front leaves the hitherto common front in a northerly direction, turns east at 55° N., and moves in an S-shaped curve through the Irminger Sea as far as the coast of east Greenland. Here it runs along at a short distance from the coast and approximately parallel to it, crosses the Denmark Straits, and can still be detected east of Iceland, where the East Iceland polar current meets the offshoot of the Gulf Stream. Insofar as can be determined from the scanty observations in winter, one polar front follows this course (A_w) approximately in the months November to March. In the summer near Cape Farewell this polar front turns into Davis Strait, crosses it, and goes parallel to the Labrador coast southward, and ends at about 50° N. on the coast of Newfoundland (A_s). The seasonal changes of position, caused by climatic influences, are thus rather great. These changes become understandable when the fundamental difference between the southern and northern hemispheres are considered. In contrast to the great water areas in the south, in the north there are only small sea spaces, often interrupted by land masses. In addition, these waters are penetrated and warmed by the Gulf Stream system and its offshoots. While the areas in the south comparable to the Irminger Sea and southern Davis Strait have an almost permanently polar character, in the north a pronounced seasonal course can be developed. The recession of the ice masses during the summer melting period, combined with the warmth, leads to the formation of a warm, though thin, top layer. The cold polar water masses accordingly disappear from the open ocean and, along with the polar front, become merely a narrow belt on the coast of Greenland and Labrador. Details of the course of the front cannot be shown on the monthly charts. Nevertheless the fishery patrols by the *Meteor* in 1929–30 provided an opportunity for studying the processes at the polar front during the summer. Figure 17 shows the probable average water movement in the summer (August), drawn up by A. Defant[35] on the basis of the distribution of temperature, saline content,

[35] G. Böhnecke, Hentschel, und Wattenberg, *Über die hydrographischen, chemischen und biologischen Verhältnisse an der Meeresoberfläche zwischen Island und Grönland.* Ann. d. Hydr. LVIII. Berlin, 1930.

See also G. Böhnecke, *Beiträge Zur Ozeanographie des Oberflächenwassers in der Dänemark-Strasse und Irminger See.* Ann. d. Hydr. LIX. Berlin, 1931 and A. Defant, *Bericht über die Ozeanograph. Untersuchungen des Vermessungsschiffes Meteor in der Dänemark-Strasse u. Irminger See.* Sitzgs.-Ber. Preuss. Akad. d. Wiss. XIX. Berlin, 1931.

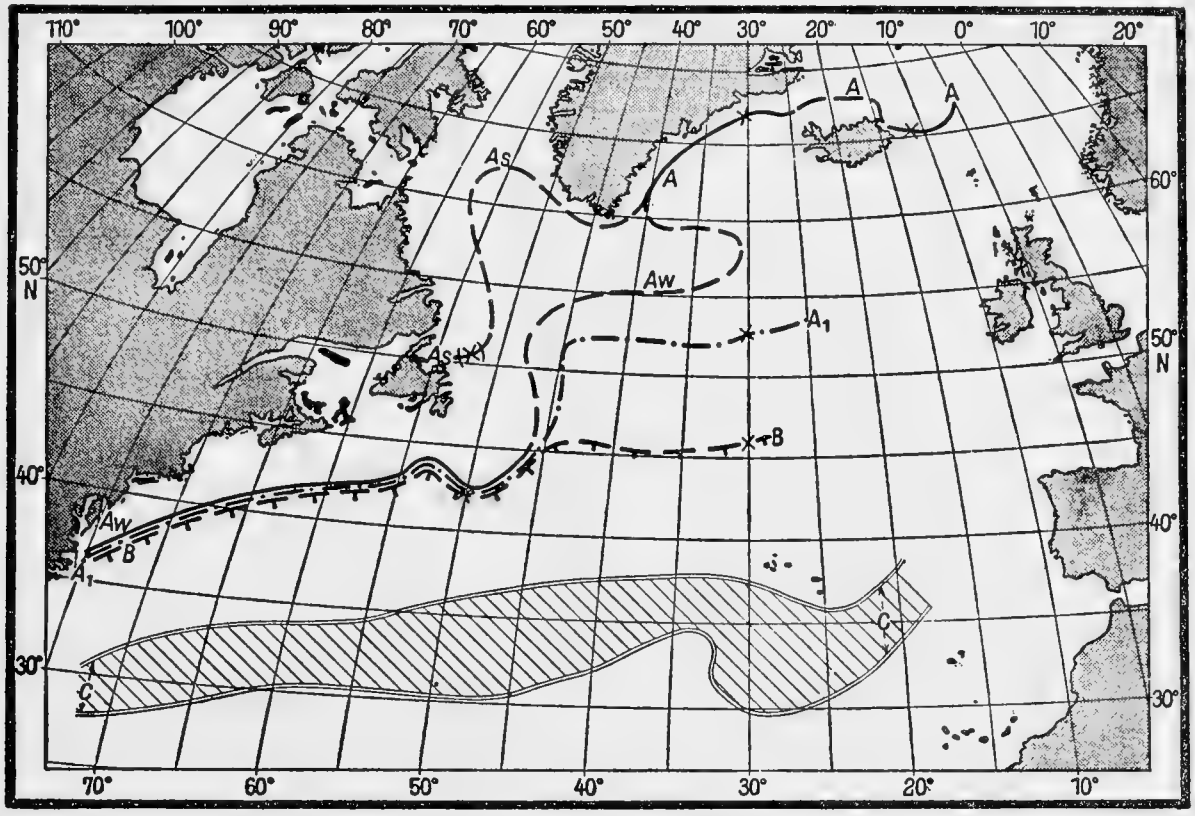
and density. Although both the temperature distribution and the polar front in this area are subject to sharp seasonal changes of position, the water movement may, at least in principle, maintain its course during the whole year according to the arrangement shown in figure 17.

The second boundary A′ likewise arises from the combined fronts between the Cold Wall and the Gulf Stream. First it goes north, then turns east at about 51° N., where it can be recognized on the average as far as 25° W. on the temperature gradients of 1.0° C. per degree of latitude. These gradients are still steep in proportion to the environment. This second boundary is to be interpreted as a secondary front within the temperature zone, analogous to the boundary A′ in the south.[36] Figure 17 shows that on this front Atlantic water and water from the Labrador Current meet at 50° to 52° N.; the condition here may be a matter of a pure convergence. The front comes to an end east of 25° W. by a mingling of the two kinds of water.

The third boundary, the subtropical boundary B, can be distinguished from the group of fronts and divides the temperate from the subtropical water. At 45° N. it runs as far as 30° W. Thence the current streams and isotherms diverge so sharply that in the eastern part of the ocean this boundary can no longer be recognized. Current charts of O. H. Felber[37] give information on its origin. It is obviously connected with the Gulf Stream and is located where the stream lines on its left flank turn off on the north and in so doing decrease both in stability and in velocity, and in velocity especially. In other words, it designates the northern boundary of the axis of the Gulf Stream.

Its seasonal fluctuations are greater than in A′ and reveal a displacement toward the north during the summer. The boundary moves from 43° N. in January to as far as 47° N. in August. The individual values are not so widely scattered as in the south, because at this point the boundary lies in the steamship path and a great many observations are possible. This movement of the boundary, therefore, seems to possess a certain amount of reality.

Finally, the area of the subtropical convergence can be



=Polar front on basis of temperature distribution

As,Aw =Polar front in summer and winter

A =Secondary polar front (Labrador front)

B =Subtropical boundary

=Convergence area based on current displacements.

X =A point plotted from temperature gradient profile.

X =A point which could not be established for every month.

FIGURE 16.—Average position of the fronts and boundaries in the North Atlantic Ocean.

[36] Cf. footnote 35.

[37] Cf. footnote 34.

considered a purely dynamic system in the North Atlantic C. It extends, according to the previously mentioned investigation of Felber, on the average between 30° N. and 35° N. from 75° W. to 20° W., that is, in an area of relatively small temperature differences. In contrast to the south, where the convergence runs from the Argentine coast to the Indian Ocean, in other words, across almost the whole breadth of the Atlantic Ocean, it does not reach from coast to coast. In the west it is broken through by the Gulf Stream, and in the east by the Canary Current. According to Felber, there is no annual periodicity, but rather this front, formed by the weak and unstable currents (often under 5 nautical miles in a day's reckoning), swings irregularly back and forth in the area marked on the chart (fig. 16). In this respect also it differs from the southern subtropical convergence, which according to our present knowledge undergoes only slight changes of position, and because of the greater strength of the currents, especially between Brazil and Falkland Currents and between Agulhas Current and west wind drift, is limited to a very narrow strip. An investigation of the currents of the South Atlantic Ocean according to one-degree fields, in contrast to results obtained from using the two-degree fields of the Dutch atlases, might reveal certain deviations, but it would probably show only minor changes in the fundamental difference between the northern and southern subtropical convergence as it has been established.

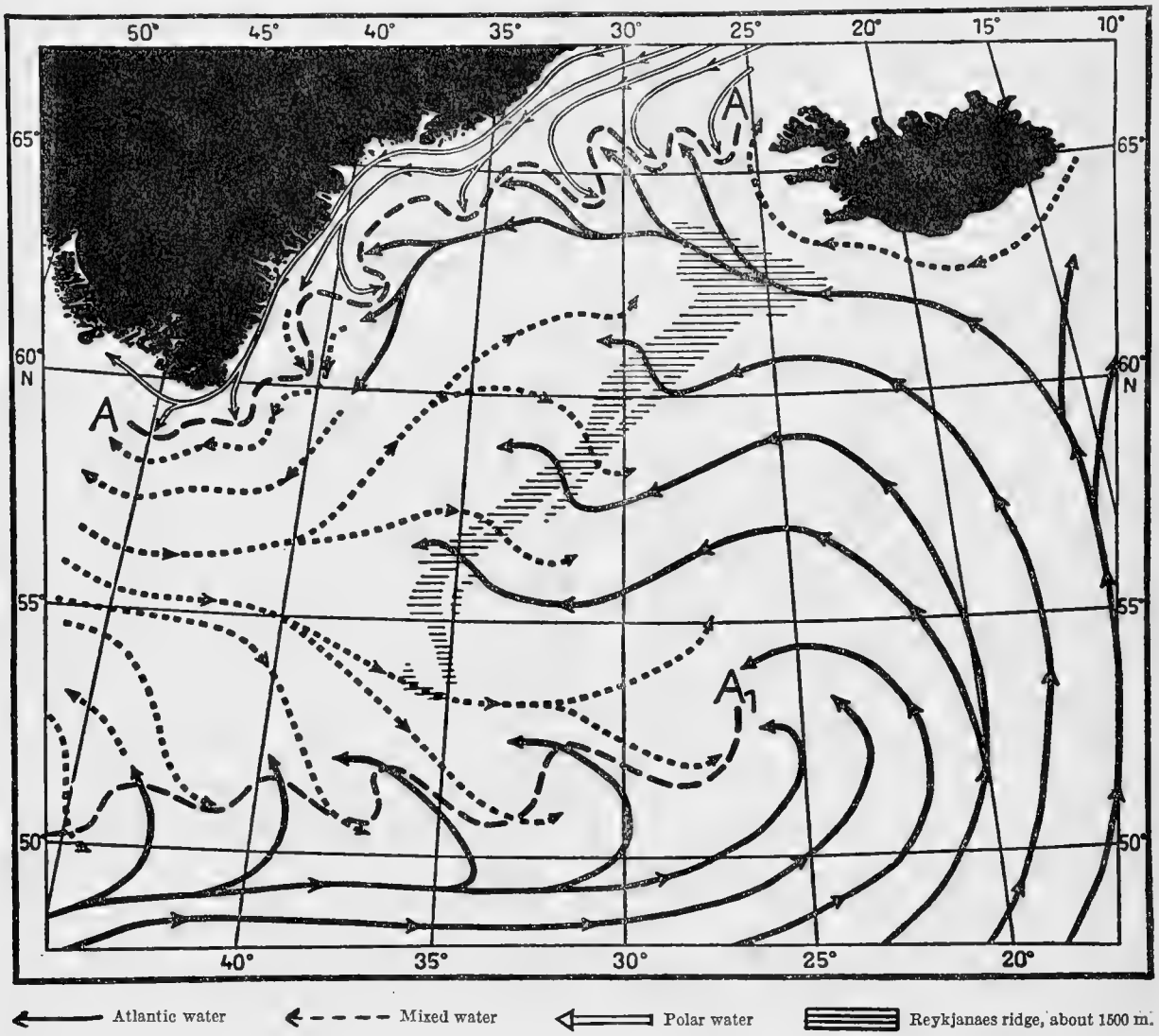


FIGURE 17.—Diagram of the average water movement in the Irminger Sea and Denmark Straits in August, based on distribution of temperature, saline content, and density, according to the data obtained on the *Meteor* fishery patrols.

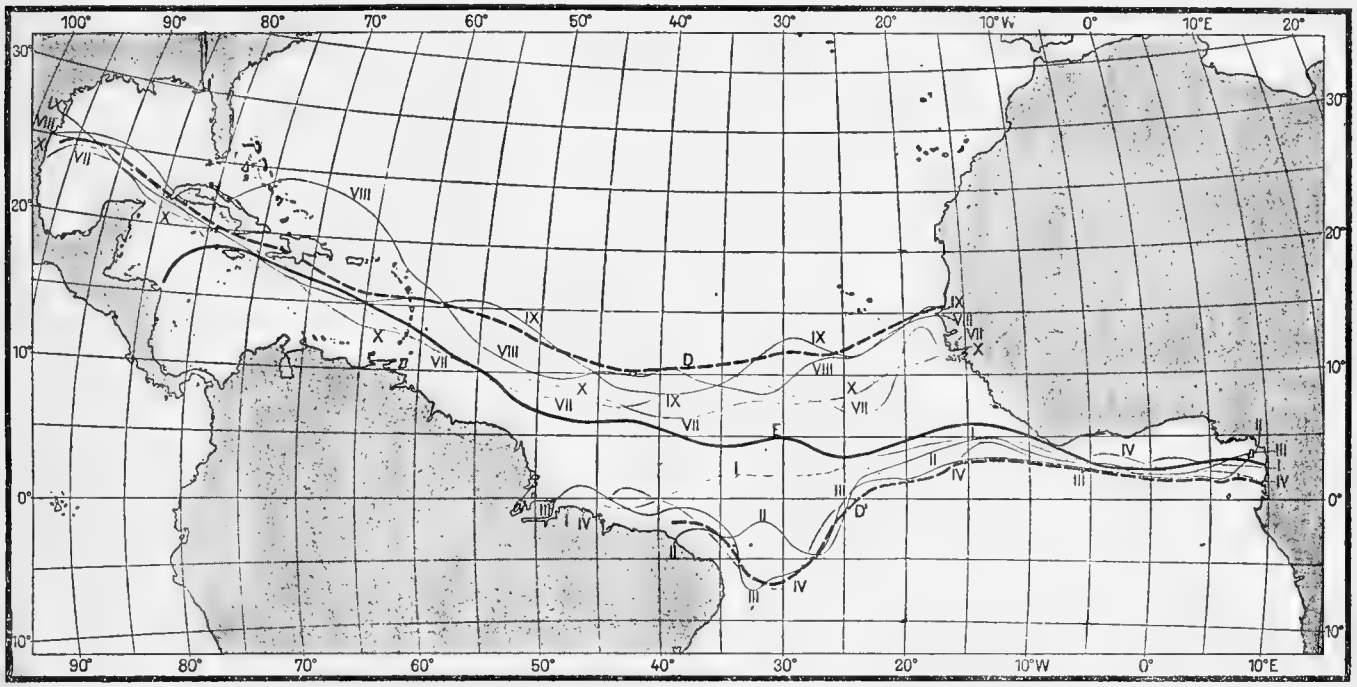
While the subtropical boundary B forms the northern boundary of the Gulf Stream, the subtropical convergence C represents its southern boundary, up to which point the water masses extend and then curve off from it into the Sargasso Sea.

c. Equatorial Ocean.

The zonal boundaries of the bodies of water at the surface of the ocean have been located by means of areas with steeper temperature gradients, which appear predominantly in the middle and high latitudes. In regions where the climatic contrasts are smaller, such a procedure is, however, not feasible.

The subtropical convergence, which in most cases cannot be distinguished by the distribution of temperature, is shown by current displacement. In the case of the equatorial part of the ocean with its large areas of evenly heated masses of water, however, another criterion must be sought to establish the boundary of the tropic zone in the sea. The thermal equator of the hydrosphere, which indicates the momentarily warmest zone in the surface water and follows, with a certain amount of lag, the solstitial point, presents such a criterion.

If the one-degree fields are combined with the highest temperature values on the monthly charts of the temperature (plates VI–XVII), the course of the thermal equator in the surface water is derived, as shown in figure 18. In August and September it reaches its most northerly position. It then runs from Cape Verde (15° N.) on the African Coast to 10° N. at 40° W. and to 25° N. in the Gulf of Mexico, where the warm water of the equatorial current is warmed still further by local heating. In October the returning movement southward sets in, so that as early as November the thermal equator reaches the Yucatan Sea and the Gulf of Guinea. While the thermal equator on the east side of the ocean remains at 2° N. as its most southerly position for the series on the northern hemisphere, it crosses the earth's equator in the west as early as January and comes on the average up to 7° S. in March and April.



——— =Position of the thermal equator at the surface for the months January, April, July, and October.

——— =Position of the thermal equator at the surface for the months February, March, August, and September.

— — — — D' =Average southern extreme position.

— — — — D =Average northern extreme position.

——— E =Average position according to the annual average of the temperature.

FIGURE 18.—Position of the thermal equator at the surface of the hydrosphere.

The northward movement first begins in the west, where in June it again crosses 21° N., whereas it does not leave the Gulf of Guinea until July. For the sake of clarity, only the months near the extreme positions, i. e., July to October, are recorded on figure 18 for the northern positions and January to April for the southern ones. In November and December and in May and June, the thermal equator assumes intermediate positions.

The way in which the seasonal displacements are expressed on individual meridians is shown in figures 19

and 20, which reveal these changes in position in the one-degree bands 30° W. to 31° W. and 20° W. to 21° W. in the form of isopleth diagrams [38] of the temperature. In the case of the eastern band, the maximum lies at 15° N. in September, simultaneously with the appearance of the temperature maximum of 28° C. The most southerly position is reached in April at 0° latitude with the second temperature maximum at 28.0° C. In the western band (30° W. to 31° W.) the fluctuations are greater; here the thermal equator swings back and forth between 10° N. in September and 10° S. in February. The double temperature maximum, which will be discussed later in more detail in the treatment of the annual course of the temperature, also occurs here, with one maximum of 27.9° C. in September and a second one of 27.6° C. in April.

Although it has never before been mentioned in the literature on oceanography, there can no longer by any doubt of the striking phenomenon of the extension of the zone of highest water temperature to the southern hemisphere in the months February, March, and April, with the maximum occurring in April. The current relationships provide the explanation for this extension into the South Atlantic Ocean. In fact, just as is shown by the current displacements in the Dutch atlases, a pronounced current moves southwest between 25° W. and 30° W. precisely in the doubtful months and transports the warm water of the south equatorial current in this direction. As an example, figure 21 shows the position in April. It is clear that the deviation of the current, drawn according to the Dutch two-degree field values, sets in to the southeast toward the Brazil Current even at the equator; that is, considerably more to the north. On the current chart for February by Meyer, this southern component of the water action at this point is only weakly expressed.

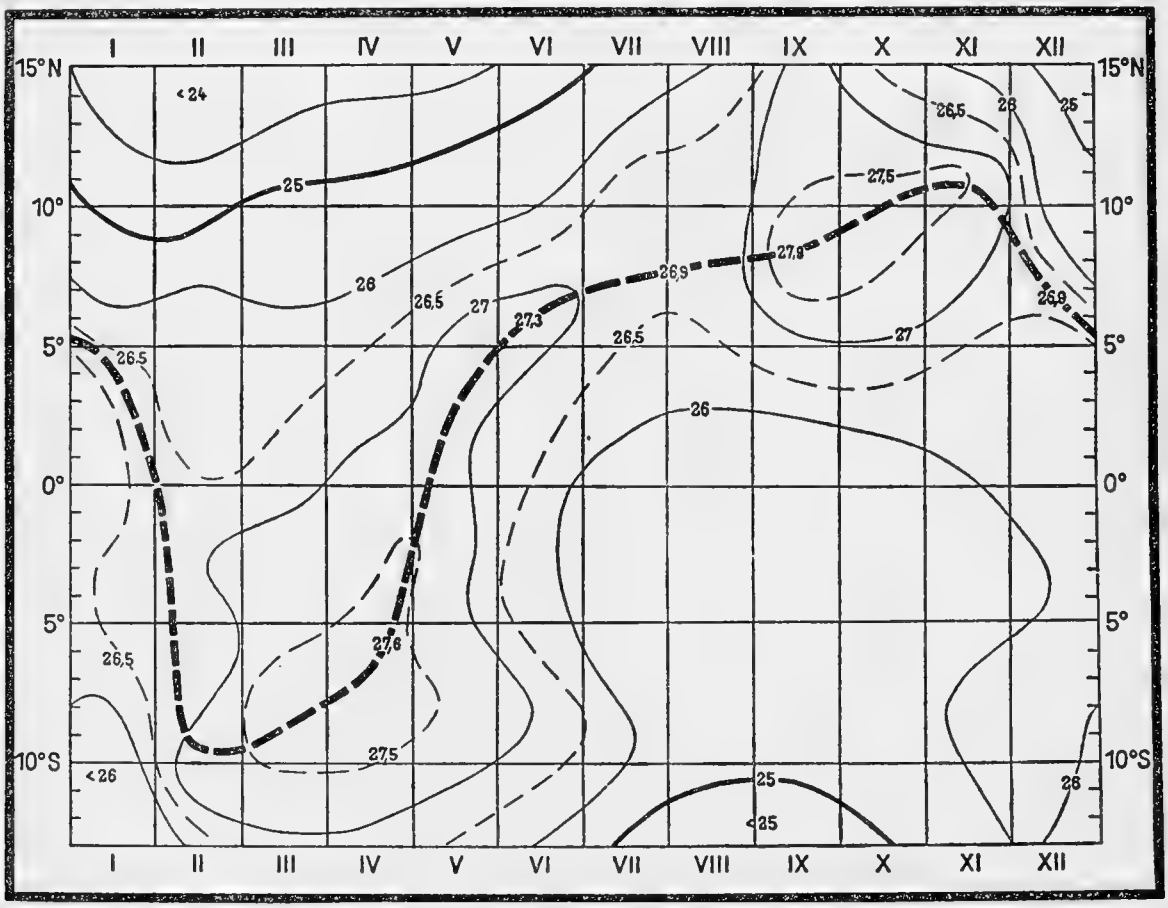


FIGURE 19.—Thermoisopleths on the surface for the one-degree field bands 30° W. to 31° W. between 15° N. and 13° S., with the position of the thermal equator.

The maximum extension of the tropical zone in the Atlantic can, therefore, be limited by means of the average northern and southern extreme position of the thermal equator in the surface water DD′, as shown in figure 18.

The average position of the thermal equator, as obtained from the annual temperature averages of the two-degree fields is a line running from Cape Gracias a Dios through the Caribbean Sea, north of Jamaica, to Martinique, south to about 5° N., and across that parallel to Cape Palamas and Fernando Poo. In table

[38] The differences in the data for latitude for the thermal equator in the isopleth illustrations and on the chart lie in the fact that in figures 19 and 20 the interpolation had to be carried out linearly, and on the chart (fig. 18) according to surface (flächenhaft).

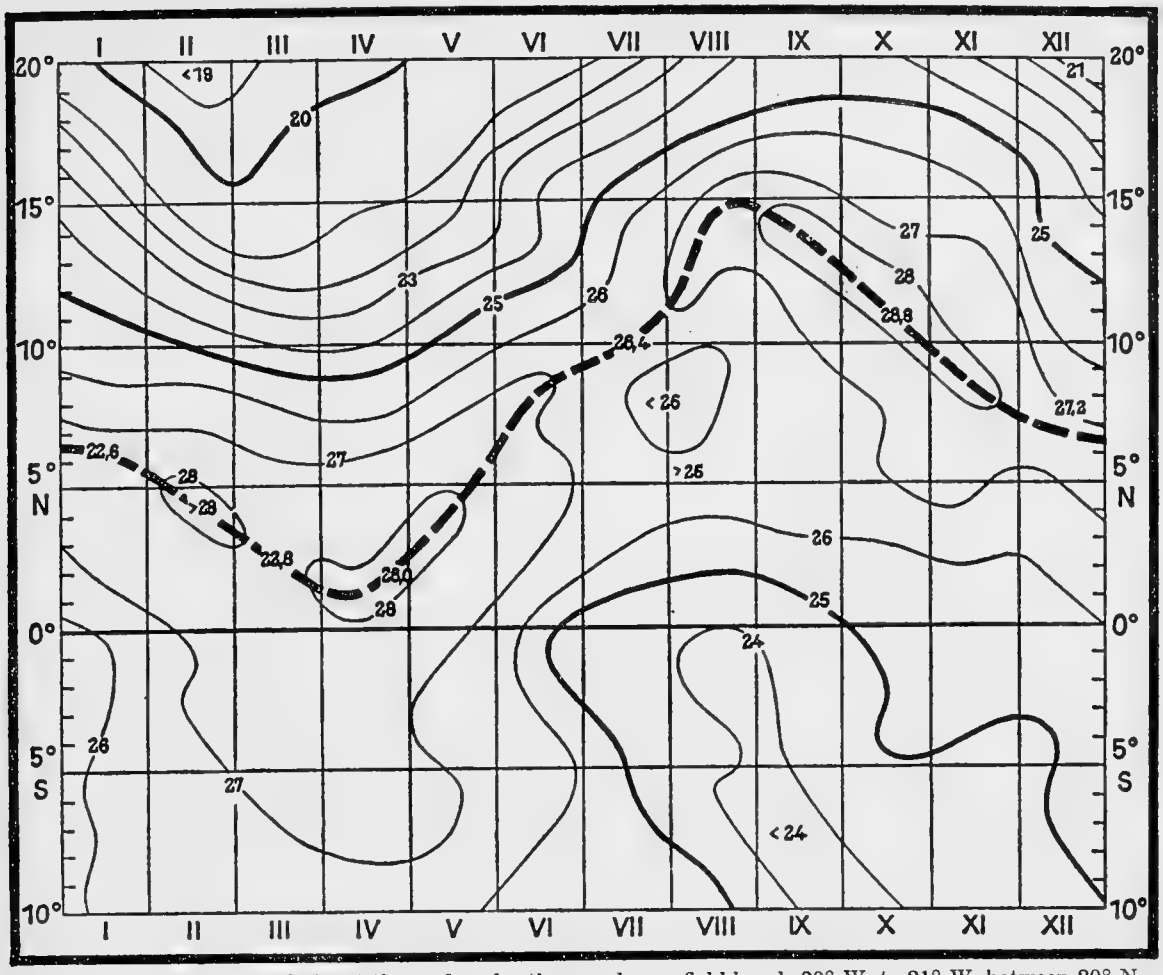


FIGURE 20.—Thermoisopleths at the surface for the one-degree field bands 20° W. to 21° W. between 20° N. and 10° S., with the position of the thermal equator.

7 the points of intersection of the average northern and southern extreme positions are those of the annual average, along with the meridians.

TABLE 7.—*Most northerly, average, and most southerly position of the thermal equator*

Longitude	90° W.	60°	30°	0°
Average northern extreme position Latitude	24 N.	15 N.	12 N.	
Annual average	--------	13 N.	5 N.	3 N.
Average southern extreme position Latitude	--------	--------	7 S.	2 N.

To summarize, it can thus be established that on the basis of temperature distribution and water movements, natural areas which correspond approximately to the main climatic zones can be delineated. Thus the polar front (A′ Southern Hemisphere, $A_{w,s}$ Northern Hemisphere) at the surface separates the oceanic stratosphere from the troposphere. Between these fronts and the poles is the domain of the cold water masses that is the polar area of the ocean, which, according to Defant and Wüst, includes not only the real polar zone of the ice-covered sea, but also subpolar water masses to about 5° C. By their sinking at the front they give the impulse for great interhemispheric circulation in the lower strata of the Atlantic Ocean. In the south, the temperatures at the front are 5° C.

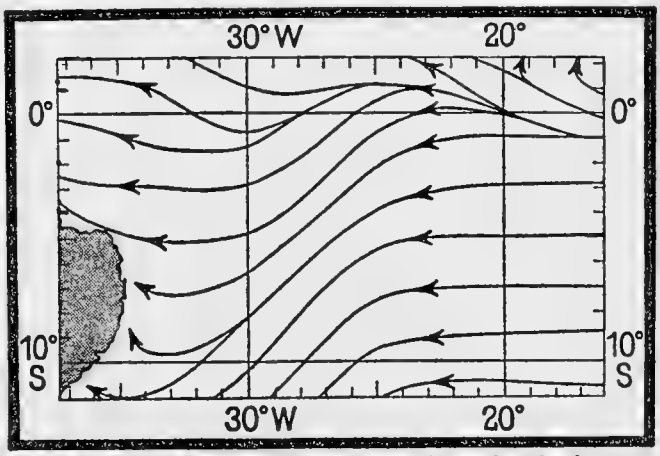


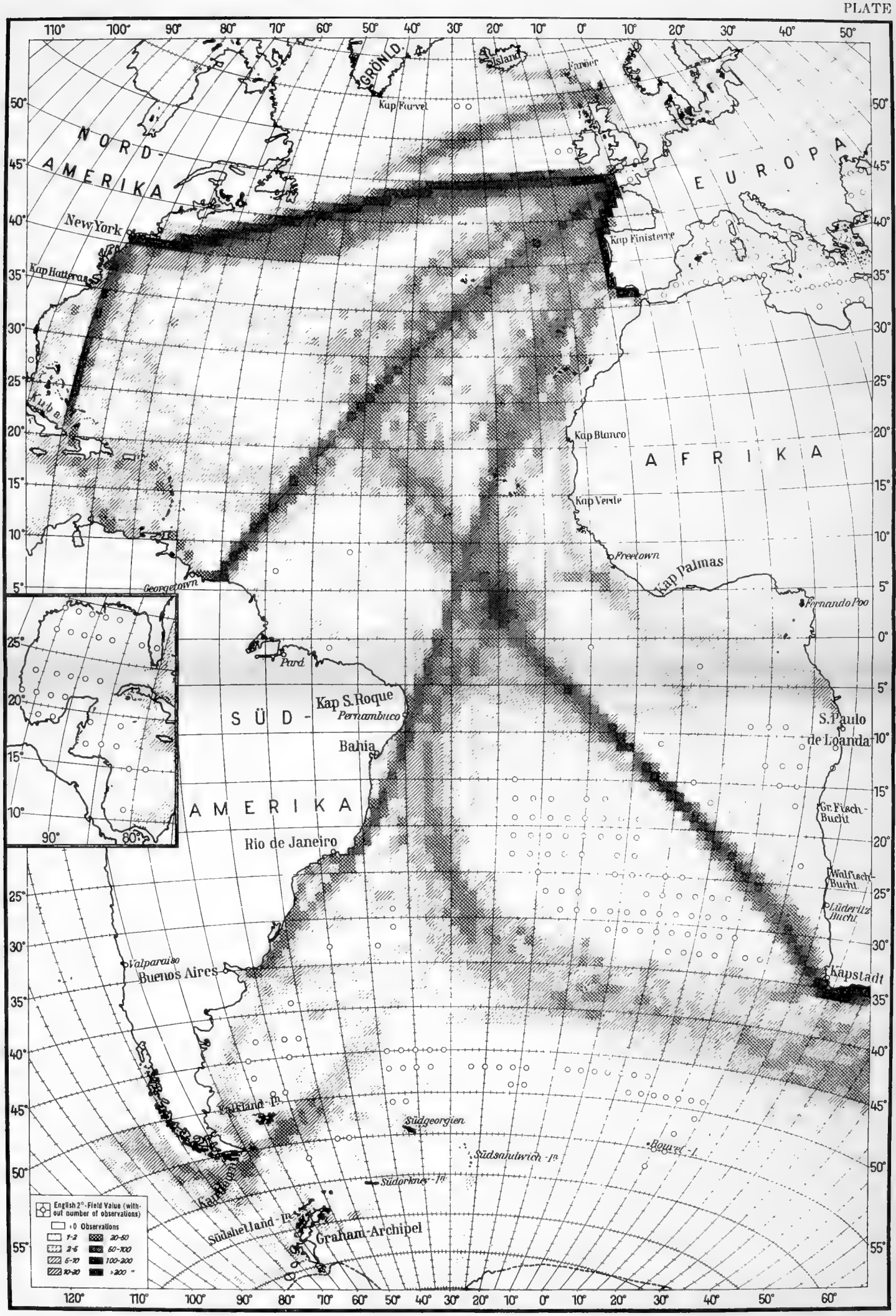
FIGURE 21.—Water movement at the surface in the equatorial area in April between 06° W. and 37° W., and between 2° N. and 12° S., according to the Dutch current displacements for two-degree fields.

and under; in the north they are apparently somewhat higher. The higher temperature is, however, probably connected with the small width of the front, its unstable position, and the other previously mentioned factors, i. e. Gulf Stream and distribution of water and land.

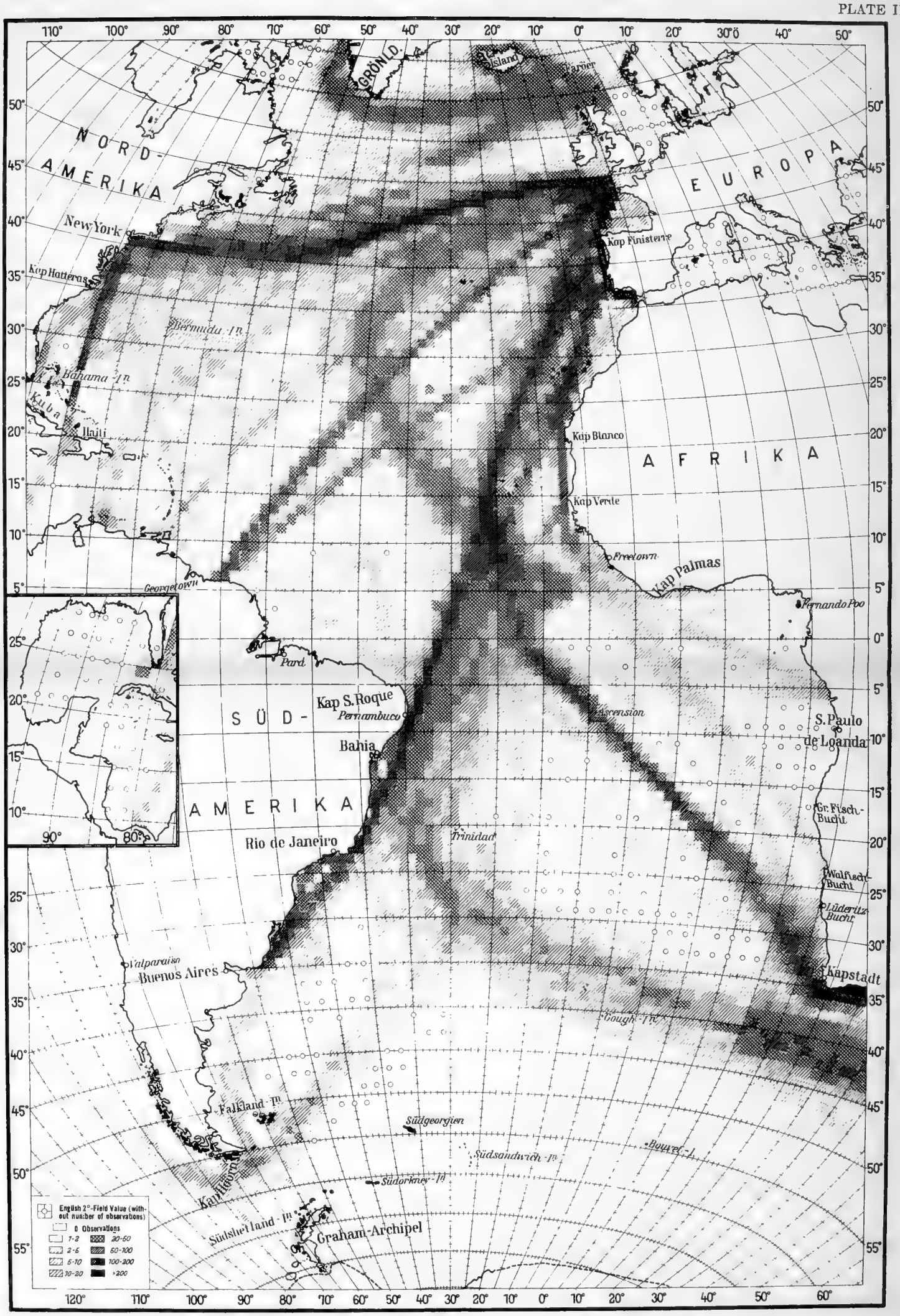
Within the polar fronts, between which the tropospheric events take place, the subtropical boundary B and B′ tends toward the equator. Between A′ and B′ and A and B lies an area which, compared with the polar zone, has higher temperatures and which is dominated in the south principally by the west wind drift. In any case, the chart of the water movement of the surface of the Atlantic Ocean by Meyer [39] shows predominantly purely eastward current directions, especially in these latitudes of the South Atlantic Ocean, while north and south of them, northeasterly directions prevail. In the North Atlantic, the conditions are more involved. Within this temperate zone of the west wind drift, in the area of the Falkland Current and south of Africa, as well as in the North Atlantic Ocean, fragments of a secondary boundary A_1' and A′ were found. This fact is explained, as was partly the subtropical boundary itself, by the appearance of a convergence-divergence line in the current system of the west wind drift. The tropical zone of the ocean was defined by the average northern and southern extreme positions of the thermal equator of the water surface. From this fact, it may be deduced that the boundary in the western part of the ocean reaches about 7.5° S. to 10° S. lat.

Between the equatorial area and the temperature zone of the west wind drift are found the subtropical areas in which lie the great dynamic convergence areas, already partly recognized by Merz and drawn by Meyer and Felber on their charts.

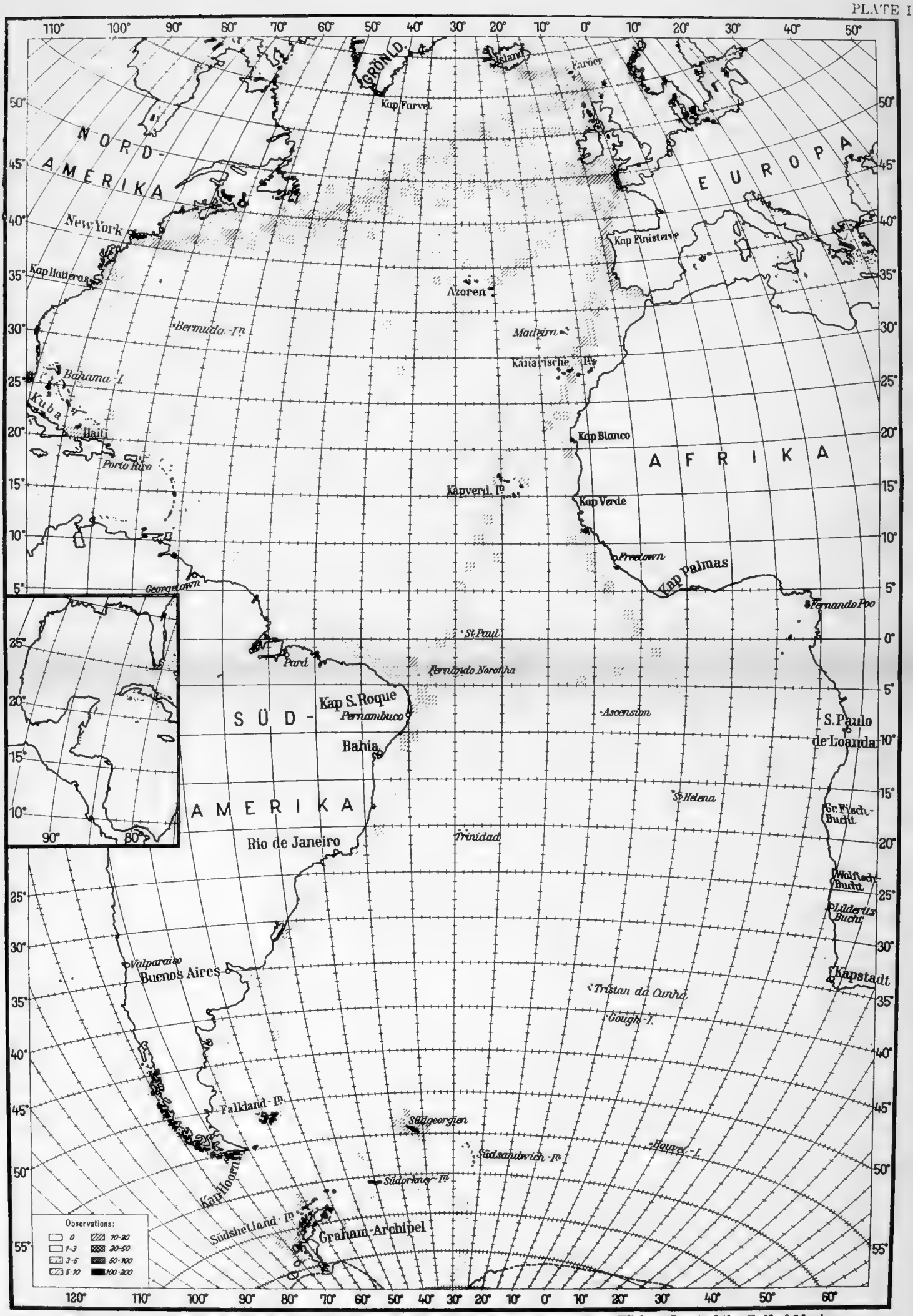
[39] Footnote 24.



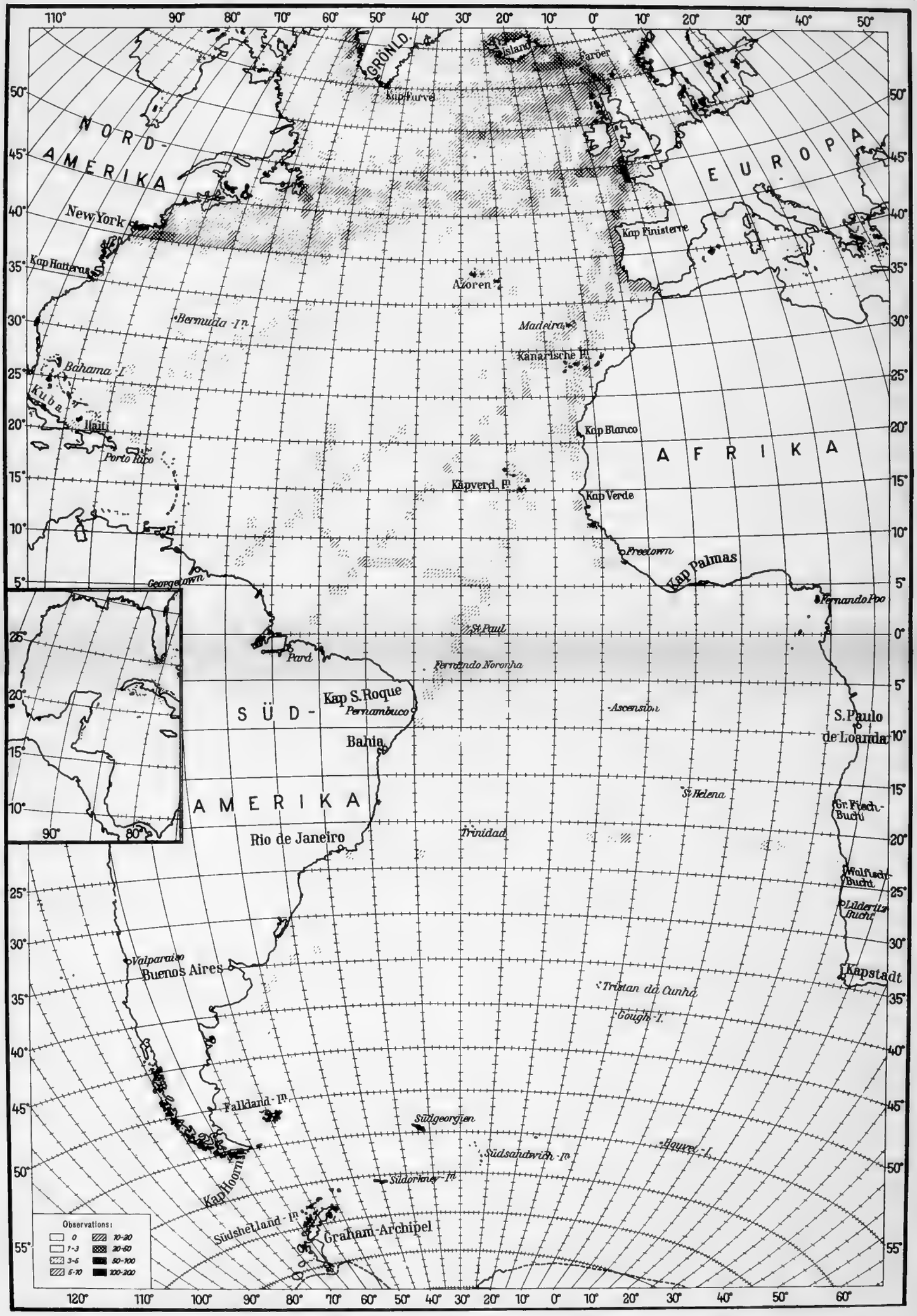
Distribution of Surface Temperature Observations in One-Degree Fields in *January* With an Inset of the Gulf of Mexico.



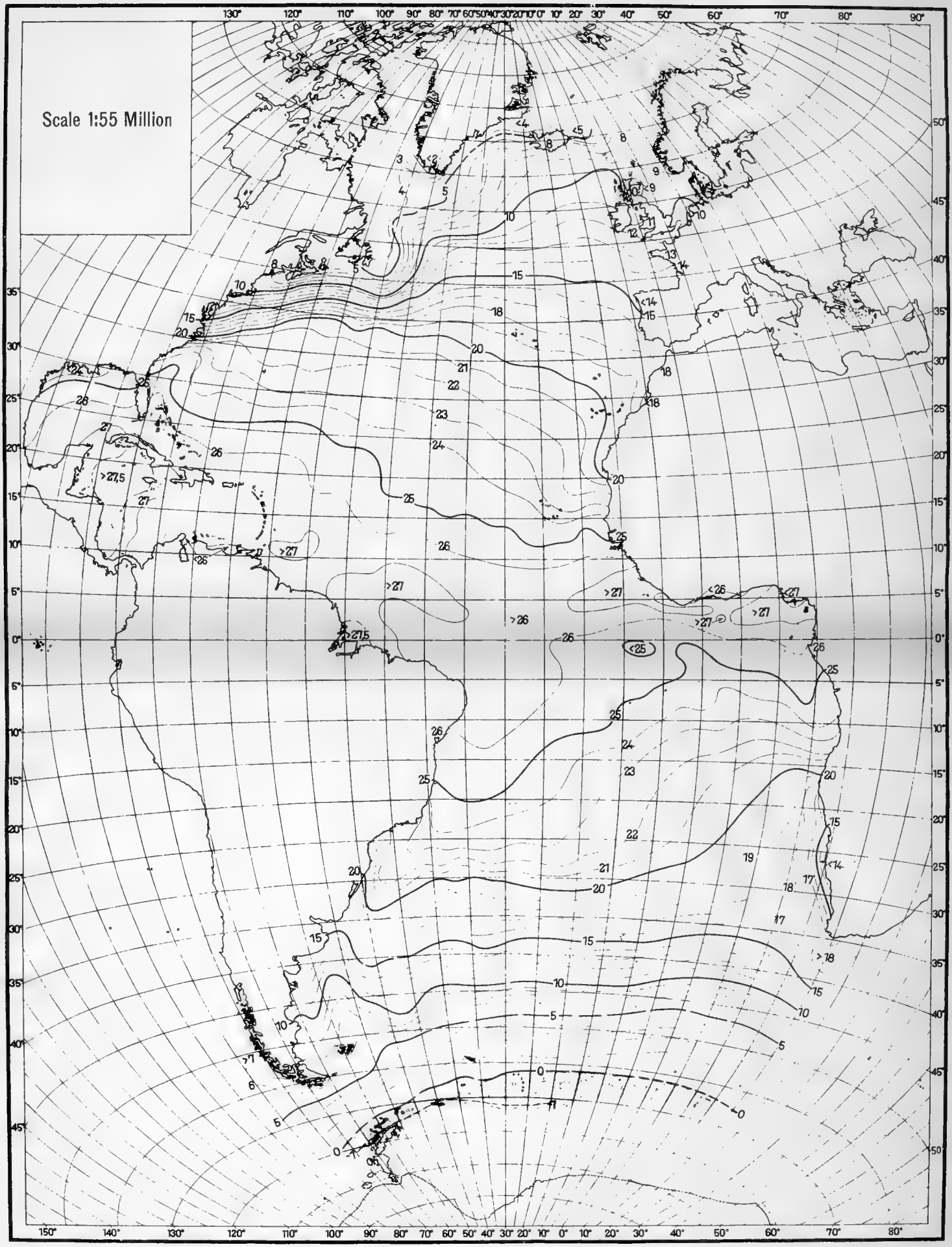
Distribution of Surface Temperature Observations in One-Degree Fields in *July* With an Inset of the Gulf of Mexico.



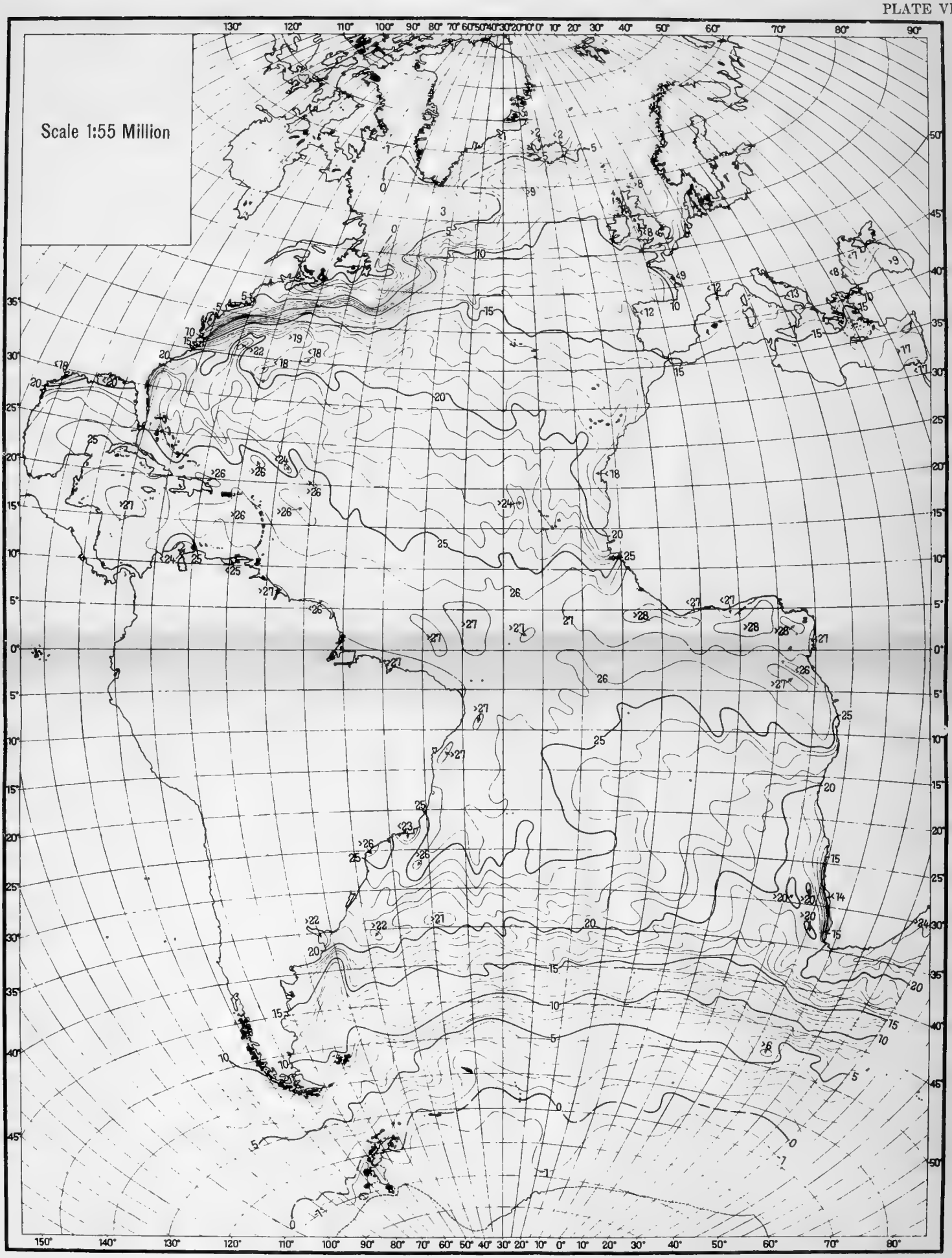
Distribution of Observations of Surface Saline Content in One-Degree Fields in *January* With an Inset of the Gulf of Mexico.



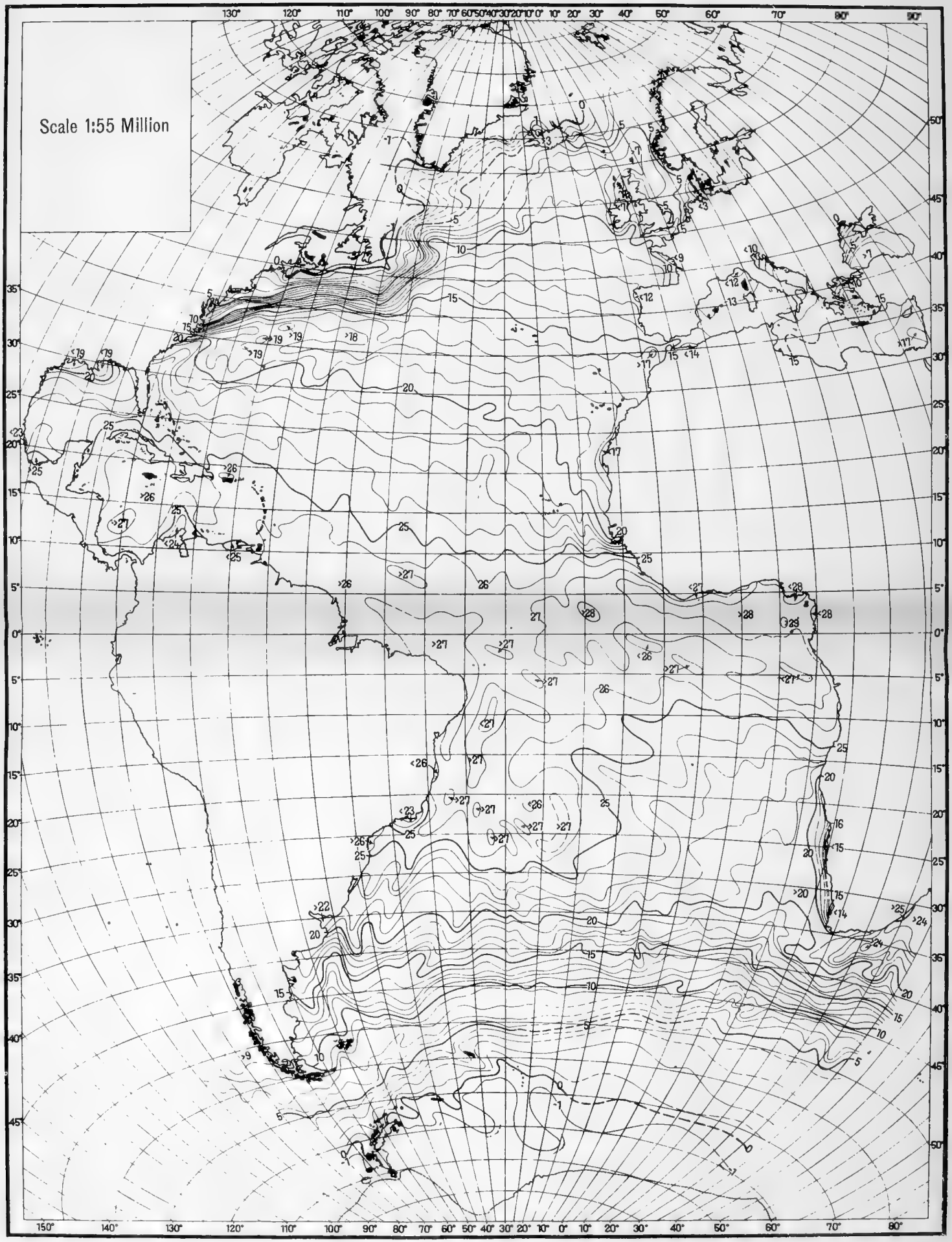
Distribution of Observations of Surface Saline Content in One-Degree Fields in *July* With an Inset of the Gulf of Mexico.



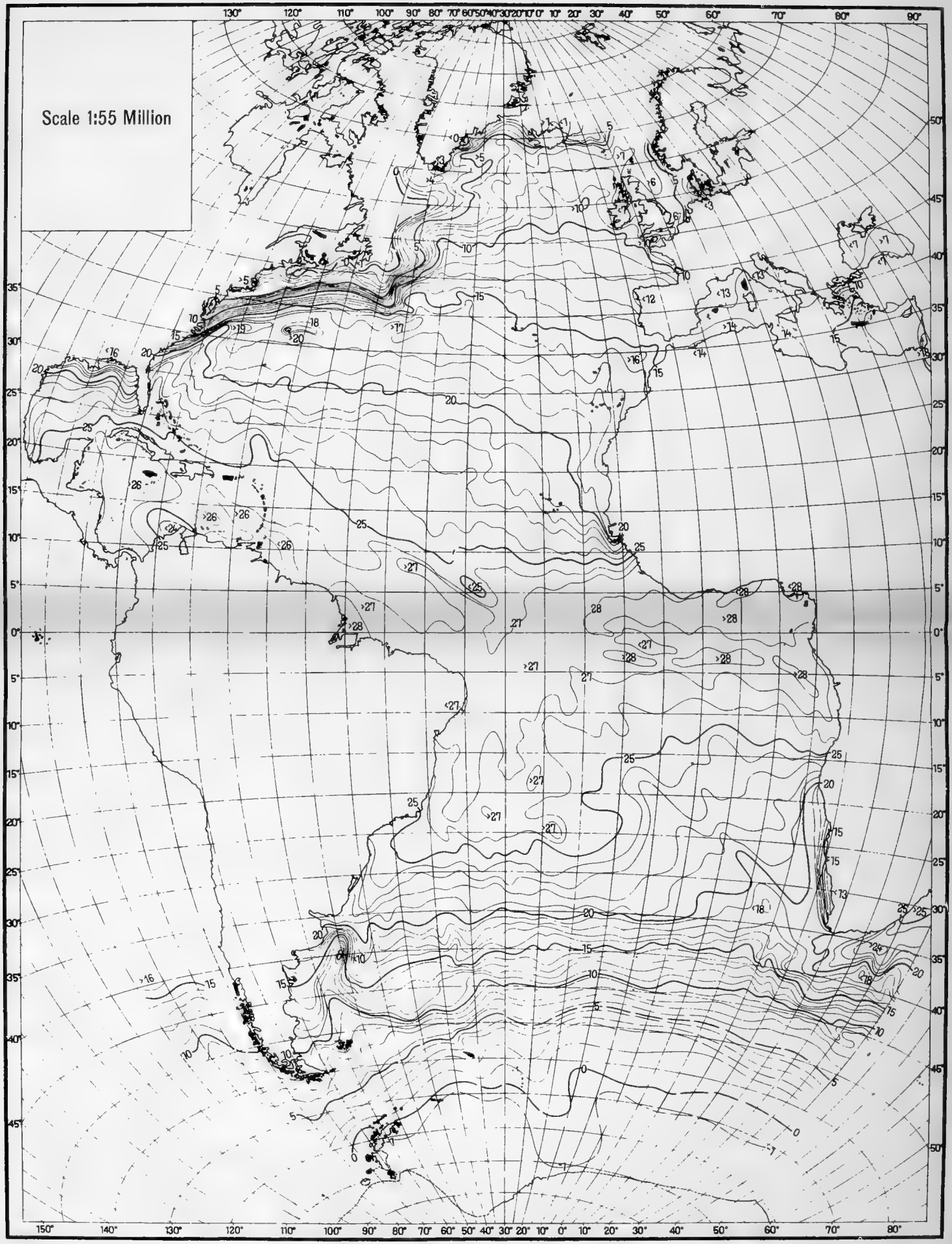
Mean Annual Surface Temperature (°C.) Computed for One-Degree Fields.



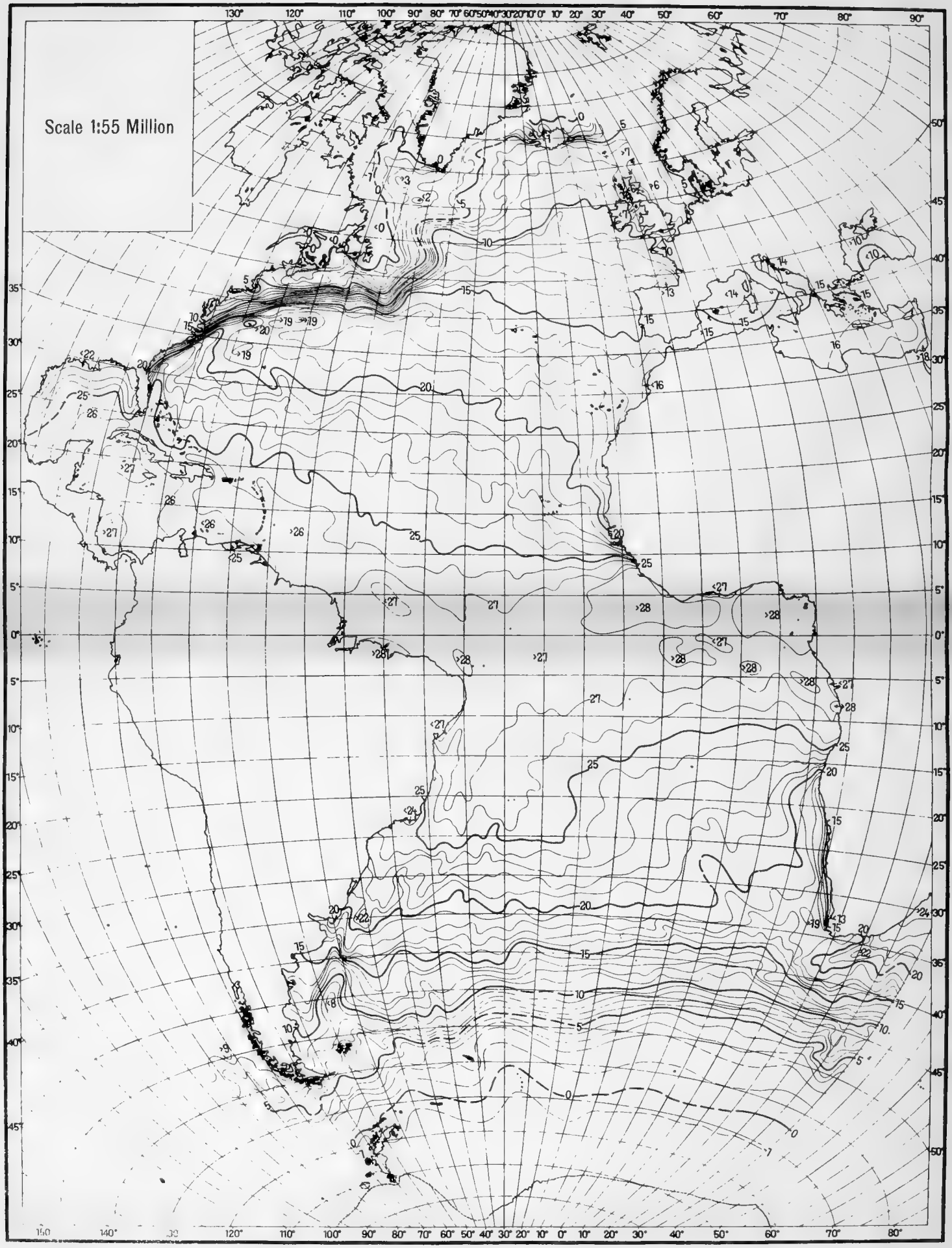
Mean Monthly Surface Temperature (°C.) for January, Computed for One-Degree Fields.



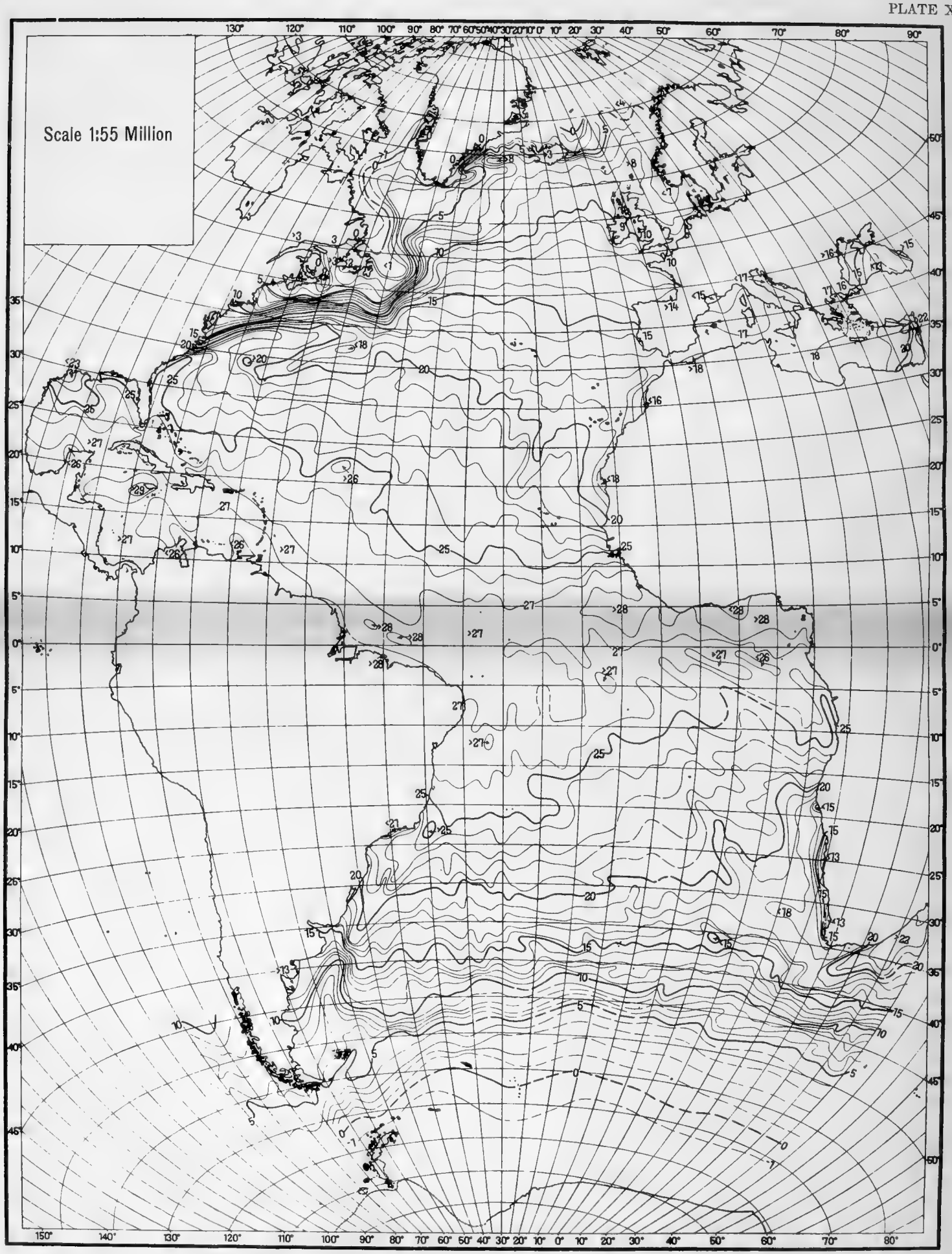
Mean Monthly Surface Temperature (°C.) for February, Computed for One-Degree Fields.



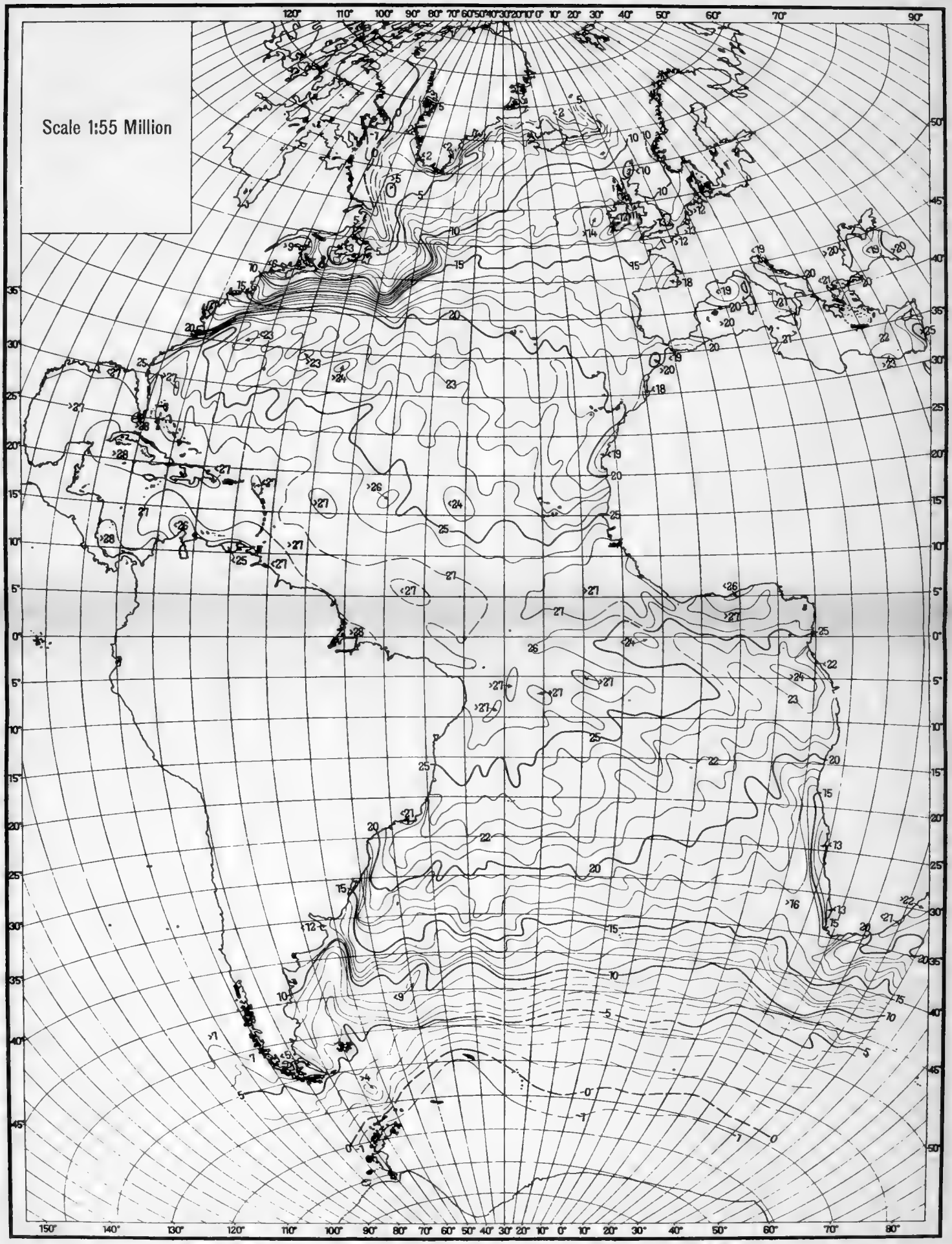
Mean Monthly Surface Temperature (°C.) for March, Computed for One-Degree Fields.



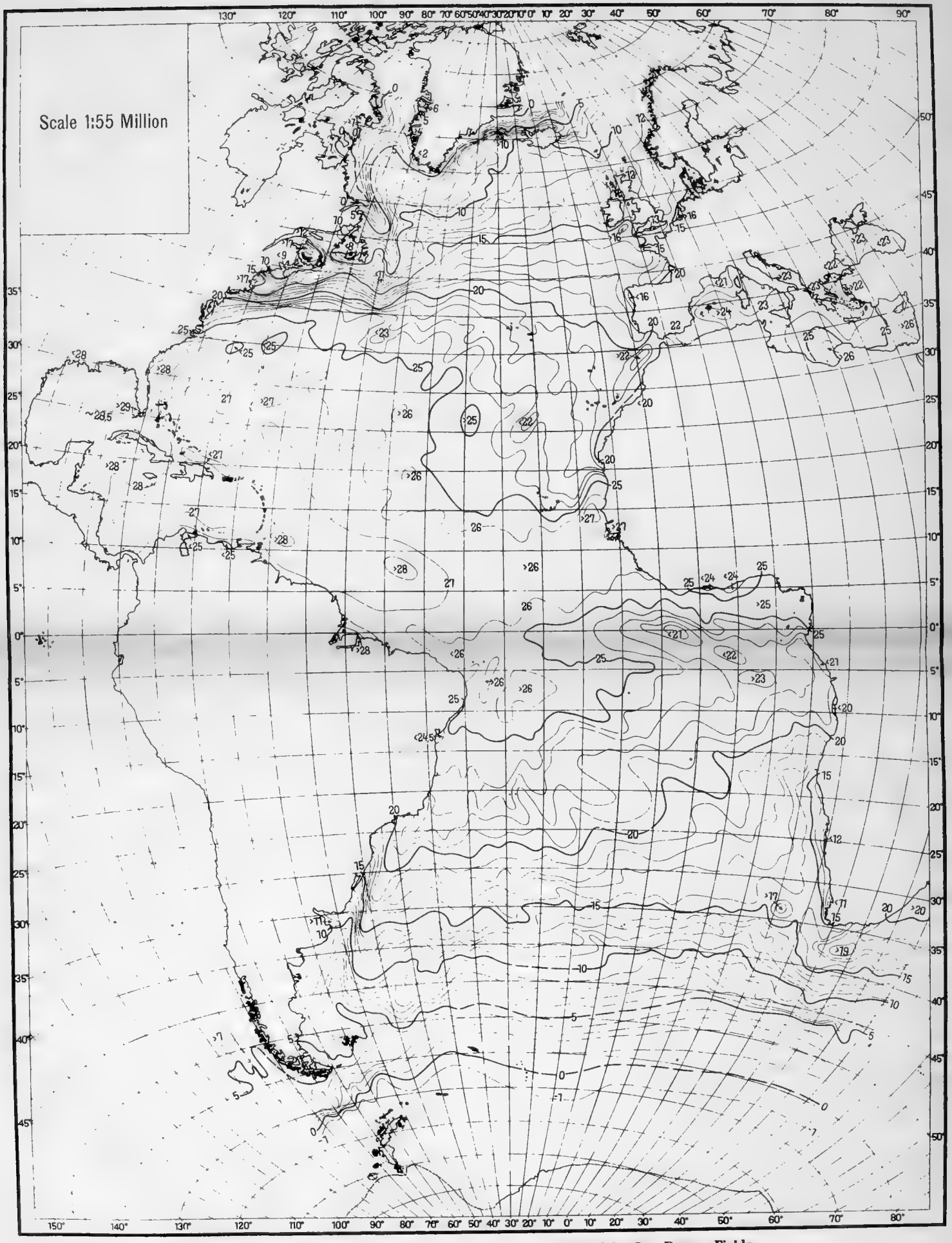
Mean Monthly Surface Temperature (°C.) for April, Computed for One-Degree Fields.



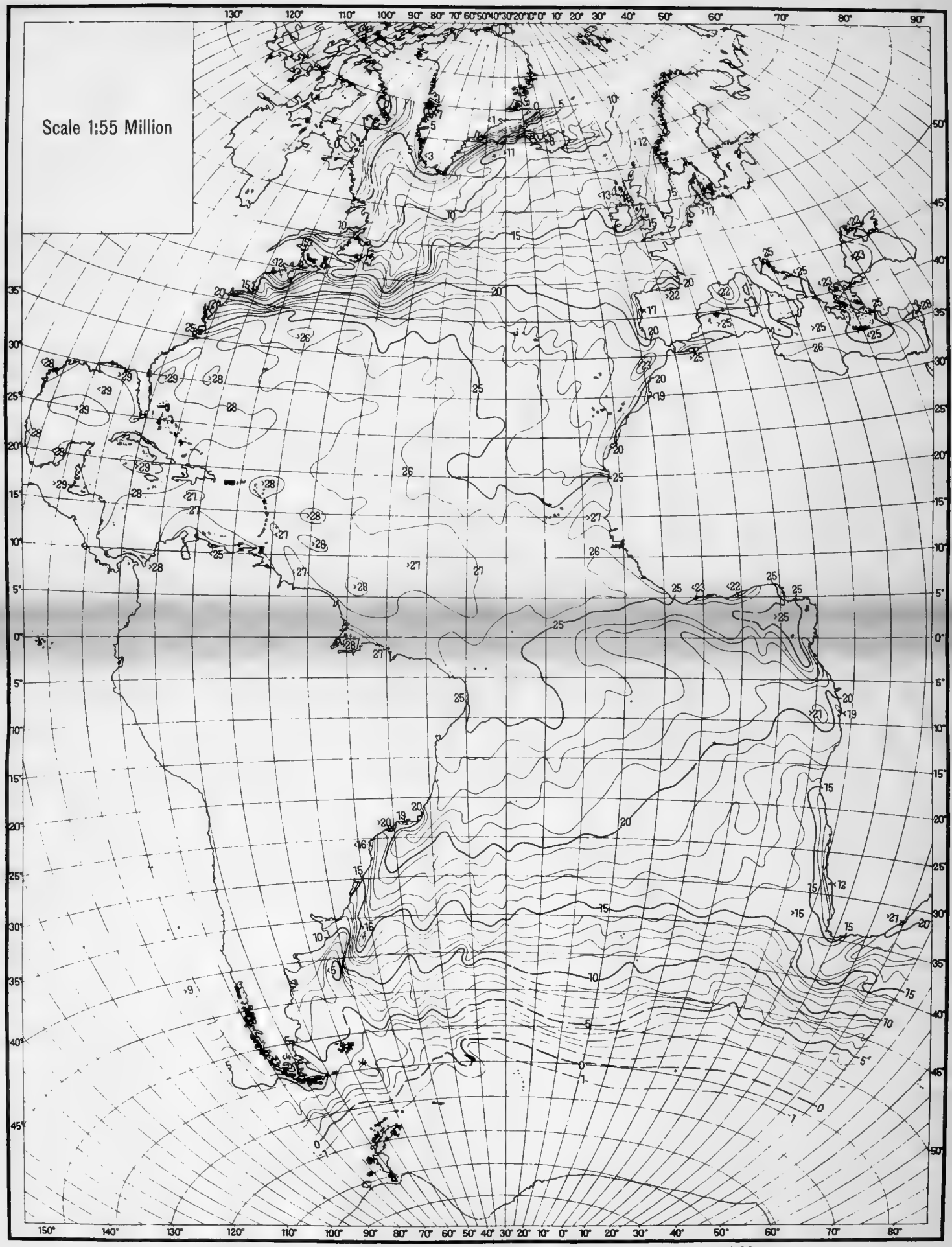
Mean Monthly Surface Temperature (°C.) for May, Computed for One-Degree Fields.



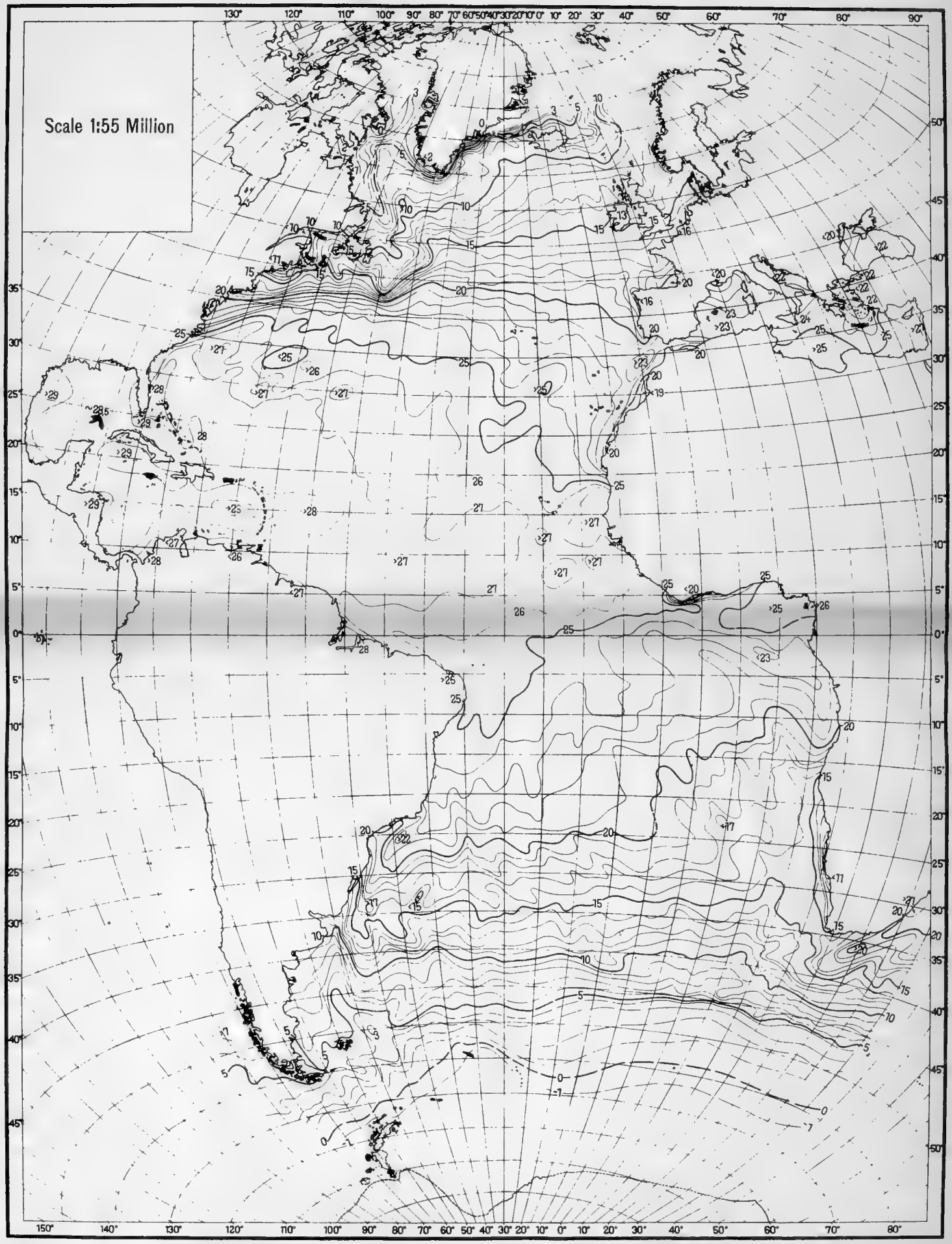
Mean Monthly Surface Temperature (°C.) for June, Computed for One-Degree Fields.



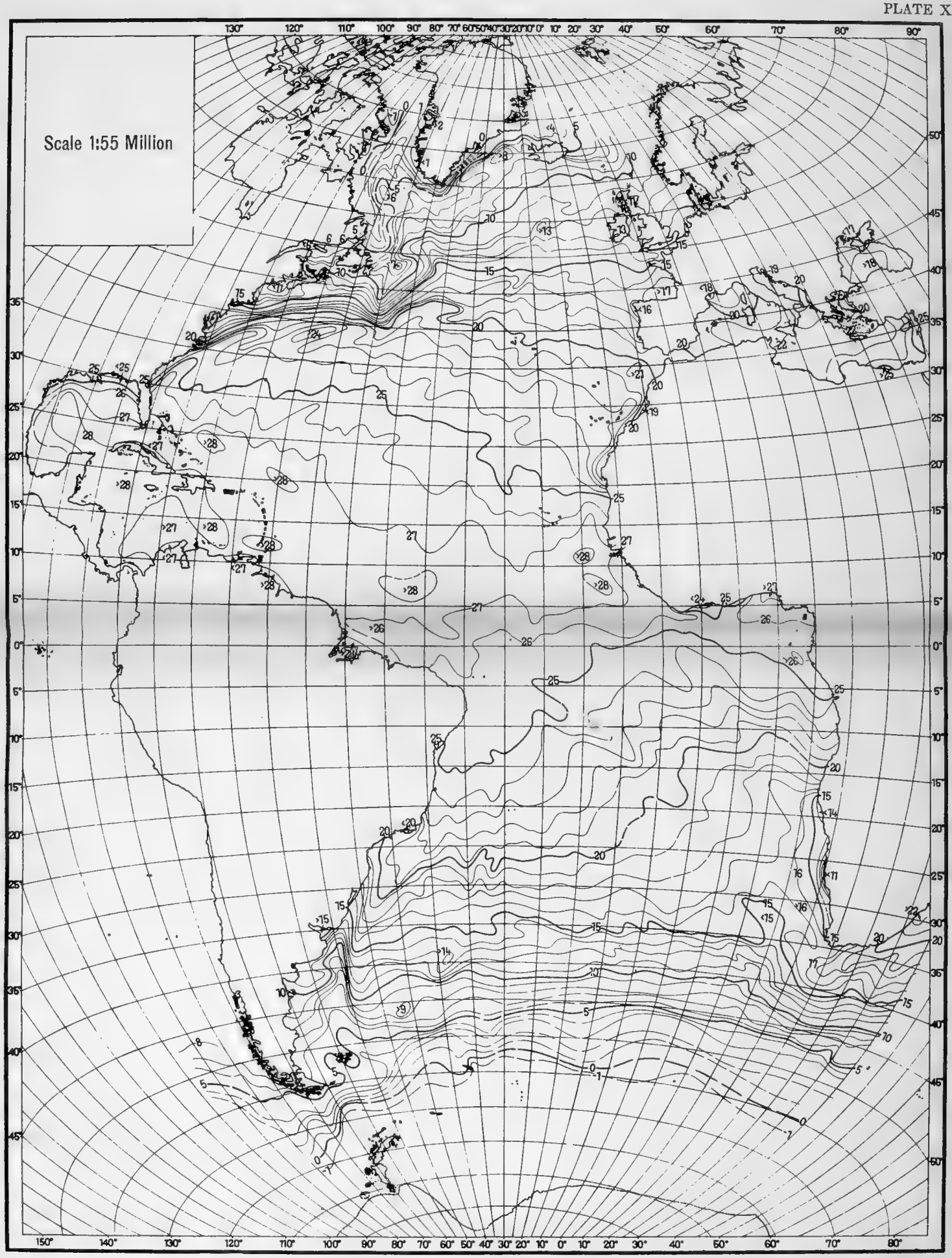
Mean Monthly Surface Temperature (°C.) for July, Computed for One-Degree Fields.



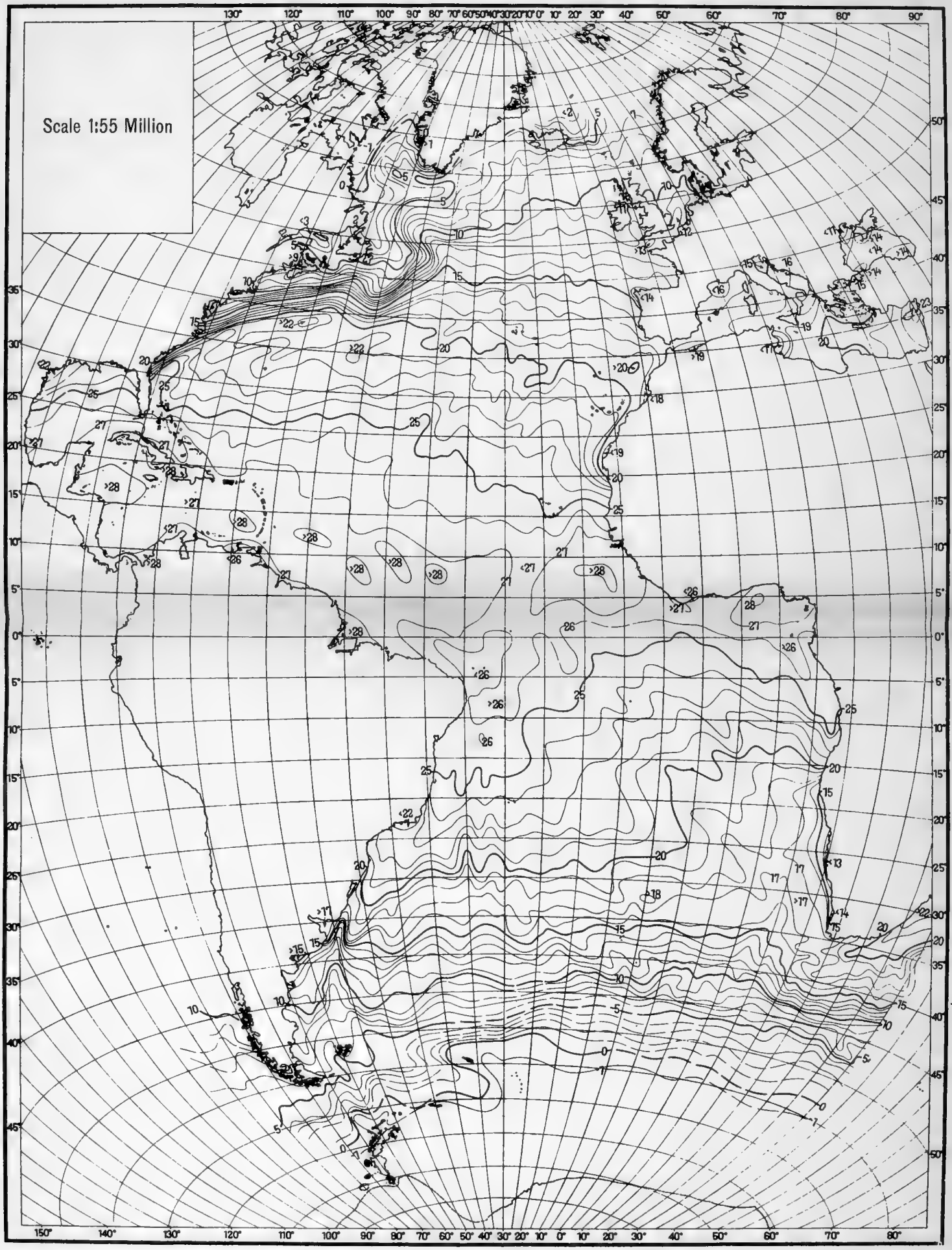
Mean Monthly Surface Temperature (°C.) for August, Computed for One-Degree Fields.



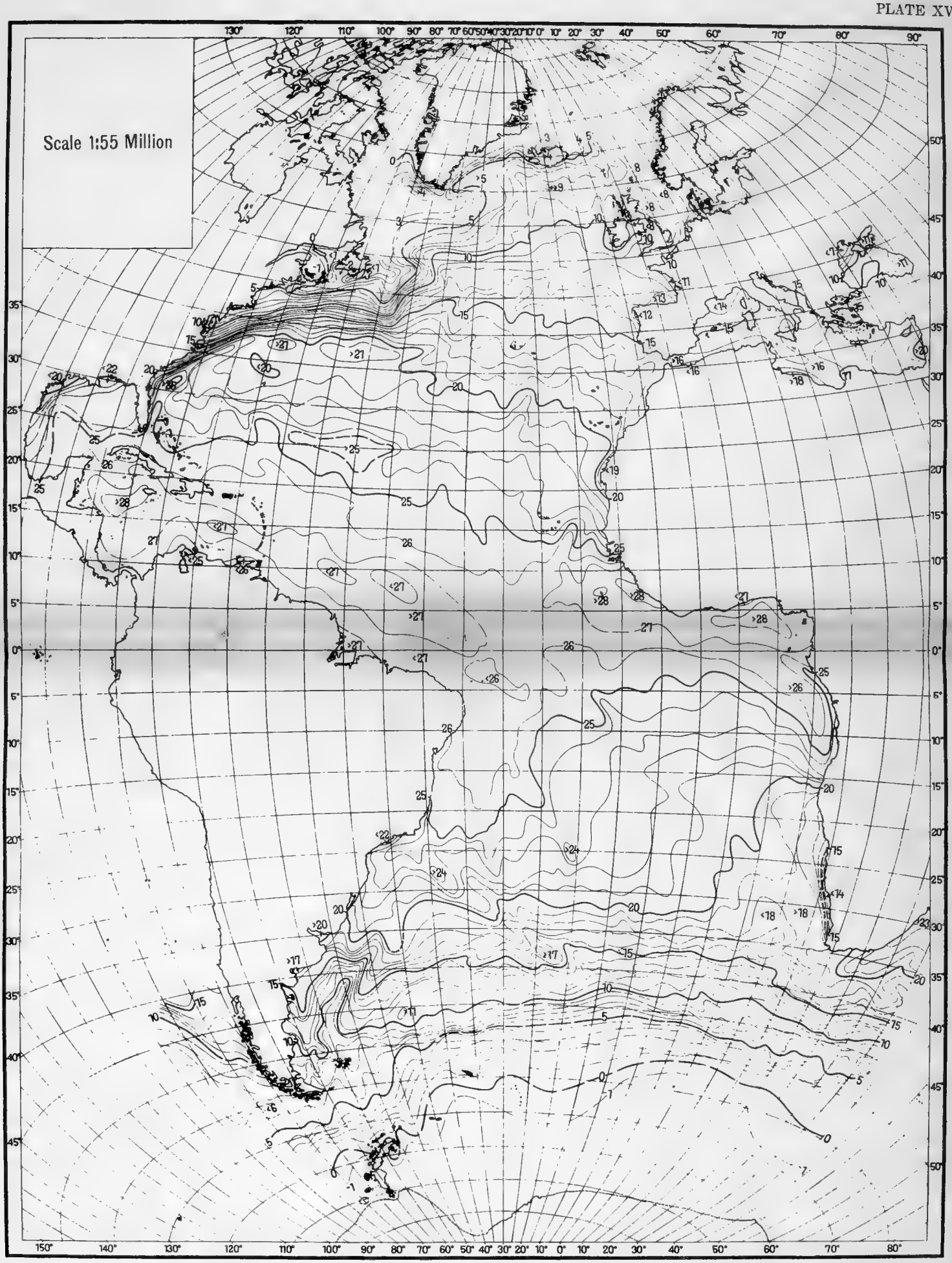
Mean Monthly Surface Temperature (°C.) for September, Computed for One-Degree Fields.



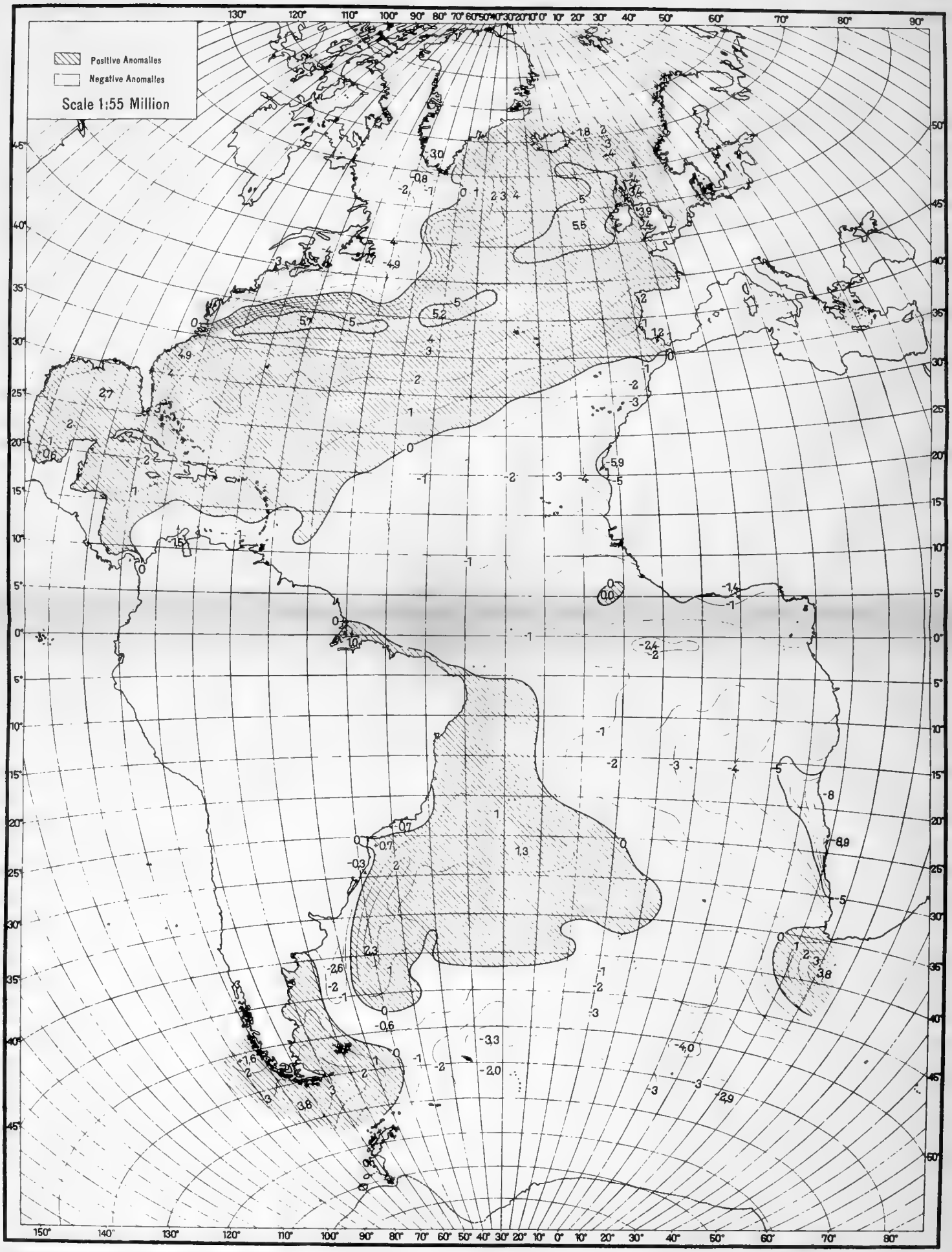
Mean Monthly Surface Temperature (°C.) for October, Computed for One-Degree Fields.



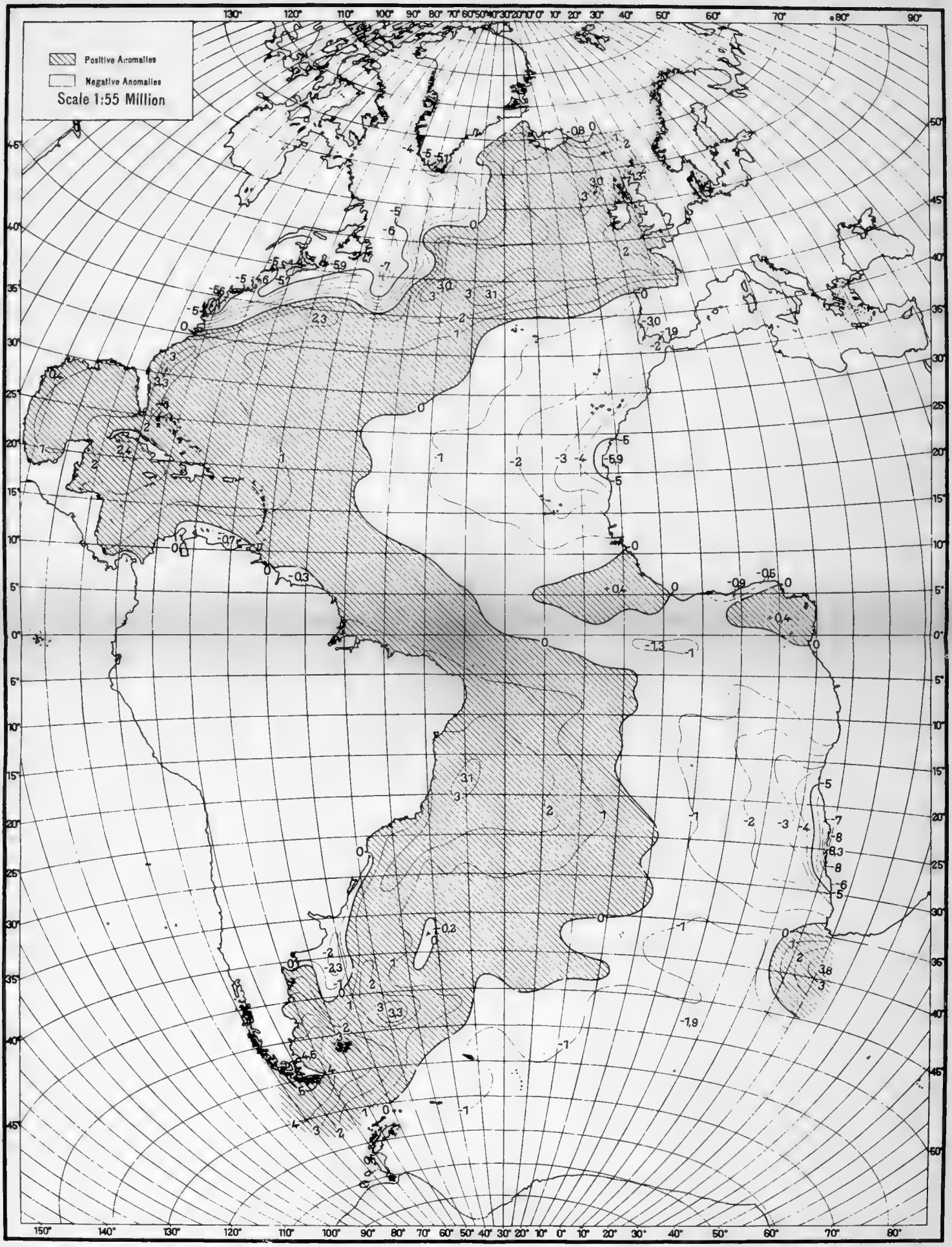
Mean Monthly Surface Temperature (°C.) for November, Computed for One-Degree Fields.



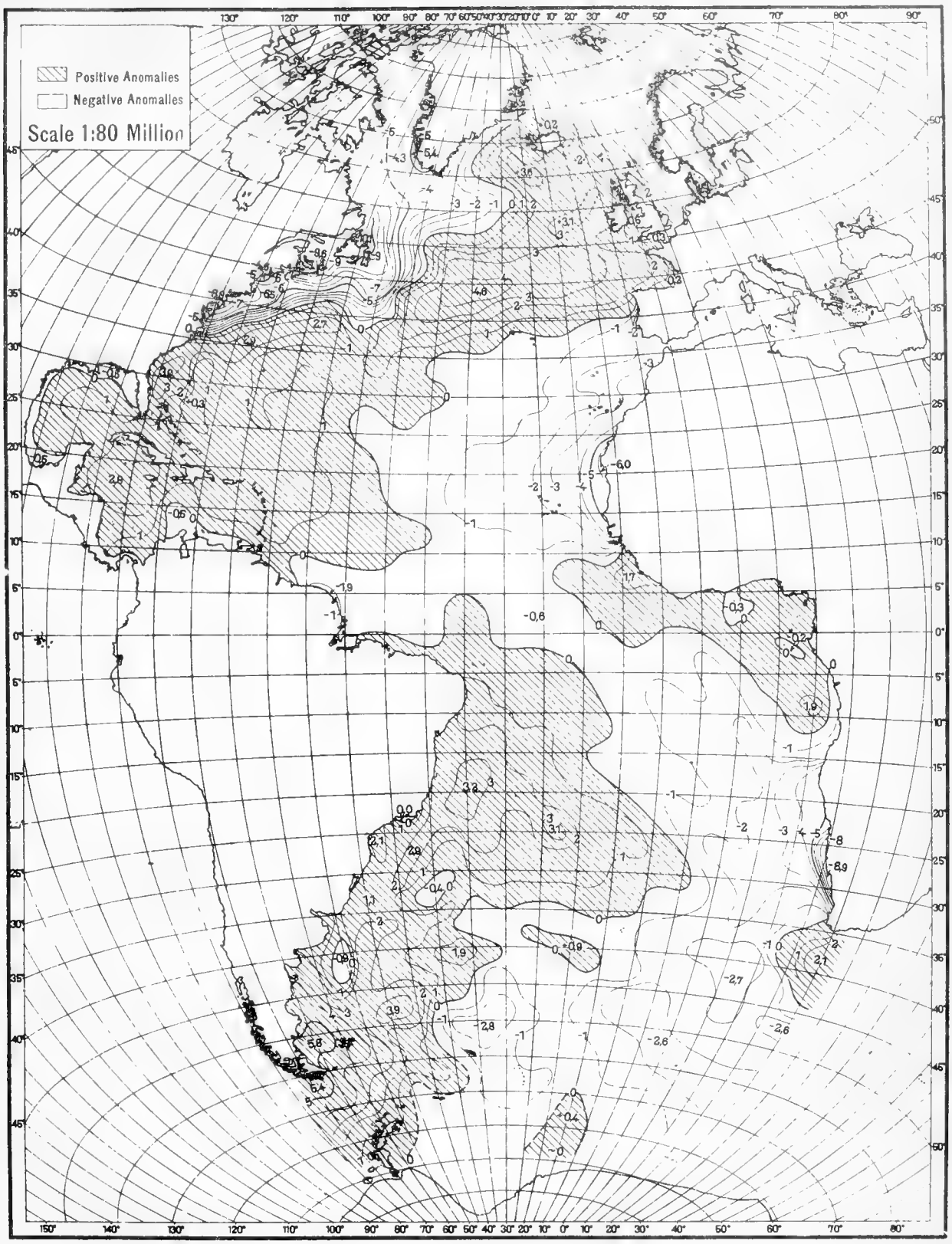
Mean Monthly Surface Temperature (°C.) for December, Computed for One-Degree Fields.



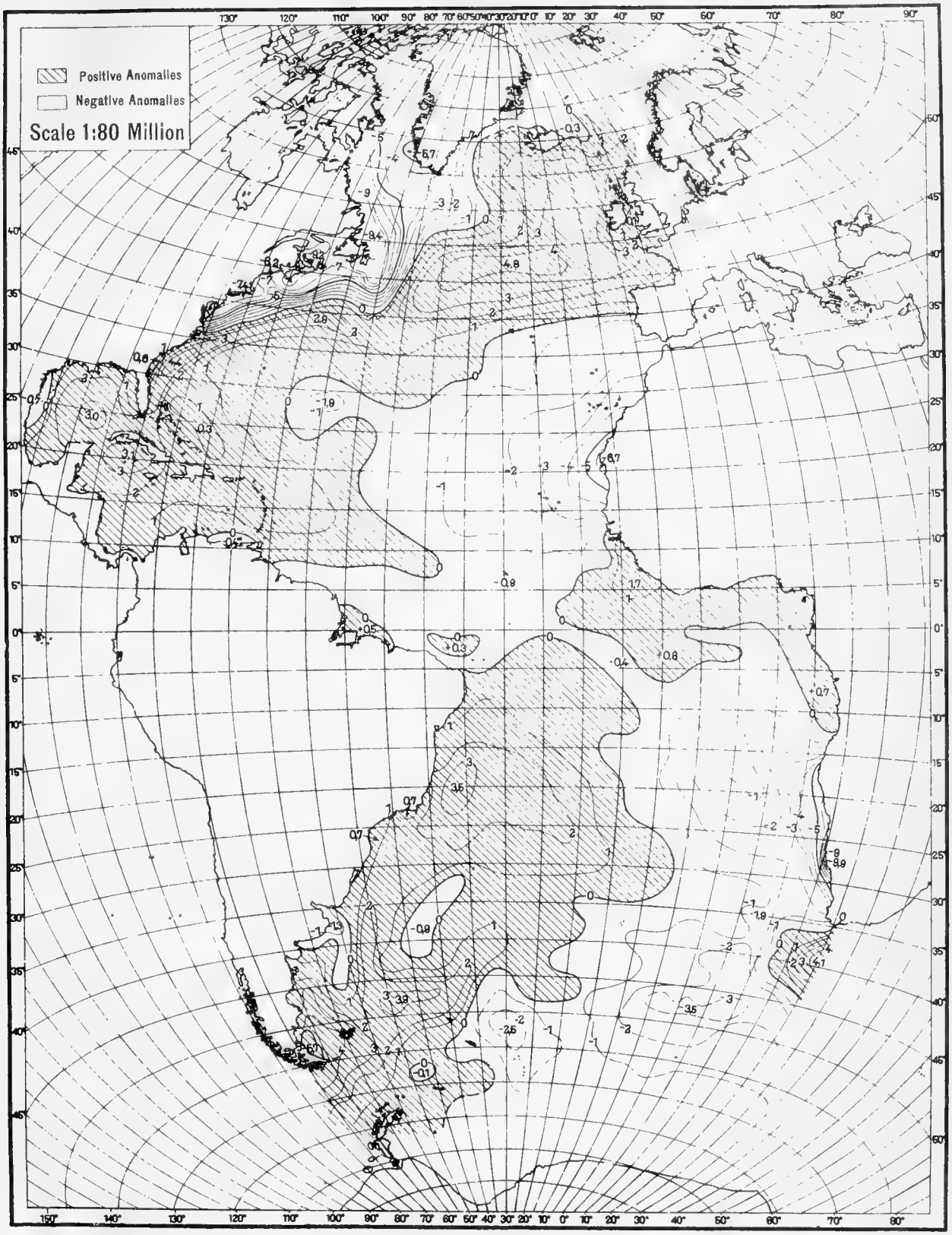
Temperature Anomaly of the Surface Water (°C.) on the Annual Average, Based on Annual Averages of the Combined Oceans for Two-Degree Zones and Drawn According to Values for Two-Degree Fields.



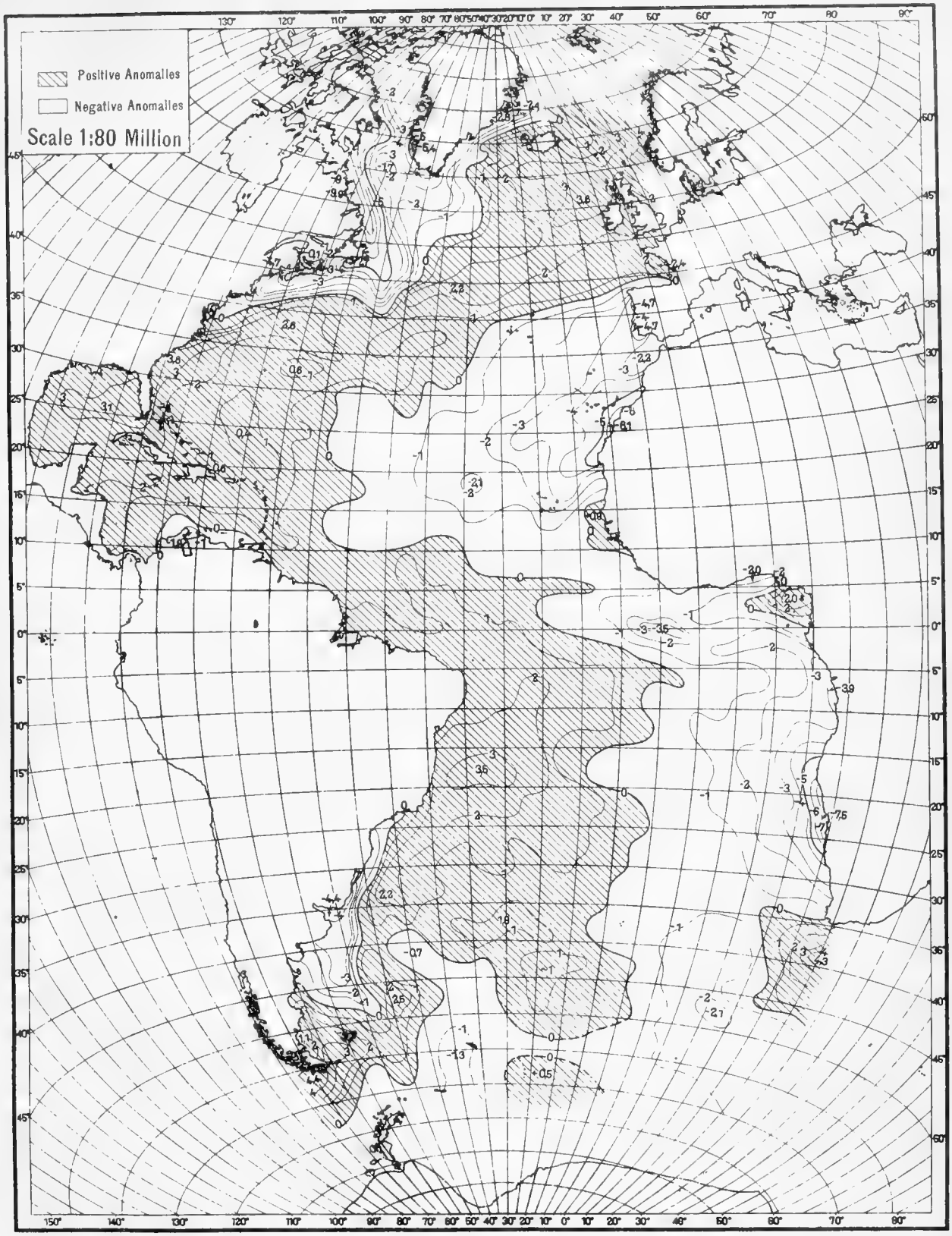
Temperature Anomaly of the Surface Water (°C.) on the Annual Average, Based on Annual Averages of the Atlantic Ocean for Two-degree Zones and Drawn According to Averages for Two-Degree Fields.



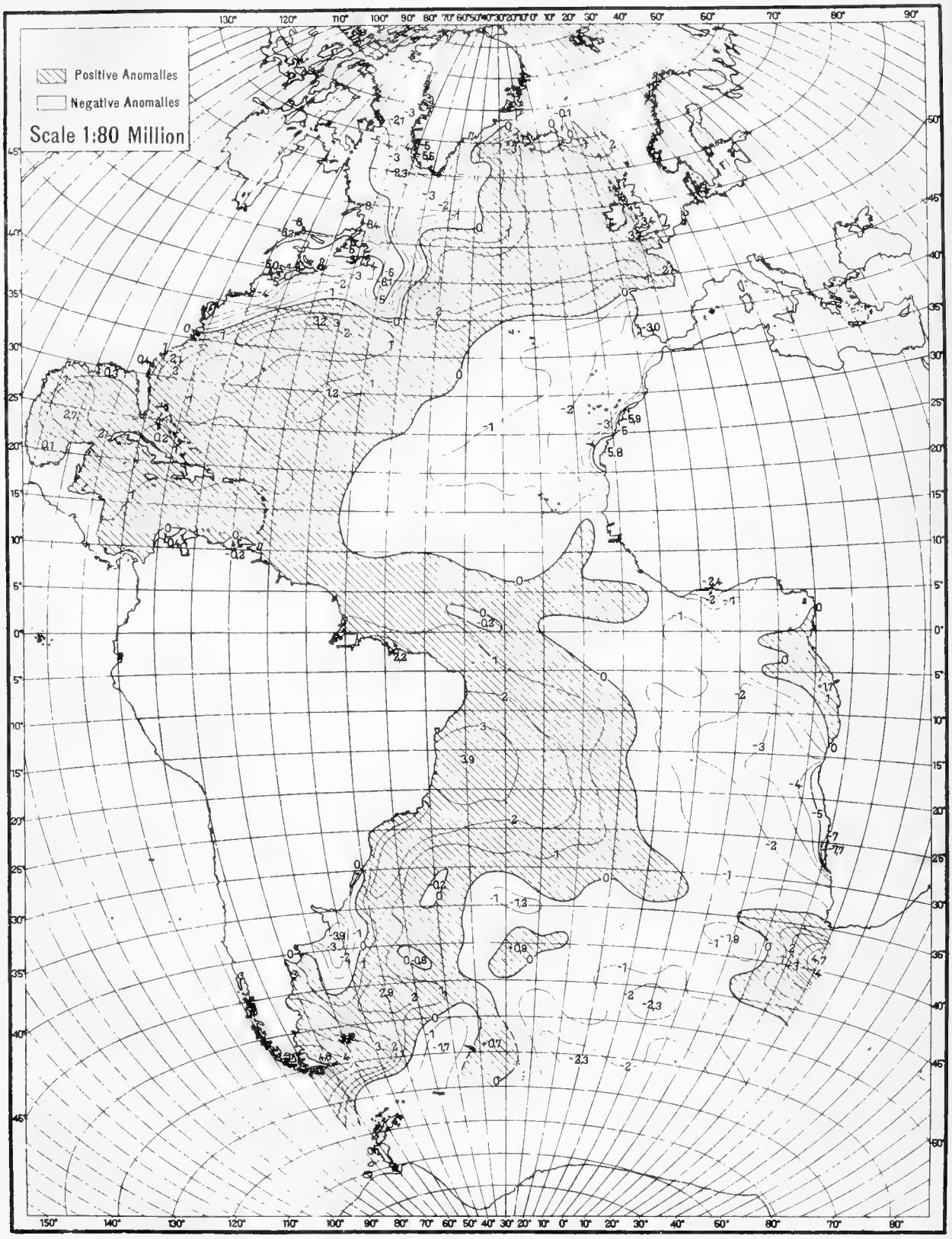
Temperature Anomaly of the Surface Water (°C.) in January, Based on January Averages of the Atlantic Ocean for Two-Degree Zones and Drawn According to Averages for Two-Degree Fields.



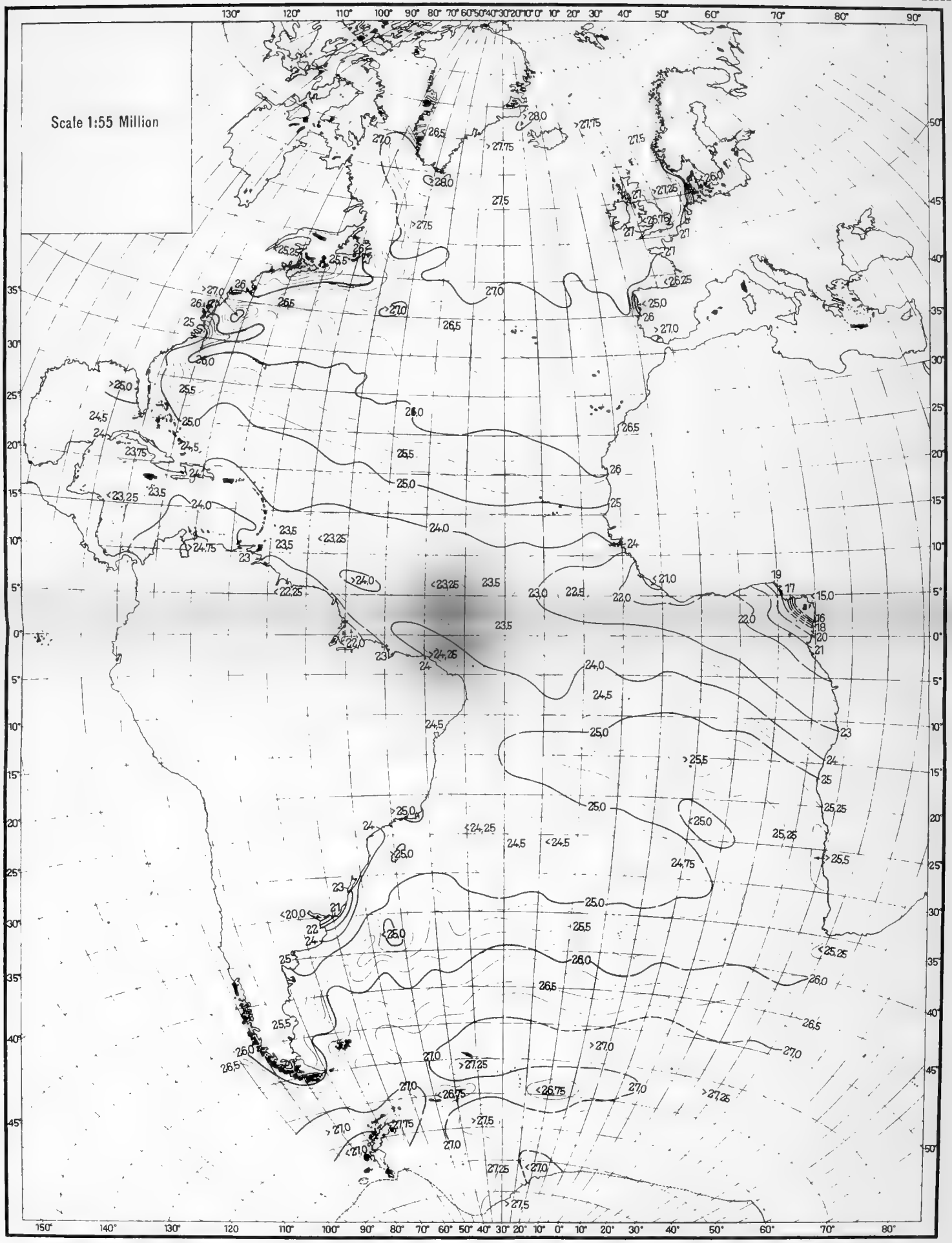
Temperature Anomaly of the Surface Water (°C.) in April, Based on April Averages of the Atlantic Ocean for Two-Degree Zones and Drawn According to Averages for Two-Degree Fields.



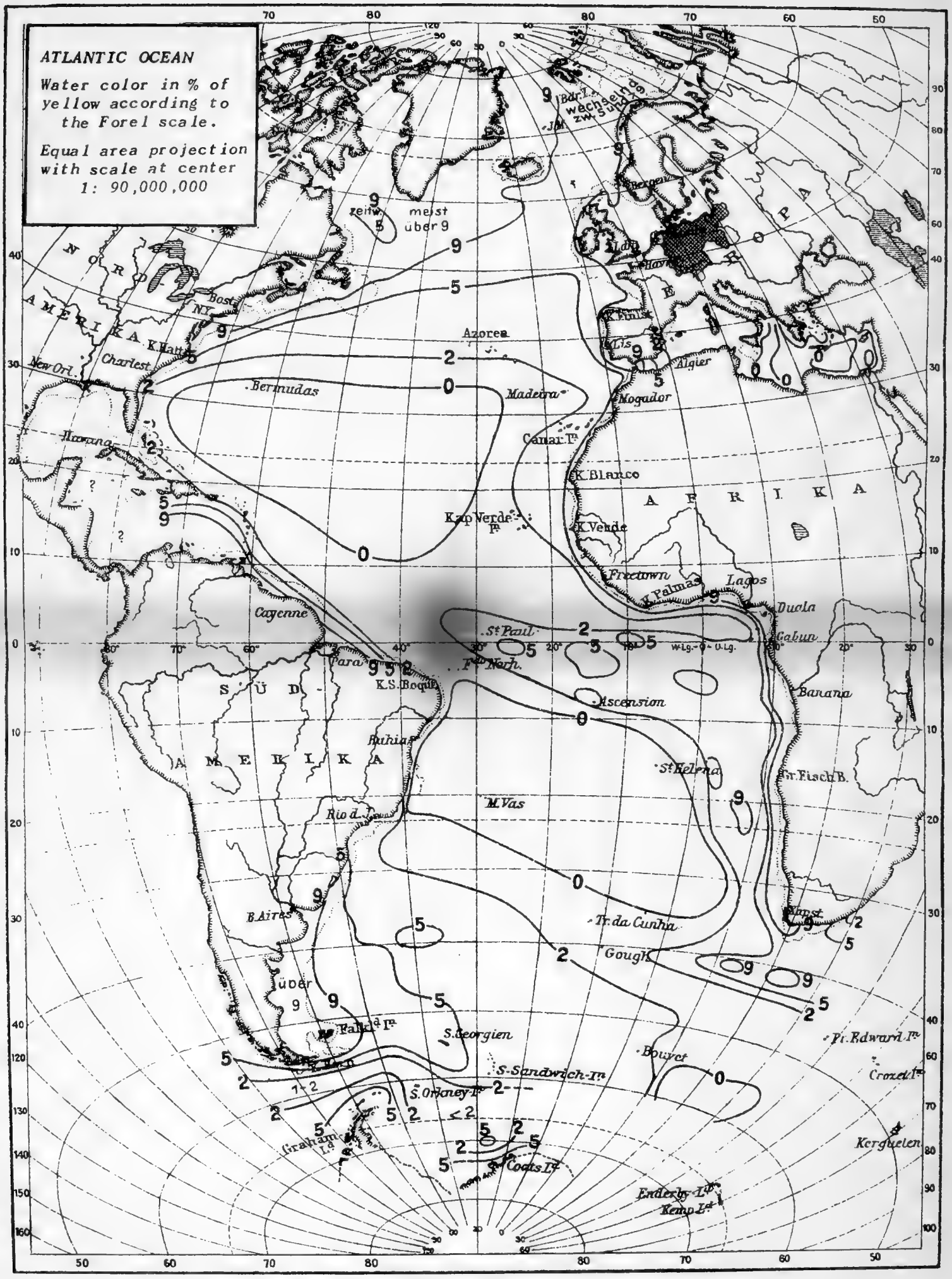
Temperature Anomaly of the Surface Water (°C.) in July, Based on July Averages of the Atlantic Ocean for Two-Degree Zones and Drawn According to Averages for Two-Degree Fields.



Temperature Anomaly of the Surface Water (°C.) in October, Based on October Averages of the Atlantic Ocean for Two-Degree Zones and Drawn According to Averages for Two-Degree Fields.

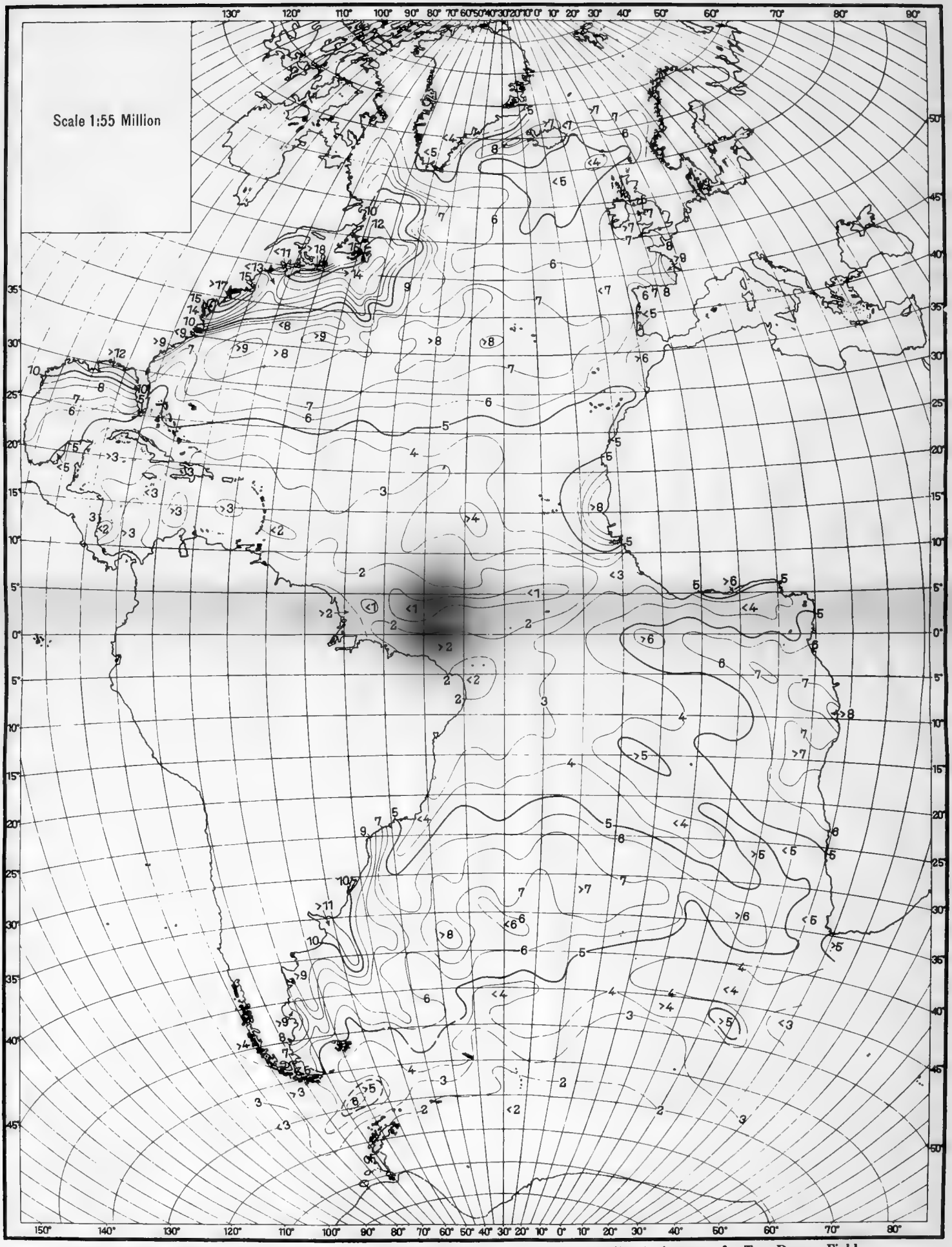


Density of the Surface Water (σ_t) on a Quarterly Average, December to February, Drawn According to Averages for Two-Degree Fields.

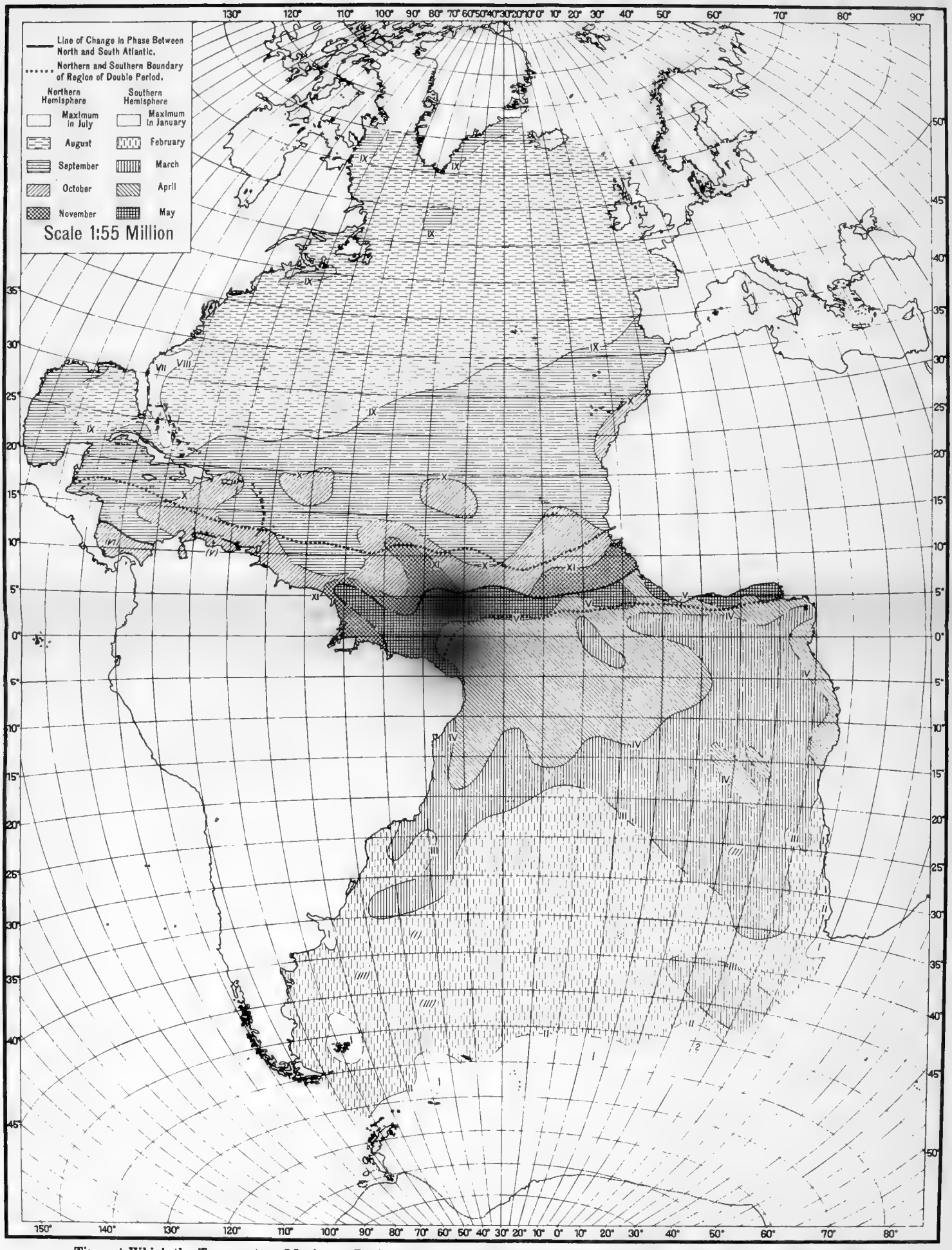


Water Color in Percent of Yellow According to the Forel Scale for the Atlantic Ocean.

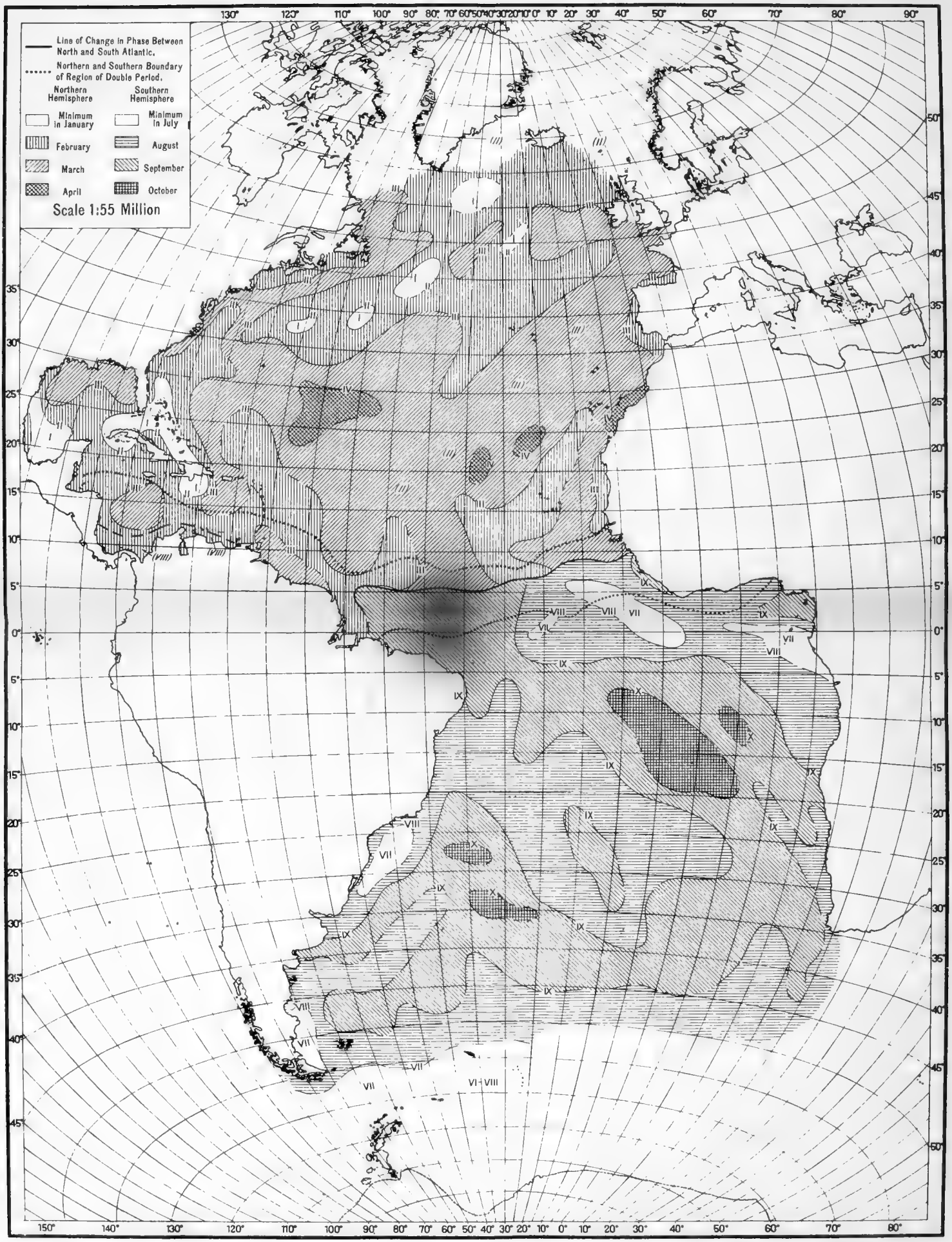
0, Deepest blue. 0–2, Blue. 2–5, Bluish green. 5–9, Greenish blue.



Mean Annual Variation of the Temperature of the Surface Water (°C.), Drawn According to Averages for Two-Degree Fields.



Time at Which the Temperature Maximum Begins in the Surface Water, Drawn According to Averages for Two-Degree Fields.



Time at Which the Temperature Minimum Begins in the Surface Water, Drawn According to Averages for Two-Degree Fields.

Appendix I

Standard values of the surface temperatures of the Atlantic Ocean for two-degree fields

(Pages 22 through 49)

Appendix II

Monthly and annual averages of surface temperatures for two degree zones

(Pages 50 and 51)

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO

Month	70° W. Long.				60°					50°					40°					30°					20°				
I																													
II																													
III																													
IV																													
V																													
VI																													
VII																													
VIII																													
IX																													
X																													
XI																													
XII																													

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°				
I																				0.3	0.4	1.7	2.0	1.9	1.8	2.2			
II																							0.8	1.0	1.0	2.0			
III																				1.2	2.6	3.3	3.1	2.0	0.8	0.5			
IV										−0.9	−0.8	−1.0											1.9	2.0	1.0	0.6			
V											−1.1	−0.6	0.2								3.3	3.0	4.1	3.2	2.6	2.0			
VI										0.0	1.1	1.6								4.0	5.2	5.0	4.3	5.4	5.6	4.7			
VII									0.8	1.9	3.0	3.3								2.2	2.8	4.1	3.3	5.0	5.2	4.9			
VIII								−0.1	1.2	2.2	3.5	4.3								0.6	0.8	2.7	5.0	6.7	7.3	6.9			
IX								0.1	1.0	1.4	2.3	3.4								2.1		2.1	2.7	5.1	7.0	6.4			
X									−0.4	1.3	1.7	1.5									4.1	5.1	5.2	6.3	6.0	4.7			
XI										−1.2	−0.2	−0.1										3.5	5.0	5.1	4.4	3.3			
XII																						1.9	2.8	2.8	1.9	3.1			

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°				
I					−1.4	−1.2	−1.1	−1.5							0.3	1.0	2.0	3.0	3.3	4.5	5.0	4.0	3.1						
II																0.2	1.0	2.0	2.0	0.8	2.0	3.1	3.4						
III															−0.4	2.3	3.6	5.3	5.8	5.8	5.3	4.0	3.4						
IV					−1.0	0.3	−0.4	−0.6								3.6	4.0	4.3	4.6	4.9	5.3	4.5	4.3						
V						−0.8	0.0	0.3							0.0	3.0	5.8	7.0	6.6	6.8	6.8	5.6	5.4						
VI				−1.7	−0.7	1.2	2.1	2.2	1.8						2.0	3.0	4.9	6.5	7.8	8.2	8.0	7.6	8.2						
VII				0.6	1.4	2.0	2.9	3.4	2.9							3.5	4.9	7.4	8.8	9.6	9.6	9.9	10.0						
VIII				2.0	2.2	3.3	4.7	4.6	4.1						1.4	2.4	5.1	6.4	8.0	9.1	10.0	10.2	10.2						
IX				0.2	0.2	1.6	3.0	3.1	2.7						1.6	2.4	5.3	8.4	8.1	8.7	9.0	9.1	8.9						
X					−0.3	1.2	2.3	1.7	1.1						1.2	2.9	6.1	7.6	8.0	8.1	7.3	7.6	7.5						
XI				−2.2	−2.1	−0.3	0.8	1.0	0.9											6.3	6.4	6.2	5.7						
XII								−0.2	−0.1								2.5	3.7	4.2	5.2	5.9	4.8	4.1						

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°				
I					−0.9	−0.2	0.0	−0.2	−1.0					0.9	2.1	3.2	4.1	5.0	6.0	7.2	7.4	6.8	6.0	6.1					
II						−0.9	−0.8	−0.9	−1.2					0.7	1.7	2.8	3.4	4.1	4.5	3.3	3.7	4.9	5.2	6.0					
III														2.9	3.2	4.3	5.2	5.4	5.8	6.2	6.8	6.2	5.8	6.8					
IV					−0.4	0.8	0.1	−0.3	−0.4					----	4.0	4.7	5.3	5.8	6.1	6.1	6.4	6.7	7.1	7.3					
V				−1.0	−0.4	0.3	0.8	0.4	0.7					1.4	4.4	4.6	5.5	6.3	6.2	6.2	7.1	7.3	7.5	7.7					
VI			−0.8	−1.1	0.1	2.1	2.4	2.3	1.8					1.6	4.4	5.1	6.0	6.8	7.2	7.7	8.1	8.8	8.9	9.0					
VII			1.5	2.4	3.2	4.6	4.8	4.0	3.0					3.4	6.7	8.1	8.0	8.3	8.8	9.5	10.0	10.6	10.9	10.8					
VIII			2.7	3.9	5.1	5.8	5.8	4.9	3.9					4.3	5.9	7.9	9.7	10.3	10.1	10.2	10.6	10.8	10.9	11.0					
IX			2.8	4.1	4.9	5.3	4.8	3.3	1.8					4.2	7.5	7.5	8.4	9.1	9.6	9.7	9.6	9.9	10.0	10.0					
X			−0.6	1.3	2.2	2.9	3.4	2.0	0.9					2.5	6.2	7.2	7.4	7.7	7.7	7.8	8.2	8.6	8.6	8.8					
XI			−1.7	−1.2	0.7	2.1	2.3	2.0	1.2					----	----					6.7	7.5	7.3	7.1	7.2					
XII			----				0.9	1.2	0.1					----	3.0	4.6	5.2	5.7	6.3	7.1	7.8	7.3	7.2	6.6					

* Intermediate values, which were introduced to determine upwelling. They were

DIX I

of the Atlantic Ocean for two-degree fields

DEGREE ZONE: 69° N. LAT.

20°					10°					0°					10°		20°	E. Long. 30°	Tm
					−0.2	0.4	1.5	2.2	2.7	3.4	4.2	4.4	4.6						2.6
			−0.2	−0.6	−0.2	0.2	2.3	3.9	4.9	5.4	5.2	4.3	4.0	4.9	5.3	5.1			2.7
																			2.1
1.4	1.6	2.8	3.0	3.7	4.7	5.0	5.6	6.3											2.7
4.4	4.9	5.4	5.6	5.9	6.3					9.5	10.0	10.8	11.0	11.1	11.0				5.9
3.0	3.8	2.9			3.8	6.0	7.3	9.6	11.8										4.3
																			0.5

DEGREE ZONE: 67° N. LAT.

2.2	1.8																		1.6
1.0	0.0	0.2	0.3	−0.1	−0.1	0.9	2.1	2.5	3.0	4.1	4.7	5.1	5.2	5.1	4.9				2.2
0.6	1.1	0.9	0.9	1.3	1.8	2.4													1.9
1.0	0.4	0.7	0.4	0.5	0.6	1.2	3.4												0.7
2.0	2.4	2.0	1.1	1.1	1.5	2.4	3.3	4.1	5.6	6.3	6.1	6.0	6.6	6.5	5.7	4.6			3.2
5.3	4.9	3.8	2.9	2.9	3.0	3.3	4.7	6.0											3.9
5.7	6.5	6.5	5.6	5.0	5.4	6.6	7.6	8.2	8.8										4.9
7.6	7.9	7.4	6.9	7.1	7.6	8.2	9.0	9.6	10.1	11.0	11.5	11.7	11.9	12.0	11.8				6.9
6.2	6.8	6.3	5.2	5.0	6.1	7.1	8.3	9.5	10.2										5.0
4.7	4.5	4.4	4.2	4.7	5.2	5.7	6.5												4.2
3.2	3.3	3.5	2.7	2.2	2.5	3.9	5.0	5.6	6.2	6.4	6.7	6.8	6.8	6.6	5.9				4.1
3.7																			2.7

DEGREE ZONE: 65° N. LAT.

			2.8	4.7	5.0														2.1
			2.2	3.2	3.0	2.9	2.8	3.2	4.5	5.4	5.9	5.8	5.4	4.8					3.2
			2.5	2.7	2.9	2.8	3.5	4.8	6.0										3.8
			3.1	3.7	3.2	3.2	4.1	4.5	4.9										3.2
			3.2	3.7	4.1	4.6	5.0	6.1	6.7	7.3	7.7	7.6	7.2	6.4	5.1				4.8
			5.2	5.6	5.5	5.8	5.6	6.9	8.5	9.4	10.0	10.1	10.0	9.7					5.7
			6.3	7.4	7.4	7.8	8.8	9.4	9.8	10.3	11.0	11.3	11.7	12.2					7.3
			7.1	7.8	8.3	8.7	9.4	10.0	10.7	11.7	12.2	12.4	12.6	12.4	12.0				7.8
			6.3	6.4	6.4	6.9	8.1	8.5	9.0	10.2									5.8
			4.9	5.3	5.5	5.9	6.4	7.1	8.1										5.0
			3.8	3.8	4.2	4.9	6.0	6.3	6.6	7.0	7.5	7.7	7.5	7.0	6.0				4.4
			4.1	4.4	4.7	5.3	6.7	7.6	8.2										4.4

DEGREE ZONE: 63° N. LAT.

7.0	7.1	7.1	6.1	6.2	6.6	5.9	5.8	5.9											4.4
6.4	6.9	6.4	5.8	6.1	6.2	5.2	4.8	5.3	6.3	6.9	6.8	5.6	4.5						4.1
6.8	6.9	7.1	7.1	6.6	6.4	5.7	5.4	6.6	6.7	6.7	6.4	5.4							5.9
7.3	7.3	7.6	7.3	7.2	6.9	6.2	6.2	6.6	6.9	7.3	6.6	5.7	5.5						5.3
7.8	7.6	7.6	7.8	7.8	7.4	7.0	7.0	7.2	7.9	8.3	8.2	7.6	6.8						5.5
9.1	9.0	8.7	8.6	8.8	8.4	8.2	8.7	9.0	9.6	10.2	10.4	10.0	9.6						6.5
10.7	10.8	10.5	10.3	10.2	9.8	9.5	9.5	10.1	10.6	11.2	11.6	11.9	12.9						8.4
11.0	10.9	10.4	10.2	10.2	10.4	10.2	10.4	10.9	11.4	12.2	12.4	12.0	13.0						9.0
9.9	9.6	9.5	9.6	9.0	8.8	8.9	9.4	9.8	10.3	11.1									7.9
8.7	8.9	9.0	8.6	8.0	7.9	7.9	7.7	7.7	8.5	9.8									6.4
7.9	7.6	7.6	7.3	7.1	7.0	7.0	7.3	7.4	8.0	8.3	8.4	8.3	7.8						5.6
6.7	6.9	7.2	6.8	7.1	7.1	6.8	6.8	7.1	8.0										5.8

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°				20°
I							0.0	0.7	1.0	0.8	0.1	0.0	−0.8	1.0	2.6	4.1	5.5	6.4	7.0	7.6	8.2	8.7	8.9	8.3	7.2
II								−0.2	−0.1	−0.1	−0.5	−0.3	−0.2	1.0	2.1	3.0	3.8	4.4	5.1	5.5	5.8	5.8	5.7	6.3	7.6
III										1.7	3.1	3.1	2.1	2.9	3.9	4.1	4.5	5.1	5.1	6.2	7.0	7.1	7.1	7.0	7.5
IV					−2.0	−0.2	0.8	0.9	1.1	0.7	0.2	1.0	0.0	1.2	3.3	3.8	4.1	5.2	5.8	6.4	7.1	7.3	7.4	7.9	8.1
V				−1.1	0.4	1.3	1.8	1.7	1.9	1.8	0.7	0.6	2.1	1.7	2.3	3.3	4.4	5.6	6.7	7.1	7.5	8.1	8.2	8.3	8.9
VI				−0.7	−0.9	−0.2	2.4	3.1	3.4	3.2	2.2	2.3	1.9	2.4	3.2	5.0	5.9	6.8	7.5	8.1	8.7	9.0	9.4	9.8	10.0
VII	1.7	0.0	0.0	0.4	1.9	4.0	5.6	6.1	5.7	4.7	3.3	3.5	3.3	4.0	6.3	7.6	7.8	7.9	8.9	9.4	9.8	10.4	10.9	11.3	11.3
VIII	0.8	0.0	1.1	1.9	3.8	5.9	6.7	6.8	6.6	5.5	3.6	3.6	4.0	5.4	7.3	8.7	9.1	9.0	9.4	10.1	10.7	11.1	11.6	11.9	12.0
IX	0.9	1.4	1.2	2.2	2.6	4.9	6.2	6.0	5.8	4.6	2.8	2.0	1.8	3.3	6.4	8.0	8.7	8.8	9.3	10.0	10.4	10.6	10.9	11.0	11.1
X					1.1	3.3	4.2	4.1	4.5	4.0	2.0	2.4	1.0	3.0	5.5	6.9	6.9	7.0	7.3	7.9	8.5	8.7	9.4	9.6	9.9
XI					−1.1	1.3	3.2	3.3	3.9	3.4	1.8	1.3	1.9		5.7	6.0	6.0	6.2	6.7	6.9	7.7	8.3	8.3	8.8	8.9
XII								2.0	2.7	3.1	1.3	0.6	0.0		3.7	5.1	5.1	5.1	5.5	6.0	6.7	7.6	8.2	8.3	8.5

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°				20°
I								0.1	1.2	1.6	1.7	1.8	1.8	2.4	3.7	4.6	4.9	5.0	5.1	6.0	7.3	8.3	9.1	9.4	8.5
II									0.1	1.0	1.5	1.6	1.6	2.3	3.1	4.0	4.8	5.3	5.7	6.1	6.6	7.2	7.7	8.1	8.3
III									0.0	2.8	3.1	3.2	3.5	3.6	3.6	4.4	4.7	5.3	6.3	6.7	7.0	7.4	7.8	8.0	8.1
IV						−1.3	0.4	1.4	2.6	2.3	2.3	2.5	2.7	3.1	3.5	4.0	4.7	5.5	6.2	6.9	7.3	7.8	8.1	8.2	8.4
V					−0.4	1.2	2.1	2.6	2.9	2.9	3.0	3.2	3.4	3.9	4.3	5.0	5.5	6.1	6.9	7.7	8.1	8.5	8.8	9.1	9.3
VI						−0.2	2.1	3.3	4.1	4.2	4.3	4.4	4.5	4.8	5.4	6.1	6.9	7.5	8.0	8.7	9.2	9.6	10.0	10.2	10.7
VII					0.4	2.9	5.4	6.3	6.4	6.5	6.1	5.6	5.6	6.0	7.1	7.9	8.4	9.0	9.6	10.1	10.5	10.9	11.4	11.6	11.7
VIII					2.1	5.0	6.9	8.0	8.1	7.6	7.4	7.1	6.8	7.1	8.1	8.8	9.3	9.8	10.3	11.0	11.4	11.8	12.2	12.3	12.5
IX				0.3	1.2	3.4	6.2	7.0	7.1	7.1	6.9	6.0	5.4	6.0	7.5	8.3	8.9	9.2	9.8	10.3	10.8	11.2	11.5	11.6	11.7
X						2.5	5.2	5.7	5.4	5.9	5.8	5.3	4.4	4.6	5.8	6.2	7.1	7.8	8.3	8.9	9.3	9.8	10.3	10.6	10.8
XI					−1.0	0.6	2.6	3.7	4.5	4.5	4.6	4.2	4.5	4.9	5.2	5.6	5.9	6.3	7.1	7.9	8.2	8.7	9.3	9.4	9.4
XII									2.4	2.9	3.5	3.3	2.5	2.4	3.8	3.5	3.8	4.7	5.3	5.7	6.7	7.8	8.3	8.9	9.0

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°				20°
I											2.0	2.3	2.6	2.7	3.0	3.5	3.6	3.8	4.3	4.8	6.0	7.5	8.2	8.7	8.9
II									−0.3	0.2	0.9	1.5	2.0	3.1	4.0	4.9	5.2	5.7	6.1	6.5	7.0	7.4	8.0	8.6	8.8
III										0.0	1.2	2.0	2.1	2.0	3.0	4.3	5.0	6.2	6.7	7.1	7.4	8.0	8.5	8.8	9.1
IV							−0.3	0.9	2.0	2.6	2.5	2.9	2.9	3.3	3.9	5.0	5.3	6.0	6.7	7.1	7.5	8.0	8.7	8.9	9.0
V						−1.0	0.2	1.1	2.5	3.3	3.7	3.7	3.9	4.4	4.7	5.3	6.1	6.7	7.2	7.8	8.4	9.1	9.5	9.8	9.9
VI						−0.6	1.1	3.3	5.2	4.8	4.8	4.9	5.2	5.7	6.1	6.7	7.3	7.9	8.9	9.1	9.6	10.3	10.9	11.1	11.3
VII						0.6	3.6	6.0	6.8	7.5	7.1	6.7	7.1	7.3	7.7	8.2	8.8	9.3	9.9	10.7	11.2	11.6	12.2	12.3	12.5
VIII						3.0	5.1	7.3	8.6	8.8	8.5	8.3	8.2	8.4	8.8	9.2	9.9	10.5	11.0	11.3	12.1	12.5	12.8	13.0*	13.2
IX						2.0	4.4	6.4	7.7	8.4	8.3	8.0	8.1	8.0	8.4	9.0	9.3	9.8	10.3	11.0	11.3	11.7	12.1	12.4	12.5
X							2.7	4.6	5.1	5.4	5.9	6.5	6.6	6.6	7.0	7.7	8.3	8.7	8.9	9.4	10.1	10.7	11.1	11.3	11.4
XI					−0.4	−0.3	0.6	1.3	2.0	2.7	3.6	3.9	3.9	4.1	5.1	6.7	7.2	7.4	7.8	8.6	9.2	9.2	9.7	9.9	9.9
XII											2.8	2.8	2.8	2.8	2.9	3.2	4.1	4.9	6.0	6.9	8.0	8.6	8.8	9.2	9.2

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°				20°
I												2.7	2.9	3.3	4.0	4.6	4.9	5.3	5.4	7.0	7.6	8.1	8.7	9.1	9.9
II											−0.8	−0.2	0.7	2.1	3.1	3.9	5.1	5.9	6.5	7.0	7.2	7.9	8.4	8.8	9.1
III												−1.2	−0.1	1.3	2.6	4.1	5.0	5.5	6.1	6.7	7.1	8.2	8.3	8.7	8.9
IV									0.4	1.4	2.3	2.5	3.0	3.4	3.9	4.5	5.1	5.6	6.4	7.2	8.3	8.7	9.1	9.3	9.8
V								−1.1	−0.1	2.3	4.0	4.6	5.1	5.6	5.7	5.8	6.2	6.9	7.6	8.0	9.0	9.4	9.8	10.1	10.4
VI							−0.5	1.2	3.8	4.9	5.7	6.3	6.5	6.6	7.0	7.4	7.8	8.4	9.4	9.9	10.3	10.9	11.3	11.5	11.7
VII							0.0	3.4	5.9	8.2	9.2	8.8	8.8	7.8	8.3	9.0	9.7	10.3	10.9	11.8	12.1	12.3	12.7	12.8	13.1
VIII						4.0	5.1	6.8	8.4	9.3	10.0	9.9	9.4	9.3	9.6	10.0	10.9	11.3	11.8	12.6	12.8	13.0	13.2	13.8	13.8
IX							3.4	4.3	6.5	9.2	9.7	9.3	9.8	9.8	10.3	10.3	10.2	10.7	11.3	11.7	12.0	12.6	13.1	13.4	13.9
X								2.1	4.3	6.5	7.7	7.9	8.1	7.5	7.7	8.9	9.4	9.8	10.2	10.4	10.6	11.1	11.7	12.4	12.0
XI							0.4	0.9	2.0	3.4	5.1	6.0	6.1	5.9	6.2	7.2	8.1	8.7	8.9	9.3	9.4	10.0	10.6	10.9	11.0
XII										3.0	3.9	4.1	4.3	4.4	4.6	4.7	5.1	6.4	7.2	7.9	8.4	8.8	9.2	9.8	10.0

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°				20°
I										0.0	2.0	3.1	4.1	5.1	5.8	5.9	6.1	6.8	7.1	7.5	8.7	8.8	9.4	10.1	10.5
II											−1.6	1.0	3.2	4.3	4.8	5.3	6.0	6.9	7.4	8.1	7.8	8.2	9.8	10.0	10.1
III											−1.0	1.5	3.8	4.9	5.2	5.4	5.8	6.3	7.0	7.4	8.3	9.0	9.8	9.3	9.3
IV									−0.7	0.9	2.5	4.0	5.4	6.2	6.5	6.6	6.4	7.0	7.9	8.3	9.0	9.3	9.6	9.9	11.1
V								−1.5	−0.6	1.7	4.3	6.1	7.9	7.8	7.7	7.8	7.9	8.1	9.0	9.4	9.7	10.1	10.2	10.9	11.4
VI								1.6	2.2	4.4	6.5	7.9	7.8	8.0	8.5	8.4	9.2	10.3	10.7	11.3	11.3	11.5	11.8	11.7	11.9
VII								3.2	3.2	5.8	8.8	10.1	10.9	10.8	10.7	10.8	11.1	11.4	12.0	12.5	12.7	12.8	13.3	13.4	13.8
VIII								6.5	7.7	8.6	10.0	11.0	11.7	11.6	11.5	11.8	12.1	12.7	13.0	13.4	14.0	13.8	13.8	14.3	14.7
IX								6.2	5.4	7.3	9.9	10.7	11.4	11.6	11.5	11.4	11.4	11.7	12.0	12.1	13.3	14.0	14.2	14.3	14.6
X								2.5	3.7	6.0	8.1	9.0	10.0	10.0	9.5	9.7	10.1	10.3	10.6	11.0	11.9	11.9	12.4	12.8	12.8
XI								1.4	2.7	4.4	6.2	7.9	8.4	8.2	7.7	8.1	8.8	9.1	9.1	9.7	10.1	11.0	11.4	11.7	11.8
XII										3.9	4.5	4.9	5.7	6.4	6.6	6.7	7.0	7.5	7.9	8.6	9.0	9.8	10.1	10.7	10.9

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 61°N. LAT.

20°					10°					0°			10°			20°			E. Long. 30°	Tm
7.6	7.9	8.0	7.9	8.0	8.0	7.4	7.2	7.6	8.0											5.3
7.8	7.6	7.7	7.6	7.5	7.6	7.3	6.8	7.0	7.1	7.2	6.3	4.8								4.7
7.9	7.8	7.8	7.8	7.7	7.5	7.3	7.1	7.2	7.0	6.7	5.9	4.2								5.8
8.0	8.0	8.1	8.1	8.0	8.0	7.8	7.6	7.5	7.3	6.8	5.8	5.1								4.9
8.8	8.8	8.7	8.7	8.6	8.6	8.4	8.4	8.5	8.4	8.4	7.6	6.7								5.5
10.1	10.1	10.0	10.0	9.8	9.6	9.4	10.0	10.1	10.1	10.2	10.2	9.9								6.6
11.4	11.4	11.5	11.5	11.3	11.2	10.6	11.0	11.3	11.6	12.1	12.4	13.2								7.8
12.1	12.1	12.1	12.0	11.9	11.4	11.3	11.7	11.9	12.1	12.2	13.0	14.2								8.5
11.2	11.2	11.2	11.1	11.0	10.7	10.3	10.6	11.1	11.3	11.8	12.6	13.1								7.8
10.1	10.2	10.1	10.1	10.0	9.7	9.6	9.4	9.6	9.9	10.2	10.7	10.9								7.3
9.0	9.0	9.0	9.0	8.9	8.8	8.8	8.5	8.7	8.8	8.8	9.2	9.0								6.5
8.4	8.4	8.2	8.1	8.2	8.4	7.5	7.8	7.9	8.2											5.9

DEGREE ZONE: 59° N. LAT.

8.2	8.3	8.4	8.3	8.4	8.4	8.2	8.0	7.8	8.0											5.9
8.3	8.2	8.3	8.1	8.2	8.3	7.9	7.1	6.6	7.0											5.7
8.2	8.3	8.4	8.3	8.4	8.3	8.1	7.3	6.4	6.3											6.1
8.5	8.6	8.6	8.6	8.6	8.5	8.3	7.7	7.1	6.6											5.6
9.4	9.5	9.2	9.4	9.5	9.4	9.3	8.9	8.1	8.0											6.3
10.8	10.8	10.7	10.8	10.9	10.9	10.9	10.5	9.9	10.2											7.7
11.8	11.9	12.1	12.2	12.3	12.4	12.3	12.1	11.8	12.0											9.0
12.6	12.7	12.6	13.0	13.0	13.0	12.9	12.6	12.1	12.3											10.0
11.9	11.9	11.9	12.0	12.0	12.0	12.0	12.1	11.9	11.8											9.0
10.7	10.6	10.5	10.6	10.7	10.8	10.9	11.0	10.9	10.8											8.2
9.5	9.5	9.5	9.6	9.6	9.8	9.8	9.7	9.5	9.1											6.8
8.9	8.8	8.7	8.7	8.8	8.7	8.8	8.5	8.2	8.0											6.3

DEGREE ZONE: 57° N. LAT.

8.8	8.8	8.8	8.9	9.2	8.4	8.0		6.7	7.5											6.1
8.7	8.6	8.7	8.6	8.5	8.0	7.2		5.6	6.0											5.8
9.0	8.7	8.8	9.3	9.2	8.8	8.0	7.0	5.6	5.9											6.2
9.2	9.2	9.3	8.9	9.2	9.3	8.7		6.4	6.2											6.0
9.8	9.8	9.9	10.0	10.1	9.8	8.8	8.1	7.8	7.8											6.6
11.2	11.2	11.1	11.2	11.6	11.8	11.4		10.0	10.2											8.0
12.5	12.7	12.8	12.8	13.1	13.1	13.0	12.9	11.9	11.9											9.8
13.2	13.2	13.1	13.3	13.5	13.4	12.8		12.5	13.0											10.6
12.7	12.7	12.8	12.8	12.7	13.4	12.8		12.5	12.2											10.1
11.1	11.0	10.9	10.9	11.3	11.7	11.0		11.5	11.5											8.9
9.8	9.7	9.7	10.1	10.2	10.6	10.2		9.7	9.8											6.7
9.2	9.1	8.9	8.9	9.4	9.4	9.3		7.7	8.0											6.8

DEGREE ZONE: 55° N. LAT.

10.0	10.1	10.1	10.1	9.7	9.2	8.9	7.8	7.0	6.9											7.2
9.2	9.2	9.0	9.2	9.1	8.2	6.9	7.0		6.0											6.2
9.3	9.2	9.2	9.3	8.8	8.3	7.0	7.0		5.2											6.3
10.4	10.2	10.3	10.0	9.9	9.7	9.1	7.7		6.0											6.7
10.6	11.0	11.1	11.0	10.8	10.1	8.6	8.9		8.2											7.4
11.8	12.0	12.7	13.1	13.1	12.7	11.3	10.5		10.5											8.9
13.4	13.2	13.7	14.1	13.8	13.6	13.0	12.8		12.4											10.5
13.8	14.0	14.3	14.5	14.5	14.1	13.1	12.7		13.9											11.4
13.7	13.7	14.0	13.9	13.6	14.0	13.1	13.0		13.2											11.2
11.9	11.9	11.8	11.9	12.1	12.2	11.8	11.8		12.1											9.8
11.0	10.4	10.4	10.6	10.7	11.2	10.9	10.8		10.1											8.1
10.3	10.3	9.9	9.9	10.2	9.8	9.3	8.9		8.0											7.5

DEGREE ZONE: 53° N. LAT.

10.5	10.4	10.4	10.3	9.7	9.4	8.5	8.3													7.4
10.2	10.1	10.1	10.1	9.5	7.8	8.7	7.7													7.2
9.9	10.0	9.7	9.4	8.7	8.4		7.8													7.1
10.8	10.0	10.0	10.0	10.2	9.8		7.8													7.4
11.6	11.8	11.7	11.5	11.1	10.0		9.8													8.2
12.3	12.9	13.6	14.2	13.8	13.0		11.4													9.8
14.6	14.4	14.2	14.6	14.0	13.8		13.7													11.5
14.8	15.0	15 3	15.5	15.0	14.6		14.7													12.7
14.6	14.7	14.8	14.6	14.7	15.0		14.1													12.2
12.8	12.8	12.8	12.7	12.7	12.7		12.8													10.5
11.6	11.2	11.5	11.3	11.4	11.5		11.7													9.1
11.1	11.3	10.9	10.5	10.1	9.7		10.0													8.4

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I								−0.8	1.2	3.4	4.5	7.0	8.3	8.9	9.4	9.5	9.6	9.6	9.9	10.1	10.2	10.6	11.1	11.1
II									−1.2	0.0	3.2	6.7	8.4	8.5	8.2	8.3	8.8	9.4	10.2	10.3	10.2	10.5	10.7	10.7
III										1.8	4.4	6.0	8.0	8.8	9.0	8.7	8.8	8.9	9.9	10.4	10.5	10.8	10.6	10.2
IV									−0.3	1.5	3.8	6.4	9.6	10.6	10.4	9.8	9.5	9.7	9.9	10.3	10.7	11.1	11.2	11.4
V							−0.2	−0.4	1.4	3.3	5.8	8.9	9.7	10.0	10.9	11.2	11.1	11.3	11.4	11.1	11.3	11.5	11.8	12.2
VI							3.4	2.6	2.7	5.2	7.7	9.7	10.7	11.2	11.3	12.3	12.6	12.4	13.2	13.0	13.0	12.6	12.8	13.3
VII							6.9	5.0	5.0	8.1	10.8	12.5	13.0	13.2	13.3	13.9	14.5	14.6	14.4	15.0	15.0	15.0	15.1	15.3
VIII							7.8	8.1	9.9	11.0	12.1	12.8	14.2	14.7	14.3	14.1	14.8	15.2	15.4	15.4	15.4	15.3	15.8	16.3
IX					9.1	7.6	7.9	7.8	8.2	10.2	11.2	13.5	14.1	14.6	14.3	13.7	13.9	14.2	14.6	14.9	15.1	15.0	15.2	15.3
X					6.8	6.2	4.3	3.3	4.5	8.2	10.6	11.8	12.7	11.9	11.9	11.7	12.0	12.1	12.6	13.3	13.9	14.1	14.0	14.0
XI					3.3	2.4	1.7	2.0	3.8	5.6	8.2	10.3	11.2	10.7	10.9	11.1	11.4	11.3	11.8	11.8	12.1	12.3	12.3	12.4
XII										4.6	6.0	8.3	9.3	9.9	9.8	9.5	9.7	10.2	10.8	10.8	11.1	11.2	11.4	11.5

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I								−0.5	1.5	3.7	6.5	6.8	9.7	11.6	11.8	11.8	11.4	10.3	11.2	11.4	11.5	11.4	11.4	11.4
II								−0.5	0.0	0.5	0.5	2.5	9.0	10.1	10.6	10.5	10.5	11.0	11.0	11.2	11.4	11.4	11.4	11.3
III								−1.5	−0.7	1.0	3.0	4.8	8.0	10.5	10.5	9.9	10.3	10.9	11.2	11.5	11.2	11.2	11.3	11.2
IV	1.1	0.6	0.0	−0.6					−0.6	1.2	4.0	5.0	9.2	11.5	11.2	11.3	11.7	11.8	11.8	12.0	11.9	11.8	11.8	11.7
V	1.5	1.4	0.6	−1.0				0.0	0.6	−1.0	2.4	4.5	10.4	12.2	11.8	12.2	12.2	12.5	12.6	12.9	12.9	12.8	12.8	12.7
VI			8.5	6.1				3.5	4.5	5.1	8.6	8.2	11.6	12.6	12.7	13.8	13.6	14.4	14.6	14.4	14.4	14.4	14.4	14.5
VII		12.2						8.3	10.5	9.4	10.3	10.7	13.9	15.2	15.8	15.9	15.8	15.6	15.7	16.0	16.2	16.2	16.3	16.2
VIII	12.6		15.5	16.9				11.7	12.3	11.4	12.9	12.5	15.3	16.9	16.4	16.5	16.2	15.9	16.0	16.2	16.4	16.8	16.9	16.9
IX	9.4		11.5		12.8			9.5	8.9	10.3	10.9	11.7	14.4	16.1	16.0	16.0	15.6	15.5	15.6	15.7	15.8	15.7	15.7	15.8
X	6.1	6.7		7.2	7.5			5.6	9.0	8.3	8.7	9.8	13.1	14.7	14.7	14.7	14.4	14.2	14.2	14.3	14.4	14.4	14.3	14.3
XI	1.7		2.8	3.5	3.3			2.0	2.3	4.1	4.9	7.5	11.2	13.5	13.4	13.2	13.0	12.8	12.7	12.9	12.9	12.7	12.9	12.9
XII		−0.6		0.6				2.2	2.5	4.3	2.6	4.9	9.1	12.2	12.1	12.2	12.0	11.7	11.8	12.0	11.9	12.0	12.0	11.9

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I					0.5	0.8	0.1	0.5	1.0	1.0	2.7	4.4	7.4	11.0	12.1	12.3	12.1	12.2	12.2	12.2	11.9	12.1	12.1	12.4
II							−1.0	−0.8	0.2	0.4	2.2	4.5	7.6	11.2	12.1	12.2	11.9	12.0	12.4	12.2	12.0	12.0	11.7	11.7
III									−1.5	−0.2	1.7	3.8	7.8	11.2	12.1	12.0	12.1	12.1	12.1	12.0	11.9	11.7	12.0	11.9
IV		−0.6	−1.1	0.6	0.8	0.5	−0.2	0.0	−0.8	0.7	2.1	5.1	8.8	12.2	12.7	12.9	12.8	12.7	12.7	12.6	12.4	12.5	12.6	12.6
V			0.0	0.3	2.9	2.4	3.1	2.8	2.6	2.1	2.2	7.3	10.4	12.9	13.4	13.5	13.7	13.7	13.6	13.5	13.4	13.5	13.4	13.6
VI			9.5	6.0	3.9	4.5	7.5	6.2	6.0	5.6	6.7	9.2	10.4	13.7	14.7	15.2	15.0	15.2	15.2	15.3	15.1	15.1	15.0	15.4
VII			15.9	14.0	13.2	8.7	9.9	11.8	11.0	9.6	10.2	11.2	13.5	15.6	16.7	16.8	17.0	17.1	17.0	17.1	16.9	17.0	17.1	17.0
VIII			17.8	16.2	17.0	16.7	15.2	12.9	13.2	12.6	12.1	13.1	14.9	17.4	17.8	18.1	18.0	18.0	17.9	17.8	17.6	17.5	17.8	18.2
IX			10.6	11.7	14.3	13.2	12.3	11.4	11.4	11.6	11.6	12.8	14.4	17.0	17.2	17.0	16.8	16.7	17.1	17.1	17.1	16.9	17.1	17.4
X			9.4	8.9	9.3	9.2	9.4	9.8	9.2	8.8	8.7	10.5	12.6	15.4	15.8	15.5	15.4	15.2	15.7	16.2	16.0	16.4	16.2	16.4
XI			5.0	4.4	4.5	4.8	5.7	4.5	4.8	5.4	6.0	8.1	10.3	13.5	14.5	14.0	14.0	13.5	13.7	13.6	14.0	14.4	14.5	14.2
XII				−1.1	2.2	2.1	0.5	2.5	3.0	2.8	3.8	5.9	8.3	11.9	13.0	12.5	12.5	12.5	12.8	13.0	13.3	13.0	13.3	12.8

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I								1.3	0.0	1.6	3.9	3.5	3.3	2.6	1.7	4.7	8.4	11.7	12.8	13.3	13.2	12.8	12.8	13.5
II						1.5	------	0.0	−1.5	0.4	2.0	2.0	1.7	1.5	1.7	5.4	9.6	12.4	13.1	13.2	13.2	12.9	12.6	12.8
III								0.0	−0.1	−0.2	1.2	2.1	1.7	1.1	1.7	7.2	9.8	12.3	13.2	13.3	13.1	12.8	12.9	13.0
IV						3.3	------	1.6	2.2	3.0	3.3	3.2	2.4	1.8	1.7	6.7	10.3	13.2	13.7	13.7	13.6	13.6	13.3	13.6
V						4.5	3.0	3.0	2.9	3.5	4.2	5.3	4.8	3.8	3.5	7.8	11.4	13.9	14.7	14.7	14.6	14.5	14.4	14.6
VI						5.4	------	9.3	9.4	8.8	8.4	9.2	10.8	9.5	6.5	10.3	13.7	15.6	15.7	16.1	16.2	16.2	16.3	16.5
VII						8.9	------	12.6	13.2	12.9	14.1	13.6	13.7	12.6	10.7	12.8	15.6	17.8	18.0	18.3	18.3	18.3	18.3	18.5
VIII						11.7	------	16.1	17.0	15.2	16.0	16.4	15.5	14.8	13.5	14.2	18.0	19.5	20.2	19.8	19.4	19.1	18.4	18.9
IX						10.5	------	16.4	15.9	15.2	15.1	15.0	14.9	13.9	12.1	13.8	17.4	19.1	19.4	19.1	19.0	18.7	18.3	19.0
X						10.5	------	13.1	12.9	12.0	12.3	12.5	11.9	10.9	9.2	11.2	14.9	16.7	17.0	17.1	16.8	17.6	17.5	16.9
XI						8.3	------	8.5	8.6	6.7	8.7	9.0	8.7	7.5	5.9	8.4	12.1	14.5	15.8	15.5	14.9	14.1	14.7	15.2
XII						5.0	------	2.4	3.0	2.3	5.3	6.1	5.5	4.8	3.1	6.0	10.5	12.6	13.8	13.6	14.3	15.0	13.9	14.1

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I				6.1	5.2	4.4	4.9	5.4	6.1	6.8	6.4	6.4	5.4	3.7	5.2	10.8	13.8	13.7	14.3	14.8	15.3	15.1	14.8	15.1
II				3.3	3.6	2.7	2.1	4.4	5.7	6.5	6.2	6.0	4.8	3.3	4.2	10.7	13.8	14.1	14.1	14.4	13.0	13.4	13.6	14.0
III				3.6	4.4	3.5	1.7	3.5	4.3	5.5	6.6	6.2	5.9	3.6	4.5	11.3	14.0	14.5	14.1	14.1	14.3	14.3	14.6	14.5
IV					5.0	3.9	3.1	4.3	4.6	7.8	8.5	7.4	8.7	5.1	5.5	12.3	14.7	14.7	14.7	14.9	15.1	15.2	15.1	14.8
V					8.1	5.6	5.1	6.9	7.3	8.9	9.2	10.2	9.9	7.0	7.2	13.2	15.7	15.9	15.7	15.7	15.6	15.5	15.6	15.8
VI				13.1	12.1	10.1	10.0	11.3	12.0	13.9	13.6	14.9	14.3	11.8	10.6	15.2	17.1	17.0	17.1	17.5	17.8	18.1	17.9	17.7
VII				17.1	16.6	14.2	13.3	15.8	15.9	16.8	17.3	17.7	17.6	15.0	13.5	18.3	20.4	20.2	19.9	19.6	20.1	20.0	20.0	20.2
VIII				17.1	17.1	15.1	16.3	18.3	18.8	18.8	18.8	19.1	19.2	16.7	15.7	20.3	20.9	21.7	20.9	20.9	21.6	21.7	22.0	21.4
IX					16.3	15.2	16.1	17.4	17.8	17.9	17.8	17.7	17.6	15.1	14.0	18.5	21.2	21.6	21.2	20.5	20.7	21.0	20.7	20.6
X					11.8	11.5	13.7	14.6	15.1	15.4	15.2	15.1	14.5	11.2	11.3	15.2	17.7	19.2	18.8	19.8	19.5	19.1	19.1	18.9
XI					7.9	8.2	10.0	11.1	11.6	12.0	11.8	12.1	10.7	7.8	9.0	13.4	15.4	17.3	17.0	16.7	17.0	17.1	17.3	16.9
XII				5.4	5.5	5.9	7.1	8.1	8.7	9.1	8.4	8.0	7.4	5.9	5.5	11.3	13.0	15.0	14.9	14.4	14.3	15.4	15.3	15.8

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 51° N. LAT.

20°					10°					0°					10°					20°					E. Long. 30°	Tm
11.1	10.9	10.8	10.7	10.4	9.8	10.0	9.7	9.0	9.0																	8.7
10.8	10.8	10.7	10.4	10.3	9.1	10.0	9.1	8.3	8.0																	8.5
10.7	10.6	10.4	10.3	10.2	9.6	9.4	8.4	8.3	8.1																	8.9
11.3	10.9	10.9	11.1	10.9	10.4	10.0	9.3	8.6	8.0																	9.1
12.3	12.3	12.2	12.0	11.7	11.2	11.2	10.8	10.0	10.0																	9.5
13.2	13.3	13.7	13.3	12.5	13.0	13.4	13.4	12.6	12.4																	11.1
15.7	15.6	15.7	15.5	15.1	15.1	15.7	15.0																			13.2
16.4	16.3	16.0	16.1	16.2	16.2	16.7	16.5	15.9	16.1																	14.5
15.4	15.6	15.8	15.7	15.8	15.5	15.3	15.4	15.6	16.1																	13.6
14.1	14.0	14.0	13.9	13.8	14.1	13.8	14.7	15.0	15.1																	11.7
12.3	12.3	12.4	12.4	12.2	11.9	11.9	12.3	12.4	12.2																	10.0
11.5	11.5	11.3	11.0	10.7	10.1	10.8	11.2	11.1	10.8																	10.2

DEGREE ZONE 49° N. LAT.

11.3	11.3	11.1	11.0	10.9	10.5	10.4	10.6	10.0																		9.6
11.2	11.0	10.9	10.8	10.6	10.1	10.1	10.0	8.9																		8.7
11.1	11.0	11.0	10.8	10.7	10.0	9.9	9.8																			8.8
11.6	11.5	11.4	11.2	11.0	10.6	10.4	10.4	8.9																		8.5
12.6	12.6	12.4	12.4	12.3	12.2	11.9	11.7	11.1																		8.9
14.4	14.3	14.3	14.1	14.1	14.1	14.1	14.0	13.0																		12.0
16.2	16.0	16.1	15.9	15.8	15.9	16.0	15.7	14.4																		14.5
16.8	16.7	16.7	16.8	16.5	16.7	16.8	16.4	16.1																		15.6
15.8	15.8	15.9	15.9	15.8	15.8	15.8	15.8	15.5																		14.3
14.3	14.3	14.3	14.4	14.2	14.0	14.0	14.0	14.4																		12.3
12.8	12.7	12.7	12.7	12.6	12.2	12.0	12.2																			9.9
11.7	11.6	11.6	11.6	11.5	11.1	11.2	11.0	11.1	10.6																	9.3

DEGREE ZONE 47° N. LAT.

12.2	11.9	12.0	12.0	11.6	11.3	11.1	10.9	9.9																		8.8
11.9	11.7	11.6	11.5	11.3	11.0	10.9	10.3	9.9	8.5																	9.0
12.1	11.9	11.7	11.4	11.3	10.9	10.8	10.4	9.2																		9.7
12.6	12.3	12.0	11.9	11.9	11.6	11.4	10.9	10.4																		8.1
13.6	13.6	13.4	13.3	13.1	12.9	12.7	12.5	12.7																		9.7
15.1	15.3	15.0	15.1	15.2	14.8	14.9	14.6	16.3																		12.2
16.9	16.9	16.8	16.8	17.1	17.0	16.6	16.4	17.0																		15.0
17.9	17.6	17.7	17.6	17.8	17.6	17.5	17.0	18.2																		16.7
17.7	17.4	17.4	17.2	17.6	17.2	16.8	16.2	17.3																		15.4
16.2	15.8	15.8	15.6	15.5	15.6	15.2	14.7	16.5																		13.6
14.0	13.6	14.0	13.9	13.9	13.4	13.1	12.7	12.7																		10.9
12.7	13.0	12.7	12.8	12.7	12.2	11.9	11.5	11.4																		9.4

DEGREE ZONE: 45° N. LAT.

13.9	13.4	13.3	13.2	13.0	12.9	12.5	12.6	12.2	12.2	12.1	11.7	11.5	10.9	9.8												9.6
13.3	12.9	12.8	12.6	12.5	12.4	12.4	12.1	11.9	11.9	11.7	11.3	11.4	11.1	9.6												8.9
13.5	13.2	13.1	12.9	12.8	12.6	12.2	12.2	11.8	11.6	11.6	11.3	11.4	10.6	9.8												9.2
13.7	13.7	13.5	13.4	13.3	12.9	12.8	12.5	12.4	12.4	12.1	11.8	12.0	12.1													9.8
14.6	14.8	14.7	14.5	14.4	14.1	14.0	13.8	13.6	13.6	13.4	13.3	13.1	13.0	13.2												10.8
16.1	16.3	16.4	16.2	16.4	15.9	15.8	15.9	15.5	15.4	15.5	15.5	16.4	16.8	17.1												13.8
18.6	18.3	18.1	17.8	18.0	17.7	17.9	18.1	17.8	17.6	17.5	17.3	18.2	18.7	18.6												16.3
20.0	19.6	19.2	18.9	18.7	18.5	18.5	18.7	18.5	18.4	18.4	18.3	19.2	19.3	18.6												17.8
19.2	19.	19.0	18.9	18.6	18.3	18.1	18.6	18.4	18.2	17.8	17.6	18.6	18.6	18.2												17.3
16.8	17.7	17.7	17.3	16.7	16.5	16.5	16.8	16.4	16.1	16.1	16.0	17.4	17.3	17.2												15.3
15.3	16.0	15.4	15.6	15.2	15.0	14.4	14.8	14.6	14.4	14.0	13.9	14.2	14.0	13.8												12.7
13.9	14.0	13.7	13.6	13.8	14.3	13.8	13.4	13.2	13.0	12.8	12.5	12.6	12.4	10.7												10.6

DEGREE ZONE: 43° N. LAT.

14.4	14.1	13.8	13.8	13.7	13.6	13.3	13.0	13.0	13.0	12.8	12.4	11.0	10.0													10.7
13.7	13.7	13.6	13.2	13.2	13.2	12.8	12.6	12.4	12.4	*12.6	11.5	10.5	10.0													10.0
14.2	14.0	13.8	13.5	13.2	13.0	12.6	12.4	12.4	12.3	*12.3	12.0	12.3	11.0													10.2
14.6	14.4	14.2	14.0	14.0	13.6	13.2	13.3	13.2	12.9	*12.9	12.9	13.0	13.4													11.3
15.7	15.5	15.3	15.1	14.9	14.5	14.5	14.4	14.4	14.1	*14.0	13.2	13.9	14.5													12.6
17.5	17.2	17.1	17.7	17.0	16.9	16.4	16.3	16.2	15.8	*15.4	16.3	16.9	18.6													15.4
19.7	19.8	19.3	19.1	19.3	19.2	18.6	18.5	18.3	17.8	16.7	17.8	18.7	17.9													18.0
20.6	20.3	20.1	19.8	19.8	19.6	19.2	19.4	19.3	18.9	17.6	18.8	18.8	19.2	22.0												19.3
20.3	20.2	20.2	19.6	19.6	19.6	19.5	19.4	19.1	18.1	17.0	18.3	18.1	19.0	20.0												18.8
18.8	18.4	18.1	17.8	18.0	17.7	17.7	17.5	16.8	16.8	*16.2	17.2	17.1	17.8													16.5
16.5	16.3	16.3	16.0	15.7	15.9	15.6	15.9	15.4	14.8	*14.5	13.8	14.4	14.6													14.3
14.8	14.8	14.9	14.7	14.5	14.4	14.2	14.3	13.7	13.5	*13.6	12.8	13.5														11.7

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.			60°					50°					40°					30°					20°
I			6.4	6.4	6.9	9.3	10.1	12.3	13.9	14.3	13.5	12.7	12.0	11.4	13.0	15.2	18.0	17.3	17.0	17.2	15.6	15.8	15.7
II			4.5	4.8	6.2	8.8	9.7	11.8	12.9	13.5	13.3	12.6	12.2	10.8	12.3	14.8	15.7	15.3	15.4	15.5	14.8	15.1	15.0
III		4.3	4.4	4.6	6.1	8.9	11.0	12.4	13.3	13.7	13.0	12.7	12.2	11.5	12.9	15.2	15.3	14.9	15.1	15.9	15.7	15.3	15.1
IV		6.6	6.0	5.9	7.3	10.5	12.2	13.3	14.3	14.6	13.5	13.8	13.0	11.5	13.4	15.8	16.3	16.4	15.9	16.0	15.9	15.6	15.5
V		10.4	9.4	8.7	10.1	13.2	15.1	15.9	16.6	17.0	16.3	15.5	15.0	13.7	15.0	17.0	17.0	16.9	16.7	16.9	16.8	16.9	16.6
VI		16.0	14.8	13.1	15.2	17.3	18.4	18.8	19.4	19.6	18.8	18.3	18.2	16.4	16.8	18.8	19.1	18.6	19.0	19.5	19.3	19.1	18.3
VII		20.2	19.1	16.6	17.9	20.6	21.3	21.8	22.1	22.2	21.8	21.6	21.4	20.0	20.4	21.7	21.9	21.5	21.9	22.0	22.1	21.8	21.3
VIII		21.0	20.3	18.2	19.2	21.0	21.8	22.6	23.2	23.1	22.8	22.7	21.7	21.1	21.4	22.4	22.3	22.8	23.3	23.1	23.2	22.7	22.0
IX		19.0	18.4	17.2	17.7	19.9	20.4	21.4	22.5	22.1	21.9	21.5	21.5	20.9	21.3	21.8	22.2	22.7	22.6	22.5	22.6	22.0	21.6
X		15.3	14.9	14.4	15.1	16.7	17.8	19.0	19.8	20.3	19.1	17.8	17.2	18.4	20.4	20.8	20.8	20.8	20.3	20.0	20.1	20.2	19.9
XI		11.5	11.7	11.3	11.7	13.3	14.9	15.8	17.5	18.5	17.6	15.6	13.8	14.7	17.6	18.8	18.8	18.4	18.5	17.8	17.9	17.9	17.9
XII		8.1	8.7	8.7	8.7	10.8	11.6	13.2	15.3	15.3	14.7	12.7	12.5	13.8	13.9	16.6	16.5	17.9	16.3	15.6	16.7	16.4	16.0

AVERAGE WIDTH OF THE TWO-

I	6.6	7.7	11.0	13.0	14.4	15.7	17.1	17.0	17.1	18.1	18.2	14.9	13.4	19.6	16.5	17.5	18.3	18.6	17.6	16.9	16.6	16.9	16.4
II	5.2	5.6	9.5	11.2	14.1	14.3	16.4	16.1	17.6	17.4	16.4	17.1	16.1	16.8	17.1	16.1	16.4	16.6	16.4	16.2	16.1	15.8	15.5
III	0.5	7.1	10.0	11.2	12.6	15.1	17.0	17.7	17.4	17.2	17.3	16.6	16.7	16.7	16.9	17.4	17.3	16.5	16.5	16.5	16.0	15.9	15.9
IV	8.4	8.8	11.4	12.5	14.9	16.9	17.4	18.4	18.1	17.6	16.8	16.5	16.9	17.4	16.4	17.4	17.3	16.8	16.7	16.9	16.6	16.2	15.8
V	12.0	12.0	13.5	15.5	17.5	19.3	20.0	20.0	19.5	17.9	19.1	18.8	17.9	18.0	18.0	18.0	18.2	18.3	18.1	18.0	17.8	17.3	17.4
VI	17.6	17.2	18.2	20.0	20.7	21.2	22.5	22.0	22.0	21.3	21.1	20.8	20.6	20.3	19.6	19.4	20.2	20.4	20.6	20.1	20.1	19.2	18.9
VII	21.8	21.9	22.5	23.5	23.9	24.5	24.5	24.4	24.3	24.1	24.1	23.4	23.9	24.0	23.5	22.8	22.5	22.1	23.0	22.9	22.8	22.6	22.3
VIII	23.1	22.9	22.9	23.6	24.6	24.8	25.3	25.1	25.0	25.0	24.9	24.6	24.0	24.3	24.2	24.7	24.8	24.3	24.1	24.7	23.8	23.0	23.0
IX	20.3	21.4	22.4	23.1	24.1	24.3	24.8	24.2	24.3	24.4	24.4	23.8	23.8	24.2	23.9	24.1	24.2	23.6	24.0	23.8	23.5	23.3	22.8
X	16.6	17.4	19.2	20.6	21.5	21.5	22.6	23.2	23.8	23.6	23.0	22.7	22.7	20.9	20.4	21.0	22.0	20.9	21.5	21.9	21.0	20.7	20.6
XI	12.7	13.0	15.9	17.4	17.9	19.4	20.0	20.8	20.5	20.9	20.4	20.1	19.8	19.1	19.6	20.0	19.0	19.4	18.7	18.2	19.1	19.0	18.5
XII	8.7	9.6	12.6	14.2	15.3	17.8	17.6	18.0	18.8	19.7	18.2	19.2	19.4	20.1	18.4	16.7	18.3	18.5	17.7	17.6	17.0	16.9	17.1

AVERAGE WIDTH OF THE TWO-

I	11.5	13.4	17.1	21.0	19.4	18.9	18.6	18.3	18.8	18.3	18.2	18.0	17.7	17.6	18.1	18.5	18.7	17.9	17.9	17.3	17.3	17.2	17.2
II	10.3	12.1	16.5	18.6	17.6	18.3	19.2	18.6	18.4	16.4	18.1	17.9	17.6	17.4	17.3	17.8	17.6	16.9	16.7	16.9	16.7	16.2	15.8
III	10.2	12.3	16.2	18.8	17.8	18.1	17.9	18.6	17.9	17.8	17.8	17.3	17.9	17.6	17.2	16.9	16.9	17.1	17.0	16.8	16.5	16.5	16.2
IV	11.7	13.6	17.4	19.4	19.0	18.6	18.6	18.5	18.4	18.1	18.5	18.6	18.2	18.2	18.6	18.2	17.7	17.8	17.3	17.4	17.1	16.8	16.5
V	15.0	17.6	21.0	22.2	21.8	22.3	21.3	20.8	20.3	19.4	18.8	18.4	19.5	19.3	19.9	19.1	19.4	19.2	18.9	18.9	18.3	18.1	18.0
VI	19.2	20.6	22.3	23.4	23.3	23.5	23.0	21.4	22.1	22.4	21.7	20.6	21.2	20.7	21.3	21.6	21.9	21.1	21.0	20.8	20.2	20.5	20.1
VII	23.3	23.7	25.2	26.0	25.8	25.2	25.3	25.7	24.8	24.3	24.4	24.3	24.5	23.9	23.7	24.0	24.2	23.8	24.2	23.7	23.8	23.0	22.7
VIII	24.4	25.0	26.1	26.1	26.0	25.6	25.7	26.2	27.0	25.9	26.2	26.3	25.6	24.7	24.9	25.0	25.2	25.0	25.3	24.7	24.3	24.2	23.9
IX	22.6	23.8	25.2	25.8	26.0	25.2	25.4	24.9	25.7	24.7	24.6	24.6	24.4	24.0	24.7	24.3	24.7	24.6	24.6	24.7	24.0	23.5	23.0
X	19.0	20.3	23.0	23.9	23.2	22.7	23.6	23.3	22.9	22.7	22.7	22.7	22.7	22.5	22.7	22.0	22.3	22.7	22.5	22.6	21.9	21.6	20.8
XI	15.6	16.6	20.9	21.4	21.6	21.4	21.7	21.2	20.3	20.9	21.0	21.0	20.9	21.3	20.5	20.4	20.2	19.4	19.5	20.6	19.8	19.3	19.5
XII	12.5	15.0	19.3	21.1	20.5	21.5	20.9	20.4	20.5	20.9	21.1	21.5	21.1	21.3	20.9	20.5	19.9	19.3	18.6	18.1	18.0	17.5	17.6

AVERAGE WIDTH OF THE TWO-

I	19.8	19.6	19.9	20.9	19.4	19.0	19.0	18.4	18.0	18.3	18.1	18.4	18.8	19.2	18.5	18.5	18.4	18.8	18.7	17.8	17.9	17.9	17.4
II	19.3	19.3	18.8	17.4	18.9	19.0	18.4	18.2	17.8	17.8	17.6	18.0	17.5	18.2	18.7	18.1	18.4	17.8	17.4	17.9	17.5	16.8	17.1
III	19.7	19.9	18.1	17.5	17.1	17.8	17.8	17.3	17.9	18.1	18.1	18.1	17.9	17.7	17.9	17.5	17.8	17.8	17.4	17.3	17.3	17.5	17.1
IV	20.7	20.8	20.3	18.6	18.6	18.7	18.5	18.3	18.0	18.2	18.3	18.1	18.1	18.5	18.4	18.6	18.4	18.1	18.2	18.3	17.9	17.5	17.6
V	24.3	22.5	22.7	21.5	20.7	20.4	20.3	20.2	19.8	19.4	19.3	19.5	19.7	19.6	20.0	20.2	20.6	19.9	19.9	19.6	19.5	19.0	18.9	18.6
VI	24.1	24.5	24.5	23.1	22.7	22.4	23.5	23.0	22.0	22.5	21.6	22.0	22.3	22.1	22.2	22.6	22.2	22.3	21.9	21.8	21.1	21.8	20.7	21.1
VII	25.7	27.0	26.4	25.6	25.5	25.6	24.2	24.9	25.1	25.8	25.9	26.1	25.4	24.8	24.1	23.9	24.7	24.4	24.6	24.5	24.2	23.7	24.0	22.9
VIII	27.2	27.1	27.2	26.4	26.8	26.6	26.0	26.4	26.0	26.5	26.2	26.2	25.6	25.6	25.3	25.5	25.4	25.8	25.9	25.7	25.1	25.0	24.4	23.9
IX	26.0	25.9	26.4	26.2	25.7	25.5	26.3	25.5	25.6	25.1	25.6	25.5	25.5	25.5	25.3	25.0	25.1	24.6	24.7	25.0	24.9	24.3	24.6	24.1
X	24.8	23.8	24.3	23.3	24.9	24.3	24.1	23.9	24.1	24.0	23.9	23.8	24.0	23.5	23.8	23.6	23.5	23.2	23.4	23.3	22.8	22.7	22.3	22.5
XI	21.9	22.2	22.2	21.6	20.2	21.6	21.9	21.9	21.2	21.5	21.2	21.4	21.7	21.5	20.9	21.1	20.6	20.5	21.0	20.6	21.0	20.7	20.9	20.4
XII		20.9	20.8	21.5	20.3	19.5	20.5	20.8	20.8	20.5	20.4	20.4	21.0	20.5	20.6	20.4	20.1	20.1	19.8	20.2	18.2	19.3	17.9	18.9

AVERAGE WIDTH OF THE TWO-

I									21.2	21.9	20.2	20.0	20.5	21.4	19.7	18.5	19.6	19.7	20.7	20.0	19.8	19.8	19.8
II									20.8	22.3	20.1	19.1	18.7	18.7	19.1	18.5	18.7	19.6	19.6	18.3	18.6	19.1	19.3
III									18.2	20.7	20.1	19.4	18.3	18.6	18.4	18.2	18.5	18.7	18.6	18.5	18.7	18.6	18.2
IV									20.1	23.0	21.1	20.4	18.8	18.7	18.1	19.0	18.7	18.9	19.3	18.9	18.6	18.7	19.5
V									24.8	24.6	23.0	22.3	22.4	21.5	20.9	20.3	20.7	20.3	20.6	20.6	20.8	20.9	20.7
VI									25.4	26.0	24.9	24.6	23.1	23.7	23.1	24.1	23.0	23.0	22.7	23.7	23.5	23.7	22.7
VII									27.3	27.8	26.6	26.6	25.3	25.7	25.2	25.4	26.4	25.1	24.8	24.8	25.5	25.5	25.6
VIII									27.5	27.8	27.3	27.4	27.2	27.0	27.2	28.0	26.7	26.9	26.4	26.1	26.3	26.2	26.1
IX									26.9	27.4	26.5	26.3	26.3	26.4	26.3	25.9	24.5	24.9	25.6	25.7	25.5	25.6	25.6
X									24.9	25.6	24.7	24.2	24.5	24.2	23.9	24.6	24.3	24.4	24.4	24.3	24.1	24.2	24.1
XI									22.3	23.9	22.8	21.7	22.6	22.0	21.8	21.5	21.7	22.0	21.9	22.2	22.0	21.7	21.6
XII									19.3	23.4	21.3	20.7	20.8	20.6	21.0	20.5	20.1	21.0	20.7	21.2	21.4	21.2	20.8

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 41° N. LAT.

20°					10°					0°	10°					20°					E. Long. 30°	Tm
15.3	14.8	14.6	14.6	14.4	14.2	13.9	13.8	13.7	13.5	*13.5												13.4
14.5	14.2	14.2	14.0	14.0	13.9	13.8	13.2	13.4	13.1	12.9												12.7
14.8	14.7	14.4	14.2	13.8	13.6	13.7	13.4	13.4	13.1	13.0												12.6
15.1	14.8	14.8	14.8	14.4	14.0	14.2	14.1	13.8	13.7	13.7												13.4
16.3	16.2	15.5	15.7	15.2	14.8	15.6	15.3	15.0	14.9	15.0												15.0
18.1	18.2	18.0	18.1	17.4	17.3	17.0	16.8	16.9	16.5	16.5												17.7
20.8	20.5	20.8	20.4	19.9	19.3	19.2	19.0	19.0	18.2	*17.3												20.4
21.4	20.9	21.8	21.2	20.6	20.3	20.6	20.1	20.2	19.3	*18.2												21.4
21.6	21.3	21.2	21.2	20.6	20.2	20.4	20.1	19.5	18.9	*18.0												20.8
19.4	19.1	19.1	19.0	18.4	18.6	18.6	18.6	18.1	17.7	17.2												18.6
17.4	17.1	17.3	17.2	16.8	16.6	16.7	16.6	16.4	15.8	15.5												16.2
15.6	15.8	15.4	15.4	15.2	15.2	15.4	15.2	14.6	14.4	14.4												14.1

DEGREE ZONE: 39° N. LAT.

15.7	15.8	15.4	15.6	15.6	15.0	15.0	14.7	14.5	14.2	13.9												15.4
15.0	14.7	14.9	14.8	14.6	14.3	14.5	14.4	14.1	14.0	13.6												14.5
15.6	15.0	14.8	14.5	14.5	14.5	14.5	14.1	13.9	14.0	13.6												14.9
15.6	15.9	15.7	15.7	14.8	15.0	14.7	14.6	14.5	14.5	14.3												15.5
16.8	16.2	16.3	16.0	16.1	16.1	16.1	16.0	15.8	15.9	15.2												17.1
18.4	18.4	18.7	18.6	17.8	18.2	17.8	18.2	17.5	17.2	16.7												19.5
21.7	21.2	21.1	20.7	20.6	20.3	19.9	19.8	19.5	19.0	17.6												22.3
22.4	21.9	22.0	21.7	21.7	21.2	21.3	21.1	20.8	20.0	18.0												23.2
22.1	21.9	22.0	21.4	21.1	21.0	21.0	20.8	20.2	19.9	18.0												22.7
19.7	19.9	19.7	19.4	19.5	19.6	19.3	19.5	19.2	18.6	17.6												20.6
18.1	17.9	17.8	17.6	17.4	17.8	17.7	17.7	17.1	16.8	16.0												18.3
16.4	15.8	16.3	16.1	16.1	16.7	16.3	15.6	15.6	15.2	14.9												16.5

DEGREE ZONE: 37° N. LAT.

16.8	16.5	16.4	16.5	16.3	15.8	16.0	15.4	15.3	14.9	14.5	15.2											17.0
16.1	15.8	15.6	15.6	15.2	14.9	15.0	15.0	14.8	14.7	14.4	14.7											16.3
16.1	15.6	15.4	15.3	15.4	15.4	14.9	14.9	14.6	14.8	14.4	14.9											16.3
16.8	16.5	16.2	16.2	15.8	15.7	15.5	15.3	15.2	15.0	15.1	15.6											16.9
17.6	17.2	17.0	16.6	16.6	16.8	16.9	16.7	16.7	16.5	16.2	17.1											18.6
20.2	19.9	19.3	20.0	19.9	19.0	18.6	18.4	17.8	18.0	17.7	19.1											20.6
22.2	21.6	21.3	21.9	22.4	20.8	20.5	20.3	19.8	19.5	18.5	20.8											23.1
23.1	22.7	22.5	22.2	22.5	22.1	22.0	21.9	21.2	20.4	18.8	21.5											24.1
23.1	22.7	22.1	21.8	22.7	22.3	21.6	21.1	20.7	20.5	19.1	21.0											23.5
21.3	20.6	20.9	21.2	20.9	20.6	20.2	20.2	19.8	19.6	18.7	19.6											21.7
18.9	18.6	18.7	19.0	18.6	18.6	18.8	18.3	18.0	17.7	16.9	17.7											19.6
17.5	17.3	17.3	17.0	17.5	17.3	17.2	16.8	16.5	16.0	15.7	16.1											18.6

DEGREE ZONE: 35° N. LAT.

17.4	17.5	17.4	17.4	17.1	17.0	16.7	16.4	16.4	16.2	16.0	15.5											18.0
16.8	16.6	16.2	16.6	16.0	16.1	16.0	15.9	16.1	15.5	16.8	14.9											17.4
16.6	16.5	16.7	16.3	16.4	15.9	15.9	15.6	15.7	15.3	15.6	15.0	14.4										17.2
17.4	16.9	16.9	16.6	16.3	16.6	16.6	16.1	16.0	15.5	15.8	15.6											17.8
18.3	18.1	17.5	17.3	17.3	17.5	17.5	17.4	17.5	17.4	17.6	17.1											19.4
20.8	20.8	19.0	21.5	19.9	19.5	19.4	18.8	18.5	18.7	19.6	19.6											21.5
22.4	21.8	21.9	21.7	21.3	21.0	21.3	20.7	20.2	20.2	21.5	21.1											23.7
23.6	23.0	23.4	23.6	22.9	22.3	22.6	21.9	21.4	21.3	21.6	21.4											24.7
23.8	22.5	22.5	22.8	23.4	22.8	22.2	21.8	21.6	21.5	21.9	20.9											24.3
21.9	21.1	21.7	21.4	21.4	21.6	20.9	20.8	20.6	20.6	20.3	19.5											22.8
19.8	20.1	20.1	19.4	19.9	19.5	19.5	19.1	19.0	19.0	18.7	17.7											20.6
18.5	18.2	18.4	17.5	18.3	18.4	17.7	17.6	17.2	16.8	17.7	16.1											19.3

DEGREE ZONE 33° N. LAT.

20.2	20.2	19.5	19.3	19.1	19.0	19.1	18.9	18.5	18.3	17.7	18.5	19.1	18.3	17.9	17.7	17.4	17.0	16.7	16.6	15.6		19.1
19.2	19.3	18.0	19.2	18.7	18.6	18.4	18.0	18.1	17.6	17.8	17.5	17.6	17.7	17.9	16.8	16.9	16.5	16.3	16.6	16.1		18.4
18.5	18.7	18.9	18.7	18.3	18.2	18.5	18.4	18.1	17.5	17.6	17.7	17.4	17.1	16.7	16.8	16.6	16.4	16.2	15.7	15.4		18.0
20.1	19.1	19.1	19.1	19.2	18.9	19.0	18.8	18.6	18.4	17.9	18.2	17.0	17.0	17.2	17.6	17.0	16.7	16.6	15.8	16.2		18.6
20.8	20.7	20.9	21.1	20.4	20.2	20.2	19.9	19.7	19.2	18.8	17.8	17.8	18.1	18.1	18.2	18.3	18.1	18.0	17.9	16.8		20.2
23.6	23.4	23.1	22.3	22.8	22.8	21.7	22.6	21.9	21.4	21.5	21.0	19.5	19.7	20.9	20.0	19.7	19.5	18.9	19.3	19.9		22.3
25.5	24.9	26.4	24.8	24.9	24.3	25.9	22.4	23.4	23.2	22.4	22.6	22.3	22.0	21.7	21.7	21.2	20.5	20.3	21.5	21.9		24.2
25.4	26.0	25.9	26.3	25.7	25.9	25.7	25.7	24.7	24.3	24.5	24.5	23.9	23.6	22.5	22.8	22.5	22.1	21.6	22.2	21.2		25.3
25.8	25.6	25.4	25.3	25.4	25.3	25.3	25.1	25.0	24.7	23.3	24.4	24.3	24.6	23.8	23.1	22.5	22.2	21.7	22.8	21.3		24.9
24.6	24.1	24.0	24.0	24.0	23.7	23.6	24.0	23.3	22.9	23.0	23.0	23.3	23.4	22.1	22.0	21.6	21.1	12.2	20.6	20.7		23.5
21.9	21.5	21.8	21.5	21.7	22.1	21.8	22.8	21.5	20.9	20.8	20.1	19.3	20.3	20.7	20.3	20.0	19.6	19.6	20.2	28.4		21.3
20.8	20.9	21.2	20.5	20.7	19.8	19.6	19.6	19.7	19.6	19.2	19.9	19.8	19.1	19.3	18.9	18.6	18.1	17.8	17.1	16.7	16.1	19.9

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I										24.3	23.1	20.6	20.5	21.3	21.7	22.4	20.3	20.9	20.8	21.8	21.9	21.2	20.4	20.2
II										22.5	21.6	20.0	19.8	19.2	19.3	19.6	20.3	21.1	20.3	19.7	20.0	20.3	20.1	20.0
III										22.6	22.4	20.3	19.7	19.7	19.5	19.6	19.5	19.2	19.8	19.5	19.0	19.4	19.4	19.6
IV										23.5	23.2	21.0	20.6	19.9	20.2	20.2	19.6	20.0	20.1	19.4	19.7	21.0	19.8	20.2
V										25.4	23.7	23.0	22.5	22.1	22.3	22.1	21.6	21.4	21.2	20.7	20.8	20.9	21.0	21.6
VI										26.4	26.2	24.8	25.3	24.8	24.7	24.2	23.4	23.2	23.0	24.2	23.7	23.6	23.2	23.5
VII										28.1	27.3	26.7	26.6	25.9	26.1	26.5	26.1	26.2	26.1	26.1	25.6	25.7	25.7	24.8
VIII										28.4	28.2	27.4	27.6	27.9	26.9	26.9	26.9	26.5	27.2	26.4	27.2	26.4	26.7	26.9
IX										28.1	28.4	26.9	26.6	26.4	26.9	26.5	26.0	25.8	25.0	25.0	25.7	25.7	26.2	26.3
X										26.1	25.5	25.0	24.8	24.8	24.9	25.1	25.0	25.0	25.0	24.8	24.9	25.1	25.1	25.2
XI										25.1	24.2	23.0	22.3	22.9	23.1	22.8	22.1	22.1	22.2	22.1	22.7	22.2	22.9	22.7
XII										23.4	24.0	21.5	21.0	22.0	20.2	21.1	21.4	21.7	21.7	21.5	22.1	21.8	21.1	20.8

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I*		18.5	19.6	20.6	20.4	20.0	20.2	20.3	22.0	24.0	22.8	21.6	21.1	21.7	21.7	21.6	21.2	21.6	21.7	21.3	21.4	21.5	20.3	21.4
II		19.0	19.2	19.6	18.9	20.0	21.3	22.2	23.8	23.1	21.4	21.1	21.0	21.1	21.5	20.7	21.1	21.0	21.4	21.5	21.4	20.6	21.0	20.6
III		18.3	18.4	17.2	17.0	18.6	17.4	17.1	22.5	23.4	21.9	21.6	20.6	20.7	20.7	20.1	20.3	20.3	20.2	20.0	20.6	20.0	20.4	19.9
IV		21.6	21.9	21.9	22.1	22.6	22.5	21.4	24.0	24.5	22.4	21.8	21.6	21.8	21.2	21.2	20.7	20.7	21.8	20.5	18.7	19.2	19.6	20.7
V		22.7	23.5	25.0	25.6	25.8	25.2	24.3	25.5	25.1	23.6	23.5	23.3	23.2	23.3	23.1	21.8	22.2	22.1	22.8	20.6	20.8	22.6	22.6
VI		27.0	27.1	27.0	26.8	27.0	26.8	26.4	26.5	27.1	26.7	25.6	26.0	24.6	24.9	24.2	24.8	25.1	24.2	25.5	24.2	23.8	24.6	23.5
VII		28.0	28.0	28.2	28.1	28.1	28.2	28.5	28.3	28.1	27.3	27.0	26.8	26.8	26.6	26.3	27.4	26.8	26.6	26.6	26.1	25.4	25.3	25.2
VIII		27.8	28.3	28.7	28.9	29.0	29.1	29.3	28.1	28.7	28.4	27.8	27.8	27.4	27.4	26.9	27.4	27.6	28.2	27.7	27.5	27.0	26.9	27.5
IX		28.8	28.3	28.9	28.9	28.9	28.9	28.9	27.0	28.3	27.4	27.2	27.4	27.0	26.8	26.7	27.0	27.1	26.6	26.6	26.6	26.7	26.8	25.9
X		25.2	25.3	25.2	25.3	25.8	25.3	25.0	26.0	26.4	25.9	25.8	25.0	26.0	25.7	25.4	25.6	25.3	25.3	25.6	25.9	25.8	25.5	25.3
XI		21.7	23.0	23.5	23.8	24.0	24.3	23.8	25.0	25.2	24.0	23.8	23.7	23.5	23.4	23.3	23.4	23.4	23.2	23.2	23.1	24.6	23.8	23.4
XII		19.4	21.0	22.0	22.2	22.8	23.2	23.3	23.5	23.7	23.1	22.5	22.3	23.7	23.5	22.9	22.7	23.1	23.2	22.2	22.7	22.7	22.5	22.3

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I	21.6	22.6	22.8	23.1	22.7	22.5	22.2	21.7		24.4	22.3	22.7	22.3	22.0	23.5	23.0	22.2	22.8	23.5	23.3	23.5	24.3	23.3	22.3
II	22.0	22.2	22.1	21.7	21.5	21.5	21.6	21.6		24.4	22.9	22.3	22.2	22.1	22.8	21.9	22.6	23.4	22.1	22.5	22.2	22.0	21.5	21.5
III	21.0	21.7	21.2	21.3	21.9	22.4	21.3	20.6		24.1	23.3	22.4	22.1	21.3	22.1	22.4	22.3	21.5	21.6	22.6	20.8	21.4	22.1	21.3
IV	21.4	22.8	24.1	24.2	24.0	24.6	24.7	22.8		25.2	22.6	22.8	22.8	23.7	22.6	22.2	22.2	23.2	22.2	22.6	21.7	22.5	21.4	23.1
V	25.8	24.8	24.4	24.7	25.0	26.1	26.3	25.4		25.6	24.3	24.1	24.0	24.8	24.0	25.0	24.3	23.3	23.7	23.9	24.4	23.8	22.7	22.2
VI	27.1	27.2	27.3	27.8	27.2	27.2	27.6	27.2		27.7	26.1	26.2	26.5	25.9	25.1	25.5	25.1	25.3	24.6	25.3	25.3	25.6	25.5	24.3
VII	28.1	28.4	28.9	28.3	28.3	28.9	28.9	28.9		28.4	27.7	27.3	27.4	27.4	26.7	26.4	26.5	27.0	26.9	26.4	26.7	26.2	26.0	25.8
VIII	28.0	28.4	28.9	28.9	28.9	28.9	28.9	29.0		28.0	28.0	28.0	27.8	28.3	28.5	27.9	27.7	28.0	27.7	26.8	27.5	27.6	27.8	27.4
X	29.8	29.9	29.1	28.3	28.6	28.9	28.5	29.1		28.3	27.8	27.7	27.7	27.8	27.8	27.3	27.6	27.4	27.4	27.1	27.2	26.9	26.5	26.4
X	25.4	27.0	28.0	27.1	26.6	26.5	26.5	26.4		26.8	26.5	26.5	26.1	26.2	26.2	26.0	26.4	25.0	26.0	26.4	26.1	26.3	26.0	25.9
XI	22.0	23.1	24.4	24.6	24.6	25.0	25.3	25.2		25.3	24.7	24.8	24.3	24.3	24.1	24.7	24.7	23.2	24.2	24.5	25.0	24.8	25.1	24.8
XII	20.2	22.7	23.5	23.4	23.3	23.3	23.8	23.7		25.1	23.9	23.5	23.5	24.0	24.4	24.3	24.2	24.9	24.9	23.8	23.2	22.9	23.2	24.1

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I	22.7	23.3	23.7	23.9	24.0	24.0	23.5	22.9	23.9	24.7	21.6	23.6	23.1	24.6	23.5	24.1	24.5	22.5	23.6	25.0	23.9	23.5	22.7	22.2
II	22.9	23.2	23.2	23.0	23.3	23.5	23.3	23.2	24.0	24.1	24.2	23.2	23.0	23.3	23.1	23.6	23.3	23.8	23.0	23.0	24.4	24.3	22.3	22.8
III	22.7	23.0	22.9	23.1	23.7	24.4	23.8	23.2	23.9	24.3	22.8	23.4	23.0	23.5	23.4	22.6	23.6	23.2	24.9	22.8	22.8	22.7	22.8	22.8
IV	22.0	23.8	24.9	25.4	25.7	25.6	25.6	24.4	25.1	25.5	24.2	23.7	23.7	23.3	24.0	24.0	23.7	24.0	23.2	22.4	21.7	22.9	23.3	23.3
V	26.6	26.2	26.2	26.9	26.2	26.3	27.0	26.9	26.0	26.0	26.1	24.9	25.0	24.9	24.6	25.0	25.2	24.9	25.1	24.9	24.8	23.4	23.5	23.4
VI	27.2	27.3	27.4	27.6	27.7	27.8	27.7	27.7	27.8	27.3	26.3	26.6	27.1	26.9	26.2	25.8	26.4	25.9	25.8	25.7	25.4	25.1	26.1	25.3
VII	28.5	28.7	28.9	28.3	28.9	28.9	28.9	28.9	29.0	28.2	27.5	27.3	27.6	27.6	27.0	26.8	26.5	27.0	26.5	27.2	26.9	26.6	25.8	25.6
VIII	28.4	29.0	29.8	29.4	29.4	29.2	28.9	28.9	29.1	28.3	28.2	27.9	28.5	27.5	28.4	27.7	27.4	27.7	27.0	27.1	27.6	27.4	27.4	26.6
IX	29.6	29.8	29.0	28.6	28.3	28.3	28.4	28.9	29.3	28.4	28.1	27.7	28.0	27.5	27.5	27.8	27.6	27.2	27.1	27.4	27.0	26.9	26.6	26.2
X	26.7	27.7	28.6	28.2	27.4	27.1	27.2	27.3	27.2	27.1	26.7	27.0	26.9	27.7	27.1	27.2	26.9	26.3	26.9	26.5	26.4	26.6	26.8	26.6
XI	24.1	24.9	26.0	26.1	26.0	26.2	26.5	26.3	26.3	25.3	24.9	25.6	25.9	25.2	25.6	24.9	25.9	25.4	25.5	25.5	25.7	25.8	26.5	25.5
XII	21.9	24.3	25.2	24.8	24.0	23.9	24.3	24.5	24.7	24.8	24.1	24.3	24.0	24.7	25.2	25.0	24.7	24.9	24.0	24.4	24.8	25.0	25.2	25.1

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I	23.1	23.5	23.9	24.3	24.7	25.1	25.1	24.5	24.7	25.2	25.1	24.1	25.9	24.8	25.5	24.0	25.0	25.1	24.4	24.9	25.0	23.6	23.8	23.9
II	23.3	23.7	23.7	23.8	23.8	24.3	25.1	25.3	25.3	24.9	24.6	24.2	23.2	24.0	24.2	24.0	24.4	24.1	24.0	24.0	23.5	23.2	23.4	23.6
III	23.2	24.2	24.1	24.0	24.4	25.1	25.5	25.2	25.3	24.5	25.0	25.0	24.3	25.0	23.8	24.8	24.1	24.8	23.7	23.4	24.1	23.4	23.3	23.6
IV	23.2	24.4	25.2	25.7	26.1	26.3	26.4	26.2	25.7	25.5	25.2	24.4	24.8	23.8	24.0	25.0	24.8	24.3	24.3	23.6	23.3	22.9	24.0	23.8
V	27.6	27.8	27.2	27.1	27.2	27.1	27.2	27.2	27.0	26.7	26.1	25.5	25.3	25.6	25.5	24.9	25.6	25.7	26.6	26.0	24.6	24.6	25.6	25.5
VI	27.8	27.6	27.4	27.5	27.8	28.2	28.2	27.9	27.5	27.2	27.2	26.7	27.4	27.1	26.1	26.9	26.5	26.6	26.5	26.2	26.1	26.4	25.8	25.3
VII	28.4	28.7	28.9	28.5	28.3	28.3	28.3	28.3	28.9	28.3	28.3	27.3	27.9	27.0	27.0	26.7	26.8	26.4	27.0	26.9	26.5	26.9	26.2	25.5
VIII	28.8	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.1	28.2	28.1	28.4	27.2	27.0	27.9	27.8	27.1	27.1	27.0	27.4	27.5	27.0	26.1
IX	29.2	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.9	28.3	28.2	27.8	28.2	28.2	27.4	26.9	27.4	27.3	27.4	26.8	27.2	27.0	27.0	26.3
X	26.9	27.6	28.2	28.3	28.2	27.9	27.8	28.0	27.4	26.5	26.9	27.4	27.3	27.6	28.1	27.5	27.3	27.2	27.0	27.0	26.8	26.7	27.0	26.4
XI	25.4	25.8	26.1	26.3	26.7	27.1	27.2	27.3	27.2	26.7	26.1	25.9	26.7	26.0	26.1	26.0	26.1	25.8	26.4	26.5	26.6	26.3	25.7	25.5
XII	22.5	23.9	25.1	25.5	25.4	25.1	25.3	25.5	25.5	25.5	25.0	25.0	25.2	25.0	25.3	25.4	25.4	25.7	25.6	24.9	24.7	24.4	25.0	25.0

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 31° N. LAT.

20°					10°					0°					10°					20°	E. Long. 30°	Tm
19.7	20.2	20.3	20.2	20.3	20.7	20.2	19.5	19.2	18.7	18.9	19.5	19.2	18.9	18.8	18.2	18.0	17.4	17.0	17.0	----	----	20.2
19.6	19.8	19.3	19.7	19.3	19.3	19.2	19.1	18.8	18.8	18.2	17.9	18.4	18.1	18.1	17.7	17.3	17.1	16.6	16.1	----	----	19.3
19.8	19.7	19.4	19.5	19.1	19.2	19.4	18.8	18.5	18.6	18.7	18.8	18.0	17.8	17.6	17.4	17.2	16.7	16.8	15.8	----	----	19.1
20.0	20.6	20.0	20.2	20.0	19.8	19.7	19.4	19.1	18.8	18.4	18.9	19.6	18.2	18.1	18.0	18.0	17.1	16.8	16.2	----	----	19.9
21.6	21.0	21.2	21.3	21.3	20.8	21.2	20.6	20.0	19.4	19.9	19.3	19.3	18.5	19.0	18.9	18.9	18.4	18.3	17.0	----	----	20.9
23.1	23.8	23.7	22.9	23.6	23.7	23.0	22.5	22.1	21.0	22.2	21.7	20.2	20.8	20.7	20.3	20.4	19.4	19.3	19.1	----	----	22.9
25.0	26.0	25.9	25.2	24.5	24.7	25.3	24.3	23.6	23.4	22.8	22.9	22.9	22.0	22.0	21.8	21.1	20.5	20.6	20.6	----	----	24.6
26.2	25.9	25.9	25.7	26.0	26.1	25.7	25.2	24.8	24.8	24.5	24.4	23.9	23.0	23.1	22.8	22.3	21.6	21.6	19.8	----	----	25.5
26.2	26.4	26.2	25.7	25.5	25.7	25.4	25.3	25.2	24.7	23.3	24.3	24.5	24.2	23.6	23.2	22.9	22.1	21.9	22.1	----	----	25.3
25.1	24.8	24.5	24.6	23.6	24.1	24.6	24.1	23.5	23.5	22.1	23.3	23.3	22.9	22.5	22.3	21.9	21.6	21.5	21.5	----	----	24.1
22.2	22.9	22.9	23.0	22.7	22.8	22.5	22.4	21.9	21.5	21.3	20.6	21.1	21.2	21.2	21.0	20.6	20.2	19.9	19.4	18.3	----	22.0
20.6	20.8	21.3	21.4	21.5	20.9	20.5	20.7	20.5	20.0	20.3	20.9	19.5	20.3	19.7	19.7	19.1	18.5	18.1	18.5	16.1	----	20.7

DEGREE ZONE 29° N. LAT.

22.8	20.7	20.9	21.1	20.9	21.1	20.2	20.0	19.9	19.6	19.5	20.3	20.2	19.5	19.1	18.8	18.7	18.1	17.9	16.7	----	----	20.5
20.5	20.9	20.4	20.2	20.2	20.1	19.9	19.6	19.8	19.3	18.8	18.7	18.7	19.0	18.3	18.4	17.9	17.8	16.9	17.2	----	----	20.1
20.4	20.2	20.1	20.4	20.1	20.2	19.8	19.5	19.4	19.4	19.2	18.5	18.7	18.3	18.3	18.0	18.1	17.4	17.2	16.0	----	----	19.5
20.3	20.6	21.1	21.1	21.1	20.8	20.3	19.8	19.9	19.4	19.0	19.3	19.3	18.8	18.8	18.6	18.2	17.5	17.2	16.8	----	----	20.6
22.2	21.1	22.8	21.9	22.0	21.5	21.5	20.9	20.5	21.3	20.2	20.5	20.0	19.4	19.6	19.8	19.2	18.7	18.1	15.6	----	----	22.0
24.0	24.2	23.3	23.8	23.9	23.6	23.3	22.9	22.8	21.9	20.8	21.3	21.1	21.6	20.9	20.6	20.5	19.9	19.9	18.3	----	----	23.9
25.3	24.6	25.4	25.4	25.0	24.6	24.6	24.4	24.7	24.0	23.7	23.6	22.6	22.3	22.1	21.7	21.4	20.9	20.8	19.8	----	----	25.4
26.7	26.7	26.0	26.2	26.3	25.8	25.4	25.4	24.5	24.4	24.6	24.0	24.1	23.4	22.9	22.6	22.0	21.7	21.9	19.5	----	----	26.2
26.3	26.2	26.1	25.5	24.2	26.3	25.5	25.7	25.5	25.5	25.4	25.5	24.1	23.8	23.8	23.3	22.8	22.3	22.0	19.0	----	----	26.1
25.5	25.3	25.0	24.8	24.3	24.5	24.8	24.3	23.9	23.7	23.9	24.5	23.6	23.1	23.0	22.7	22.1	22.0	22.3	20.0	----	----	24.7
23.9	24.1	23.8	23.5	23.8	23.1	22.6	22.7	22.5	21.7	21.7	21.5	21.8	22.0	22.2	21.3	20.9	20.6	20.2	19.4	----	----	23.0
22.0	22.8	23.0	22.4	21.4	21.6	21.3	21.4	21.3	20.8	21.5	21.6	21.0	20.5	20.6	20.0	19.5	19.2	18.7	17.5	----	----	21.8

DEGREE ZONE 27° N. LAT.

21.3	21.7	22.5	22.0	21.7	21.3	21.0	20.8	20.6	19.9	21.2	20.6	20.3	20.1	19.6	19.6	18.6	18.3	----	----	----	----	21.8
21.6	21.7	21.3	20.6	21.4	20.8	20.6	20.4	20.4	19.9	20.1	18.6	19.7	19.6	19.1	18.8	18.4	18.1	17.8	----	----	----	21.2
22.3	21.5	21.4	21.0	21.0	20.7	20.5	20.5	20.7	20.4	19.8	19.6	18.9	19.2	19.1	18.9	18.3	17.9	----	----	----	----	21.1
22.4	21.3	21.8	21.6	21.7	21.4	21.0	20.8	20.8	20.0	20.2	19.7	19.5	19.6	19.4	19.4	18.5	17.8	----	----	----	----	21.9
22.4	22.6	22.5	22.6	22.5	22.2	22.0	22.3	22.6	21.9	20.6	20.8	20.1	20.2	20.1	20.6	19.2	18.6	17.5	----	----	----	23.0
24.7	23.8	23.7	24.3	23.8	23.7	23.8	23.8	23.6	21.1	22.0	21.5	22.1	22.1	21.1	20.9	20.4	19.9	----	----	----	----	24.6
25.3	24.9	24.9	25.8	25.4	24.7	24.6	25.0	24.4	24.4	22.9	22.9	22.1	22.7	22.2	21.7	21.1	20.3	----	----	----	----	25.8
26.1	25.9	26.4	27.7	26.2	25.4	25.6	25.6	25.0	25.0	24.8	24.1	23.6	23.3	23.0	22.7	22.1	21.1	20.5	----	----	----	26.5
26.2	26.2	26.8	26.3	26.7	25.9	25.8	25.6	24.9	25.0	24.6	24.1	24.5	24.1	23.8	23.4	22.5	21.8	----	----	----	----	26.6
26.0	25.6	25.6	25.7	25.6	24.9	25.0	25.0	24.8	24.5	24.2	23.7	23.6	23.5	23.3	22.9	22.4	22.0	19.4	----	----	----	25.3
24.5	24.4	24.3	24.5	24.9	23.6	23.3	23.6	23.0	22.6	23.1	22.5	22.2	22.9	22.3	22.0	21.3	20.9	----	----	----	----	23.9
24.3	23.0	22.2	22.2	22.4	22.4	21.9	22.2	22.2	22.1	22.2	21.9	21.2	21.3	21.1	20.4	19.9	19.7	----	----	----	----	22.8

DEGREE ZONE: 25° N. LAT.

22.0	22.4	22.4	22.5	22.1	21.7	21.6	21.5	21.8	21.6	21.7	21.3	21.1	20.6	20.2	19.8	19.1	18.2	----	----	----	----	22.5
21.6	22.1	21.5	21.8	21.8	21.5	21.4	21.5	21.5	20.9	20.6	20.9	20.1	20.0	19.3	19.2	18.7	19.4	----	----	----	----	22.3
22.6	22.5	22.0	21.8	21.6	21.4	21.5	21.5	21.3	20.6	20.2	20.5	20.2	19.9	19.7	19.1	18.5	17.9	----	----	----	----	22.2
23.1	22.3	22.8	22.6	22.2	21.9	22.0	21.8	21.6	20.7	20.9	20.4	20.1	20.3	19.8	19.4	18.6	17.2	----	----	----	----	22.7
23.1	23.2	22.8	23.4	22.8	22.7	22.6	22.8	22.2	22.0	21.8	21.8	20.1	20.6	20.6	20.0	19.3	19.8	----	----	----	----	23.8
23.7	23.5	23.8	24.5	24.0	23.3	24.3	23.8	22.3	22.7	22.6	22.3	23.0	21.8	21.4	20.9	20.2	19.4	----	----	----	----	24.9
25.4	25.7	24.6	25.0	25.1	24.8	24.3	24.8	24.7	23.6	23.1	22.5	23.1	22.5	22.2	22.0	20.5	19.8	----	----	----	----	25.9
25.9	26.2	26.3	25.7	25.4	25.4	24.9	25.6	24.9	24.4	24.3	23.3	23.5	23.5	23.1	23.0	21.6	21.1	----	----	----	----	26.5
26.3	26.5	27.4	26.7	26.1	26.0	26.0	25.7	25.1	24.8	24.9	25.2	24.8	24.4	23.9	23.1	21.9	21.6	----	----	----	----	26.7
26.0	26.1	25.7	26.0	25.6	25.3	25.7	25.3	24.8	24.5	24.4	24.7	24.3	24.0	23.6	23.0	22.1	22.5	----	----	----	----	26.0
25.1	25.1	25.2	26.0	24.2	24.1	23.5	23.7	23.7	23.5	23.3	22.9	23.3	23.4	22.6	22.1	21.4	20.8	----	----	----	----	24.8
24.6	25.1	25.0	23.7	23.2	23.1	23.0	22.9	23.0	22.8	22.6	22.5	22.6	22.0	21.2	20.8	20.0	20.3	----	----	----	----	23.9

DEGREE ZONE: 23° N. LAT.

23.5	23.0	23.3	22.9	22.7	22.4	22.6	22.3	22.3	22.0	22.3	21.9	21.6	20.7	20.2	19.3	18.1	----	----	----	----	----	23.4
23.2	22.9	22.3	22.6	22.7	22.4	22.5	21.8	22.0	23.2	21.7	21.0	20.4	20.1	19.7	19.1	17.7	----	----	----	----	----	23.0
23.1	22.6	22.3	22.4	22.1	22.2	22.3	22.2	21.9	21.3	21.2	20.8	20.6	20.2	19.9	19.0	18.0	----	----	----	----	----	23.2
24.1	23.7	23.2	22.9	22.5	22.7	22.9	22.2	21.7	22.1	21.4	20.4	20.9	20.5	20.1	19.2	18.3	----	----	----	----	----	23.5
25.0	24.0	24.0	23.6	23.2	23.2	23.2	22.8	22.7	22.7	22.5	20.9	21.1	21.0	20.5	19.9	18.8	----	----	----	----	----	24.6
25.2	25.1	24.5	24.4	24.3	24.0	24.2	23.4	23.3	23.2	23.3	23.3	22.4	21.7	21.3	20.4	19.0	----	----	----	----	----	25.4
25.6	26.1	25.8	25.2	25.2	25.0	24.4	24.4	24.4	24.0	23.0	22.8	23.1	22.7	22.2	21.2	20.9	----	----	----	----	----	26.0
26.1	25.1	25.3	25.7	25.6	25.6	25.0	25.0	25.0	24.2	24.5	24.3	23.7	23.6	23.2	22.5	21.2	----	----	----	----	----	26.5
26.6	26.4	26.8	26.1	26.2	27.0	25.6	25.2	25.3	24.9	25.6	25.4	24.9	24.4	24.1	22.9	20.8	----	----	----	----	----	26.8
26.4	24.8	25.8	25.9	25.8	25.5	25.6	25.2	25.0	24.6	25.1	25.2	24.8	24.2	23.7	22.7	21.2	----	----	----	----	----	26.3
25.8	25.6	26.1	25.0	24.8	24.7	25.6	24.7	24.3	24.3	24.2	23.9	24.0	23.4	23.0	21.7	20.3	----	----	----	----	----	25.4
25.0	24.6	23.7	23.8	23.6	24.0	23.9	23.4	23.5	23.1	23.6	22.5	22.6	22.1	21.7	20.4	19.6	----	----	----	----	----	24.2

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.				60°					50°					40°					30°					20°
I	23.3	23.8	23.8	23.8	24.2	25.3	25.7	25.8	25.8	25.7	24.6	24.8	25.0	25.6	25.5	25.3	25.6	25.4	25.7	24.5	25.4	25.3	24.8	24.7
II	23.3	24.3	23.9	23.8	23.8	24.4	25.4	25.8	25.9	25.8	24.8	24.9	25.0	24.6	25.0	24.6	24.8	24.5	24.9	23.8	24.2	24.2	23.8	23.9
III	22.5	24.6	25.1	25.1	25.3	25.7	26.2	26.0	26.1	26.7	25.0	24.9	25.2	25.0	24.3	25.1	25.2	25.1	24.4	24.4	24.2	24.5	23.5	23.6
IV	24.9	25.2	25.7	26.1	26.3	26.5	26.8	27.1	27.1	27.2		25.3	25.2	26.5	24.6	25.2	25.4	24.7	25.3	24.9	25.0	24.5	24.6	24.9
V	26.7	27.0	27.0	26.1	26.3	27.2	27.4	27.5	27.3	26.7		26.0	25.9	26.3	26.2	25.7	26.3	26.1	26.2	25.8	24.8	24.4	25.0	25.6
VI	27.7	27.6	27.4	27.7	27.8	28.1	28.2	28.3	28.3	27.8		27.1	27.6	27.4	27.9	27.5	27.0	27.1	26.7	27.1	27.2	26.6	24.9	25.7
VII	28.2	28.3	28.3	28.9	28.5	28.2	28.3	28.9	28.9	27.8		27.3	27.0	26.8	27.0	27.0	27.1	26.8	26.8	27.2	26.7	26.5	25.9	26.4
VIII	27.9	28.8	28.3	28.0	28.3	28.3	28.3	28.3	28.4	28.4	27.6	27.9	28.1	27.4	27.9	27.7	27.3	27.2	27.8	27.3	27.4	26.8	26.1	26.2
IX	29.2	28.9	28.9	28.9	28.9	28.9	29.0	29.4	29.1	29.0		28.1	27.9	26.8	27.2	27.5	27.4	27.2	26.9	26.8	28.0	26.5	26.2	26.7
X	26.8	26.8	26.8	26.9	27.9	28.5	28.9	28.3	28.9	28.3		27.7	27.5	27.3	27.0	27.6	27.7	27.3	27.6	27.5	27.2	27.2	26.4	26.3
XI	26.8	26.8	26.7	26.4	27.0	27.3	27.4	27.4	27.8	27.8		26.7	26.9	27.1	26.3	26.1	26.1	26.8	27.3	26.8	26.8	26.4	25.9	26.1
XII	23.4	24.1	25.0	25.4	25.9	26.2	26.0	26.1	26.4	27.2		25.7	25.6	25.1	26.7	26.8	25.0	25.4	26.0	25.9	25.8	25.2	25.0	24.8

AVERAGE WIDTH OF THE TWO-

I		23.7	23.8	23.9		26.1	26.3	26.7	26.7	26.5	26.3	25.9	25.8	25.3	25.9	25.3	26.0	25.8	25.5	26.2	25.1	25.5	25.7	24.4
II		25.0	25.0	24.4		25.0	25.6	26.1	26.2	26.1	26.1	26.0	25.5		25.3	25.6	25.3	25.1	24.9	24.9	24.5	24.0	24.5	24.2
III		24.1	25.1	25.3		25.6	25.8	26.1	26.6	26.2	26.2	25.8	25.7		25.1	25.2	25.6	25.3	25.7	26.2	24.2	24.2	23.2	23.5
IV		25.4	25.8	26.2		26.7	26.8	27.1	27.2	27.3	26.7	25.6	25.1		25.7	25.9	25.0	25.4	26.0	25.5	24.8	25.1	25.0	24.8
V		26.7	26.3	26.1		27.3	27.9	27.8	27.9	26.7	27.7	26.7	26.7		26.7	27.0	26.7	26.7	26.1	25.4	25.2	26.1	26.4	25.3
VI		27.3	27.2	27.3		27.6	27.9	28.0	28.1	28.4	28.4	27.8	28.2		27.4	27.4	27.3	27.1	27.4	27.2	26.9	25.5	26.3	26.7
VII		28.1	28.3	28.5		28.2	28.3	28.3	28.2	28.3	28.4	27.8	27.5		27.4	26.7	27.2	27.3	26.9	27.3	26.9	25.9	26.5	26.6
VIII		28.3	28.6	27.8		28.5	28.3	28.3	29.0	29.1	28.9	28.1	28.4		27.7	27.4	27.3	27.5	27.7	28.1	27.2	26.5	26.5	26.4
IX		29.4	28.9	28.8		28.9	28.9	29.1	29.4	29.6	29.1	28.2	28.8		27.2	27.4	27.3	27.5	27.5	27.5	27.8	26.6	26.7	27.5
X		26.2	26.2	26.4		28.3	28.1	28.5	28.9	28.5	28.5	28.4	28.2		27.9	27.8	27.6	27.3	26.8	28.2	27.8	26.7	26.9	26.7
XI		26.7	26.7	26.2		27.7	27.9	28.1	27.8	27.1	27.7	27.1	26.8		26.8	26.8	26.8	27.7	26.8	27.1	26.9	26.2	26.5	25.8
XII		24.5	25.1	25.3		26.3	27.2	26.8	26.7	27.8	27.6	26.5	26.2		26.6	26.9	26.3	26.4	26.3	26.4	26.6	25.5	26.0	24.2

AVERAGE WIDTH OF THE TWO-

I						26.2	26.7	27.1	27.3	26.9	26.2	26.2	25.1	25.3	25.7	25.4	25.7	26.1	25.8	25.8	25.9	25.6	25.2	24.9
II						25.5	25.7	26.0	26.6	26.1	26.2	26.3	26.0	26.0	26.0	25.2	25.7	25.4	25.3	25.6	25.0	24.7	24.8	24.7
III						25.6	25.8	26.1	26.2	26.3	26.1	25.9	25.9	25.8	25.9	25.5	25.2	24.7	25.4	25.3	25.4	25.4	24.4	24.6
IV						26.6	26.7	26.7	26.9	27.1	26.3	26.3	26.2	25.8	25.8	26.0	25.6	25.7	25.8	24.8	25.8	25.6	25.4	26.3
V						27.4	28.2	28.3	28.7	29.0	28.0	26.9	27.2	26.6	27.4	26.8	26.6	26.7	26.4	26.1	25.5	25.7	25.0	26.1
VI						27.6	27.5	27.5	27.6	27.8	27.8	27.5	27.7	27.6	27.1	27.5	27.7	27.3	27.3	27.4	26.1	26.8	27.0	26.5
VII						28.3	28.3	28.1	27.9	28.3	27.5	27.4	27.5	27.3	27.3	27.2	27.4	27.6	27.5	27.2	26.6	26.5	26.9	26.6
VIII						29.1	28.8	28.3	28.3	28.3	27.5	27.9	28.0	26.9	27.2	27.4	27.8	----	27.7	28.2	26.5	26.6	27.2	26.3
IX						28.9	28.9	28.9	28.5	29.5	27.4	28.0	28.9	28.0	27.5	27.9	27.8	28.3	27.9	28.1	26.9	26.8	27.5	27.3
X						28.3	28.3	28.3	28.6	28.3	27.6	27.7	27.7	28.2	27.7	27.9	27.3	27.7	26.9	28.1	26.9	26.7	27.1	27.0
XI						28.8	28.3	28.3	28.3	28.1	27.3	27.3	27.8	27.1	27.2	27.6	27.1	27.4	27.4	27.1	26.7	27.0	26.2	26.6
XII						26.6	27.3	28.1	28.3	28.0	27.5	27.2	26.6	26.5	27.1	26.9	26.5	26.5	26.4	26.4	26.7	26.3	26.6	26.0

AVERAGE WIDTH OF THE TWO-

I			26.8	27.2	27.0	27.2	26.2	24.2	26.2	26.4	25.8	26.3	25.9	26.2	25.8	25.5	26.0	25.8	25.3	25.0	24.8	24.7	24.6	24.1
II			26.0	26.4	26.1	26.6	26.1	24.9	25.9	25.9	25.6	25.5	25.7	25.5	25.4	25.4	25.4	25.0	24.9	24.6	24.5	23.8	23.7	23.9
III			26.0	26.1	25.1	24.7	26.1	25.5	25.7	25.7	26.0	25.3	26.0	25.5	25.3	25.2	25.5	25.4	24.9	24.5	24.3	24.4	24.0	23.9
IV			26.6	26.7	26.6	26.1	26.3	25.7	25.6	26.0	25.9	26.7	26.4	26.5	25.7	26.2	26.1	25.9	25.3	24.9	24.8	24.4	24.4	24.2
V			27.8	27.7	27.2	26.7	26.7	27.6	27.1	26.7	26.8	26.9	27.0	27.2	26.6	26.7	26.5	26.5	26.6	25.5	25.4	24.9	25.0	24.7
VI			27.3	27.2	27.8	27.1	26.4	26.5	27.0	27.7	27.5	27.7	27.6	27.0	26.3	26.1	25.8	26.9	26.5	26.0	25.7	25.1	25.1	25.3
VII			28.0	27.2	27.2	27.0	26.8	27.3	27.0	27.2	27.3	27.6	27.4	27.5	26.7	26.6	26.9	26.3	25.5	26.1	26.2	25.7	25.7	25.6
VIII			28.2	27.8	28.3	27.5	27.7	27.6	26.9	26.9	27.1	28.0	27.5	27.5	26.6	26.6	28.1	28.0	27.6	26.5	26.4	26.2	26.3	26.7
IX			29.8	28.9	28.3	27.6	27.3	27.3	27.8	28.4	29.3	28.8	28.6	27.9	27.5	27.5	27.7	28.0	28.0	27.0	27.2	26.6	26.5	27.7
X			28.3	28.3	28.0	27.6	27.8	27.8	28.0	28.1	27.6	27.5	27.5	27.4	27.0	27.0	27.2	27.5	27.2	27.0	26.9	25.8	26.6	26.4
XI			28.1	28.0	28.5	27.2	27.3	27.2	27.2	27.6	27.3	27.5	27.6	27.4	26.8	26.8	27.5	27.4	27.1	25.6	26.5	26.2	26.0	26.0
XII			27.4	27.9	27.2	26.7	27.0	26.7	26.5	26.7	27.0	27.0	27.1	26.6	26.7	26.7	26.2	26.4	25.9	25.8	25.5	25.4	25.5	25.8

AVERAGE WIDTH OF THE TWO-

I			26.6	26.7	26.7	26.7	25.9	24.9	24.8	25.9	25.5	26.1	25.9	26.7	26.2	25.6	25.9	25.8	25.6	25.5	25.4	25.0	25.9	25.8
II			26.3	27.0	27.2	26.4	26.7	24.2	24.7	25.8	25.4	25.5	25.4	25.8	25.8	26.0	26.2	26.0	25.3	25.1	25.1	25.7	25.2	24.4
III			26.0	26.3	24.8	24.9	24.1	24.5	25.1	25.8	25.7	25.8	26.0	25.9	26.0	25.9	25.6	25.4	25.1	24.9	24.8	24.6	24.7	24.2
IV			27.0	27.1	26.3	26.2	25.8	25.9	25.5	25.7	25.9	26.1	26.4	26.4	26.6	26.5	26.7	26.2	25.4	25.3	25.3	24.9	25.5	24.9
V			27.2	27.7	26.8	26.5	26.5	26.2	26.5	26.5	26.5	26.4	26.4	26.7	26.9	26.4	26.3	26.5	26.0	25.7	25.7	25.3	25.4	24.3
VI			27.9	27.9	27.3	27.0	26.5	25.6	26.2	27.0	27.1	27.3	27.0	26.7	26.8	27.0	27.6	27.1	26.4	26.4	25.9	25.8	26.1	26.0
VII			27.8	27.8	27.1	26.9	26.7	26.2	27.2	26.8	27.0	27.4	27.1	26.9	26.8	27.4	28.5	26.5	26.4	26.5	26.3	25.8	26.0	26.6
VIII			28.2	27.8	27.4	27.6	28.4	27.5	25.9	26.8	27.0	27.2	27.8	27.4	26.8	26.9	27.8	27.5	27.0	26.8	26.6	26.7	27.3	27.3
IX			28.8	28.4	27.8	27.5	27.5	27.8	27.5	28.1	27.2	28.2	27.9	27.6	27.4	27.7	27.9	27.8	27.3	27.1	26.9	27.2	27.4	27.1
X			28.3	28.3	27.7	27.8	27.7	27.5	27.5	27.9	27.7	27.9	27.9	27.7	27.5	27.4	27.5	27.4	27.3	27.1	27.1	26.9	27.2	27.0
XI			27.8	27.8	26.3	27.3	27.3	26.8	26.8	27.5	27.6	28.0	28.0	27.2	27.3	27.6	27.3	27.2	26.8	26.7	26.7	27.1	27.4	26.6
XII			27.1	27.3	27.2	27.2	27.1	26.9	26.3	26.9	26.6	26.6	27.0	27.1	27.2	27.0	27.1	26.6	26.4	26.1	26.1	26.2	26.2	25.2

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 21° N. LAT.

20°					10°					0°					10°		20°	E. Long. 30°	Tm
24.5	24.0	23.6	23.2	23.0	23.2	23.3	22.7	22.6	22.7	22.6	22.3	21.5	20.8	20.2	19.3	17.8			23.8
24.1	24.1	23.4	23.0	22.8	23.1	22.7	22.7	22.9	22.4	21.8	20.8	20.6	20.1	19.5	18.9	17.1			23.4
23.4	23.2	23.1	22.7	23.1	22.6	22.8	22.6	22.5	21.9	21.3	21.4	20.8	20.5	19.6	18.9	17.5			23.6
24.3	23.8	23.6	23.1	23.3	23.0	23.1	22.8	22.0	22.2	22.3	21.2	21.2	20.6	20.0	19.0	17.3			24.0
25.9	25.8	24.2	23.9	23.9	23.5	23.5	23.1	23.1	22.7	21.7	21.7	21.5	21.3	20.5	20.1	17.9			24.7
26.0	25.2	24.9	24.9	24.1	23.8	24.0	23.9	23.9	23.7	23.6	23.4	22.7	21.9	20.7	20.1	18.2			25.6
26.3	25.6	25.4	25.4	24.5	24.8	24.5	24.2	24.4	24.5	24.0	23.5	23.3	22.8	21.9	21.2	20.4			26.0
26.0	25.5	25.9	25.8	25.4	25.0	25.0	24.7	25.0	24.6	24.3	23.3	23.7	23.7	23.7	23.3	22.8			26.4
26.9	26.8	26.3	26.3	26.7	25.6	25.4	25.6	25.9	25.5	24.9	25.4	25.1	24.7	24.3	23.6	22.1			26.9
26.7	26.5	26.2	26.2	25.9	25.1	25.4	25.4	25.2	25.2	25.6	25.4	25.0	24.6	23.9	23.3	20.7			26.5
26.0	26.1	25.4	25.2	25.3	25.3	25.1	24.9	25.0	24.7	24.5	24.3	24.3	23.7	23.0	22.1	19.3			25.8
24.9	24.5	24.2	24.2	24.3	24.5	24.7	24.0	24.0	23.8	23.7	23.3	22.9	22.0	22.1	20.6	19.7			24.7

DEGREE ZONE: 19° N. LAT.

24.1	24.2	23.9	23.8	23.7	23.3	23.1	23.1	22.7	22.8	23.0	22.7	21.5	20.9	20.6	19.6	18.6			24.2
23.2	23.8	23.5	23.6	23.0	23.1	23.3	22.9	22.8	22.3	21.2	21.5	20.9	20.4	19.5	19.3	18.2			23.7
23.7	23.5	23.3	23.1	23.2	23.0	23.1	23.0	22.8	22.5	21.4	21.3	21.0	20.6	19.8	18.8	18.5			23.8
24.0	24.0	23.4	23.8	23.8	23.4	23.4	23.1	22.6	22.9	22.6	21.8	21.3	20.7	19.9	19.4	18.7			24.3
25.2	25.3	24.4	24.5	24.3	23.7	23.8	23.5	23.4	23.1	21.9	22.3	21.8	21.4	20.5	19.4	18.7			24.9
26.1	25.3	25.2	25.1	24.5	24.1	24.1	24.2	23.7	24.1	23.8	23.1	22.4	21.5	21.0	20.4	20.6			25.6
26.0	25.9	25.7	25.9	25.3	25.0	24.8	24.0	24.0	24.7	24.2	23.8	23.5	22.7	22.2	23.2	24.0			26.1
26.5	26.2	26.1	26.3	25.7	25.5	25.0	25.1	24.7	25.2	24.4	24.3	24.4	24.3	24.3	25.2	25.7			26.7
27.0	26.5	26.4	26.5	25.9	25.6	25.8	26.3	26.2	26.3	25.9	25.7	25.5	24.9	24.9	25.5	26.1			27.2
27.0	26.5	26.4	26.3	25.9	25.6	26.3	25.3	25.9	25.8	25.3	25.8	25.2	24.9	24.8	24.7	24.4			26.7
26.2	26.2	25.8	25.5	25.4	25.3	25.0	25.0	24.6	24.9	25.0	24.8	24.5	24.0	23.6	23.2	22.5			26.0
24.6	24.9	24.9	24.9	24.6	25.0	24.4	24.2	24.5	24.1	24.2	23.7	23.0	22.0	22.1	22.0	21.0			25.1

DEGREE ZONE: 17° N. LAT.

24.9	24.5	24.4	24.5	24.2	24.0	23.5	23.3	23.1	23.3	22.2	23.0	22.0	21.7	21.2	19.8	19.2			24.5
24.5	24.0	24.0	23.5	23.4	23.3	23.5	23.0	23.2	22.5	22.7	21.8	21.4	20.9	20.5	20.4	18.6			24.1
24.3	24.0	24.2	23.7	23.4	23.4	23.3	23.3	22.8	22.6	22.2	22.1	21.5	20.7	20.3	19.3	18.9			24.0
24.9	24.3	24.2	24.5	24.0	23.9	23.4	23.3	23.1	22.9	23.0	22.3	22.0	20.9	20.5	20.4	20.3			24.5
25.2	25.0	24.8	24.6	24.2	24.2	23.4	23.7	23.3	23.0	23.5	22.8	22.3	21.9	21.3	20.3	20.3			25.2
25.6	25.7	26.1	25.1	24.7	24.3	24.0	24.0	23.8	24.0	23.9	23.7	22.9	22.1	22.0	22.9	22.9			25.8
26.2	25.9	25.9	25.4	25.1	25.3	24.6	24.6	24.2	24.6	25.2	24.4	24.2	23.0	22.9	24.8	25.3			26.2
26.9	26.2	26.5	25.7	25.8	25.9	25.8	25.5	25.3	25.3	25.8	25.4	25.1	24.7	25.1	27.0	26.7			26.8
26.9	26.6	27.0	26.4	26.2	26.8	26.5	26.2	26.6	26.8	26.7	26.4	25.9	25.6	25.8	27.2	27.3			27.3
26.5	26.6	26.3	25.9	26.2	26.1	26.7	26.8	25.5	26.1	25.8	26.1	25.6	25.7	25.7	26.5	26.2			27.0
26.6	26.2	26.1	25.9	25.8	25.5	25.2	25.9	25.1	25.3	25.8	25.3	24.9	24.7	24.7	24.7	24.4			26.5
25.4	25.3	25.4	25.6	25.5	25.6	25.5	24.7	24.6	24.8	24.5	24.1	22.8	22.9	23.1	23.2	22.5			25.8

DEGREE ZONE; 15° N. LAT.

24.2	24.1	23.7	23.7	23.6	24.0	23.0	22.8	22.3	22.9	20.0	19.6								24.7
24.0	23.7	23.4	23.6	23.3	23.4	22.4	21.9	21.4	21.4	21.1	19.4								24.3
23.7	23.5	23.6	23.4	23.3	23.1	22.5	22.1	21.6	20.9	19.0									24.3
24.1	23.8	23.6	23.4	23.3	23.8	22.8	22.6	21.5	21.4	22.0	20.9								24.7
24.6	23.8	23.8	23.9	23.6	23.9	23.3	23.2	22.3	22.2	22.0	20.9								25.3
24.4	23.7	24.0	24.3	24.5	24.8	24.1	23.6	23.0	23.0	24.6	24.8								25.7
25.0	25.2	25.0	24.7	24.8	25.4	25.4	24.7	24.2	24.4	27.1	26.8								26.2
26.4	26.3	26.4	26.1	26.0	26.4	26.1	25.9	25.7	26.4	27.3	27.1								26.9
26.8	27.0	27.2	27.2	27.1	27.1	27.0	26.5	26.1	26.7	27.2	27.4								27.6
26.8	26.8	27.6	27.3	26.0	26.4	26.4	26.3	26.2	26.6	27.5	26.6								27.2
26.4	26.0	26.2	25.9	25.7	25.6	25.7	25.4	25.2	26.2	25.8	25.3								26.7
25.3	25.0	25.2	24.5	25.1	24.9	24.6	24.0	23.9	25.1	24.0	22.8								25.8

DEGREE ZONE: 13° N. LAT.

25.3	24.6	24.4	24.1	24.4	24.4	23.8	23.4	23.3	24.0	22.5	20.6								25.1
24.4	24.1	23.8	23.9	23.8	24.5	23.2	22.7	22.8	22.0	22.2	20.3								24.8
23.8	24.0	23.7	24.1	23.8	23.5	23.1	22.9	22.2	22.0	21.1	19.1								24.4
24.2	24.2	24.2	24.1	24.1	24.1	23.5	23.4	22.4	22.3	23.7	23.9								25.2
24.8	24.6	24.1	24.5	24.6	24.7	23.9	23.9	22.9	23.0	23.7	23.5								25.5
25.7	25.2	24.5	24.5	25.3	25.3	24.5	24.4	24.0	24.8	26.3	26.3								26.2
26.7	26.6	25.6	26.0	25.7	25.7	25.8	25.1	25.5	25.9	26.5	27.0								26.6
26.8	26.8	26.7	26.4	26.2	26.5	26.5	26.4	26.4	26.9	26.7	26.7								27.0
26.9	27.0	27.3	27.5	27.3	27.6	26.9	26.9	26.7	27.1	27.1	27.1								27.5
27.0	26.2	26.9	28.0	26.2	26.6	26.8	26.7	26.6	27.2	27.7	27.1								27.3
26.3	26.3	26.2	26.5	26.3	26.1	26.2	26.2	25.8	26.8	26.7	26.3								26.9
25.2	25.2	25.5	24.9	25.1	25.7	25.0	25.2	25.4	25.2	25.4	23.5								26.1

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO

Month	70° W. Long.		60°						50°						40°						30°						20°
I		26.7	26.6	26.1	26.1	26.4	25.2		25.5	25.2	25.1	25.1	26.0	26.7	26.5	26.0	25.9	25.9	25.8	25.9	25.6	24.9	25.3
II		26.4	26.7	25.8	26.1	25.3	24.6		25.9	25.7	25.3	25.4	25.7	26.2	25.6	25.8	25.6	25.5	25.8	25.3	25.2	25.2	25.0
III		26.6	26.5	25.1	26.5	25.5			25.9	25.9	25.8	26.0	26.2	25.5	26.9	26.4	25.7	25.2	25.3	26.0	25.1	24.7	24.5
IV		27.5	27.2	26.5	26.6	27.2	26.0		25.9	25.6	25.3	25.2	26.0	26.5	26.5	26.5	26.0	25.8	25.9	26.2	25.9	25.7	24.8
V		27.8	27.8	27.1	27.8	27.1			26.8	26.3	25.8	25.9	26.5	26.9	27.3	26.7	26.5	26.2	26.4	26.6	26.1	25.7	25.8
VI		28.3	28.3	27.3	27.3	27.8			26.3	25.9	25.9	26.6	26.5	27.7	26.7	27.1	26.6	26.5	26.2	25.9	27.0	26.8	26.9
VII		27.8	27.8	27.2	27.0	26.7		27.4	26.4	26.1	25.9	26.6	27.1	28.2	27.8	27.2	26.8	26.7	26.6	26.4	27.6	26.6	26.2
VIII		27.8	27.8	27.3	27.4	26.8	25.3		27.1	26.3	26.4	26.7	27.0	27.4	26.7	27.9	27.3	27.0	27.0	26.7	26.0	27.1	27.0
IX		28.3	28.3	28.0	27.9	27.7			27.6	27.2	26.0	25.7	27.5	27.5	27.9	27.7	27.5	27.4	27.4	27.8	27.2	27.2	26.5
X		28.3	28.2	27.6	28.0	27.0			27.8	27.7	27.2	27.4	27.8	27.6	27.7	27.8	27.6	27.4	27.1	27.7	27.6	26.9	26.8
XI		27.8	27.8	27.3	27.4	27.5	26.8		27.1	27.1	26.7	26.6	27.1	27.6	27.6	27.7	27.4	27.2	27.1	27.1	28.1	27.8	27.3
XII		26.8	27.1	27.2	27.5	26.7		24.4	26.6	26.5	26.3	26.2	26.7	26.7	27.8	27.2	26.6	26.5	26.4	28.2	28.0	27.6	25.4

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.		60°						50°						40°						30°						20°
I			26.8											26.4	26.5	25.8	26.1	26.0	25.9	25.9	26.1	25.8	25.6
II			25.6											26.2	26.2	25.4	25.9	25.6	26.1	26.1	26.1	25.5	25.3
III			26.1											26.5	25.8	26.1	25.9	25.8	25.4	25.3	26.4	26.8	26.0
IV			27.8											26.2	26.2	26.0	26.3	26.3	26.4	26.6	26.2	25.9	27.4
V			27.9											26.5	26.8	27.1	26.6	26.8	26.9	26.8	26.8	26.9	26.8
VI			28.4											26.7	26.7	26.0	26.9	26.7	26.4	26.9	27.0	27.3	27.2
VII			27.8										26.7	27.3	27.0	26.8	27.0	27.1	26.8	27.3	27.8	28.6	27.0
VIII			28.2											27.1	26.7	26.4	27.2	27.3	28.3	28.3	27.1	27.2	27.5
IX			28.1	27.7										27.6	27.6	27.6	27.6	27.9	27.6	27.8	27.8	27.8	27.2
X			28.9	27.7										27.9	27.5	27.6	27.5	27.5	26.7	27.3	28.1	27.7	27.4
XI			27.6	27.2										27.4	27.2	27.4	27.3	27.2	28.0	27.9	27.7	28.2	27.5
XII			26.7										26.5	26.7	27.0	26.7	26.7	26.5	26.5	26.9	26.8	27.5	28.0

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.		60°						50°						40°						30°						20°
I														26.0	26.7	26.2	26.2	26.5	26.3	26.3	26.0	26.8	26.1
II														26.3	26.2	26.1	26.1	26.0	25.8	25.7	26.7	27.0	26.5
III															26.1	26.1	26.4	26.5	26.3	26.4	26.0	26.5	27.0
IV															26.2	26.3	26.6	26.7	26.5	26.7	26.7	26.7	26.3
V															26.6	26.6	26.8	27.4	27.2	26.8	26.7	27.2	26.7
VI															26.4	26.7	27.0	27.0	27.1	26.8	26.8	26.5	27.2
VII															26.8	26.9	27.3	27.1	27.1	27.6	27.6	27.9	27.7
VIII															27.0	27.0	27.3	28.0	28.7	27.8	28.0	27.6	27.3
IX															27.3	27.3	27.5	27.7	27.5	27.5	27.8	27.6	28.0
X														27.5	27.3	27.0	27.4	27.4	27.6	26.8	27.3	28.4	28.0
XI														26.7	27.1	27.0	27.3	27.5	27.5	27.9	27.5	28.5	27.1
XII														27.8	26.8	26.6	26.5	27.0	27.1	27.2	26.4	26.7	27.1

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.		60°						50°						40°						30°						20°
I		26.0	24.9	26.7	26.5	26.5	26.8	26.6	26.6	26.9	27.3	26.8	26.5	26.2	26.3	26.6	26.8	26.9	27.3	27.6	27.7	27.7	27.8
II		25.6	26.4	26.2	26.4	26.3	26.5	26.6	26.6	26.6	26.5	26.5	26.2	26.1	26.5	26.7	26.6	27.6	27.3	27.8	27.9	28.1	28.3
III			27.5	28.8	26.2	26.4	26.8	26.7	26.7	27.0	26.2	25.2	26.3	26.3	26.7	27.2	27.1	27.3	27.6	28.2	27.8	27.9	28.2
IV		26.8	27.1	27.0	26.8	26.7	27.2	27.0	26.5	26.8	26.9	26.9	26.5	26.5	26.9	27.2	27.2	27.3	28.0	28.0	28.5	28.5	28.4
V			27.9	27.3	27.8	27.0	26.6	26.9	27.7	27.7	26.9	27.1	27.1	26.8	26.9	27.2	27.3	27.3	28.0	29.0	28.5	28.0	27.3
VI		26.6	26.8	27.3	27.0	26.9	27.0	28.5	27.7	27.0	27.6	27.2	26.8	26.7	26.9	27.0	27.3	27.3	27.4	27.1	27.0	26.8	26.9
VII			27.0	26.6	26.7	26.9	27.0	27.3	27.5	27.4	26.9	26.9	26.5	26.7	26.5	26.6	26.6	26.5	26.1	26.2	25.3	25.6	25.3
VIII		27.0	27.1	28.3	27.7	28.0	27.0	26.2	26.9	27.2	27.6	27.0	26.7	26.4	26.3	26.4	26.4	26.2	25.8	25.8	25.8	25.4	25.1
IX			27.1	26.5	27.1	27.1	27.0	27.2	27.5	27.0	26.6	27.6	26.2	26.4	26.4	26.8	26.7	26.5	26.1	25.9	26.0	25.8	25.4
X			27.0	27.4	27.2	26.9	27.3	27.4	27.3	26.5	26.7	27.0	26.1	26.8	27.0	27.1	27.2	27.0	26.9	26.8	26.5	26.6	26.1
XI			27.5	27.1	27.2	27.3	27.3	27.5	27.0	27.3	26.5	27.0	26.0	26.6	27.0	27.1	27.1	27.1	27.3	28.3	27.3	27.0	26.8
XII			27.2	26.8	26.8	27.0	27.1	27.0	27.5	27.6	27.0	26.9	26.3	26.5	26.7	26.9	26.7	27.0	28.3	27.8	27.5	27.4	27.7

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.		60°						50°						40°						30°						20°
I				26.6	25.8	26.8	26.6	26.9	26.8	26.9	27.2	27.1	26.4	26.5	26.8	26.7	26.7	26.8	27.4	27.5	27.4	27.7	27.6
II				26.7	26.8	27.0	26.6	26.8	26.9	27.5	27.0	26.7	26.2	26.2	26.8	27.2	27.2	27.6	27.9	26.9	26.1	27.9	28.0
III				27.0	27.2	27.0	26.7	26.5	26.6	26.8	27.1	27.4	26.4	26.4	27.2	27.3	27.5	27.4	27.8	28.1	28.4	28.0	28.3
IV				27.8	27.0	27.0	27.0	27.0	27.1	26.9	26.8	27.1	26.9	27.0	27.3	27.4	27.6	27.9	28.0	28.3	28.3	28.1	28.5
V				27.7	27.7	27.4	26.7	26.6	27.3	27.6	27.3	27.0	27.2	27.1	27.3	27.4	27.6	27.5	27.1	27.5	27.4	28.1	28.0
VI				26.8	27.1	27.2	26.4	26.7	27.1	28.0	27.7	26.8	26.7	26.6	27.0	27.0	26.9	27.1	27.0	26.7	26.7	27.3	26.2
VII				26.7	27.0	26.1	26.2	27.0	27.1	26.8	26.8	26.4	26.1	26.2	26.1	25.8	25.8	26.1	25.6	24.8	24.8	24.9	24.9
VIII				27.8	27.0	27.3	27.5	26.7	26.6	26.8	26.7	27.0	26.1	25.9	25.7	26.1	25.6	25.4	24.8	24.9	24.9	24.7	24.5
IX				26.8	27.0	26.1	26.7	27.0	26.6	26.7	26.5	26.7	26.1	25.9	25.8	26.1	26.0	26.0	25.9	25.9	25.1	25.2	25.3
X				26.9	26.8	27.0	26.7	26.8	27.5	26.1	26.6	26.5	26.4	26.4	26.9	26.7	26.4	26.3	26.3	26.5	26.7	26.4	26.0
XI				27.8	27.1	27.0	27.4	27.4	27.5	27.4	27.3	27.1	26.2	26.5	26.8	26.9	26.6	26.4	26.9	27.2	26.7	26.7	27.1
XII				26.9	27.2	27.0	27.1	27.2	27.4	27.5	27.9	27.4	26.4	26.5	26.7	26.7	26.6	26.5	27.9	26.7	27.2	27.2	26.9

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 11° N. LAT.

20°					10°					0°			10°			20°		E. Long. 30°	Tm
25.5	25.4	25.1	24.9	24.7	25.0	24.5	24.0	25.0	25.4	24.1	23.2								25.4
25.0	24.8	24.7	24.6	24.5	24.5	23.9	23.3	23.9	24.8	22.8	23.6								25.1
25.0	24.7	24.6	24.6	24.9	24.4	23.6	23.7	23.5	23.4	23.7	20.7								25.1
25.1	24.5	24.8	24.9	24.9	24.8	24.2	23.9	24.0	23.8	25.5	25.7								25.6
25.2	25.3	25.1	24.9	25.3	25.3	24.5	24.3	24.3	24.4	25.5	25.7								26.0
26.4	25.7	26.1	25.2	25.5	25.8	25.2	25.1	25.8	26.7	26.6	27.1	27.4							26.6
27.3	26.5	26.9	26.5	26.7	26.0	26.1	26.2	26.5	26.4	26.7	26.7	26.9							26.7
25.9	27.1	26.4	26.6	25.5	26.4	26.5	26.2	26.3	26.5	26.2	26.1	26.9							26.7
26.7	26.6	26.9	27.7	27.8	27.4	26.9	26.7	26.9	26.7	26.7	26.5	26.2							27.2
27.1	27.2	27.3	27.6	27.3	26.6	26.9	27.1	27.3	27.4	27.8	27.0	26.4							27.4
27.0	26.7	26.3	27.7	26.9	26.6	26.5	26.6	26.7	27.6	27.1	27.2	26.8							27.2
25.8	25.5	25.5	25.7	25.3	26.0	25.7	25.7	26.9	25.3	26.5	26.4	26.5							26.4

DEGREE ZONE: 9° N. LAT.

25.4	25.5	25.6	25.7	25.6	25.3	25.3	25.1	25.7	25.9	26.2	25.6	26.8	27.6						25.9
26.0	26.2	25.3	25.1	25.4	25.0	24.8	24.8	25.6	26.7	24.5	25.5	26.1							26.7
25.3	24.8	25.5	25.2	26.3	25.1	24.8	24.7	25.0	25.0	24.4	24.4	25.3							25.5
26.3	25.7	25.3	25.4	25.6	25.4	25.1	25.2	25.1	25.4	25.1	25.6	27.2							26.0
25.8	25.8	26.3	25.8	25.8	25.9	25.6	25.5	25.4	25.6	26.7	26.8	27.3							26.4
27.0	27.5	26.4	26.7	26.0	25.9	26.2	26.3	26.8	26.9	27.1	27.4	27.1	26.6						26.8
27.1	27.2	27.4	26.8	26.5	26.2	26.3	26.4	26.5	26.3	26.3	26.4	26.3	26.3						26.9
26.7	26.7	27.1	27.0	26.6	26.4	26.4	26.2	26.3	26.3	25.9	25.8	25.9	26.6						26.8
27.5	27.4	27.6	26.7	27.6	26.8	26.8	26.9	26.8	27.0	26.8	26.4	26.1	26.0						27.2
28.0	27.5	27.2	27.0	27.3	27.2	27.1	26.9	27.4	27.6	28.1	27.2	26.7	26.5						27.5
28.0	27.7	27.2	26.9	27.0	26.7	26.8	26.9	27.3	27.6	27.5	27.6	27.4	27.2						27.4
27.0	26.5	26.5	25.9	26.1	25.8	26.3	26.5	26.8	26.8	27.3	27.3	28.0	27.7						26.8

DEGREE ZONE: 7° N. LAT.

25.4	25.9	26.2	25.7	26.0	25.9	25.7	26.2	26.8	26.6	27.3	27.2	27.4	27.8	27.5					26.4
26.3	26.1	26.7	25.2	26.0	25.7	25.6	25.8	26.1	27.1	26.8	27.1	27.7	27.4						26.3
26.8	25.3	25.1	25.8	26.0	25.9	25.9	26.2	26.1	26.1	26.3	26.8	26.8	27.8	27.8					26.3
27.1	26.4	26.2	26.0	26.1	26.2	26.2	26.5	26.5	26.7	27.6	27.1	28.0	28.4						26.7
26.8	26.5	26.4	26.7	26.4	26.4	26.5	26.5	26.6	27.2	27.9	28.0	27.8	27.6						26.9
27.0	27.0	27.0	26.7	26.9	26.4	26.6	27.0	27.1	27.3	27.0	27.6	27.3	27.2	27.1					26.9
27.5	27.2	27.1	26.7	26.8	26.4	26.4	26.5	26.5	26.3	26.2	26.1	26.0	26.2	25.7					26.8
27.8	27.6	27.5	27.1	26.8	26.5	26.2	26.4	26.4	26.2	26.1	25.7	25.6	25.8	26.0					26.9
27.9	27.8	27.8	27.5	27.4	26.7	26.6	26.9	26.9	26.7	26.0	26.3	25.9	25.7	25.3					27.1
27.7	28.0	27.3	27.5	27.5	27.0	27.1	27.3	27.3	27.1	27.0	27.8	26.9	25.9	26.5					27.3
28.0	27.8	27.2	27.0	27.0	26.7	26.9	27.1	27.3	27.7	27.6	28.2	27.6	27.2	26.8					27.4
28.0	27.2	26.1	25.5	26.3	26.2	26.4	26.9	27.0	27.0	27.5	27.7	27.8	28.1	27.8					27.0

DEGREE ZONE: 5° N. LAT.

27.6	27.8	27.8	27.8	26.7	27.5	28.0													27.0
27.2		26.7	26.7	27.2	27.8	27.8	28.3												26.9
28.0	27.2	28.1	28.1	27.8	28.0	28.3	28.4	28.0											27.3
28.0	28.2	27.8	27.7	27.5		28.0													27.4
27.7	27.7	28.3	28.3	28.5	27.9	28.3	28.6												27.6
26.2	26.9	26.8	26.3	26.4	25.9	*25.8	25.0												26.8
25.4	25.3	24.8	24.4	24.9	25.6	24.7													26.1
25.2	*25.1	24.2	24.0	23.8	24.0	25.0	23.0												25.8
25.2	*24.3	23.1	23.2	22.1	23.1	24.9	25.2	25.3	25.5										25.6
26.0	*24.7	24.1	24.6	25.1	25.0	25.8	26.0	25.7	26.2										26.3
26.8	*26.2	26.4	26.5	26.0	26.4	27.1	27.1	26.9	26.8										26.9
27.5	27.2	27.2	27.2	27.2	27.2														27.1

DEGREE ZONE: 3° N. LAT.

27.5	27.4	27.2	27.5	26.8	26.9	27.3	27.9	28.0											27.1
27.9	27.4	28.0	28.2	27.8	27.8	28.3	28.3	28.3	27.8										27.3
28.3	28.3	28.5	28.2	28.3	28.3	28.3	28.6	28.5	28.5										27.6
28.1	28.4	28.5	27.8	27.9			28.0												27.6
28.1	27.6	28.1	28.3	28.5	28.2	28.2	28.1	28.5											27.6
25.9	26.7	26.9	27.2	27.1	27.4	27.0	26.9	25.5											26.9
24.6	24.6	24.3	25.2	25.5			28.0	28.0											26.0
23.3	24.5	24.3	24.5	25.0	25.0	25.6	23.9	24.6	25.1										25.6
24.9	24.9	24.8	24.7	24.5	24.8	25.0	24.7	25.1	25.4										25.7
25.8	25.5	25.4	25.0	25.6	26.0	26.0	26.0	25.3	26.4										26.3
26.3	26.4	26.2	26.2	26.6	26.8	26.5	26.3	26.9	26.5										26.8
27.1	27.2	27.4	27.3	27.7	28.0	27.9	27.1	28.2	27.7										27.2

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°					20°
I		26.7	26.6	26.5	26.3	26.7	27.2	27.1	26.8	27.2	26.2	26.5	26.8	26.3	26.3	26.5	26.8	27.0	27.4	27.1	27.0	
II		26.8	26.4	27.0	26.9	27.5	27.0	27.1	27.1	26.9	26.3	26.5	26.5	27.0	27.3	27.4	27.6	26.7	25.3	26.2	27.4	
III		28.2	29.0	29.0	27.4	27.1	26.7	26.9	27.1	27.1	26.7	26.7	27.2	27.3	27.4	27.3	28.5	27.5	26.8	27.9	27.9	
IV		27.8	27.4	27.0	27.7	27.3	27.1	27.7	26.9	27.1	27.1	27.2	27.3	27.5	27.6	27.7	28.2	28.6	28.1	28.3	27.6	
V		27.8	27.6	27.7	28.2	27.8	27.2	27.0	27.5	27.6	27.0	27.1	27.1	27.1	27.1	27.3	27.1	27.1	27.5	27.0	27.2	
VI		28.0	27.4	26.9	27.5	27.3	26.7	26.8	27.3	26.4	26.3	26.3	26.5	26.7	26.0	25.7	26.8	25.5	24.8	22.9	25.7	
VII		28.0	26.7	26.1	26.0	25.7	26.0	26.4	27.1	26.1	25.7	26.1	25.6	25.2	25.0	25.0	24.8	25.3	23.2	22.0	23.3	
VIII		28.0	28.3	26.0	26.6	26.3	26.6	25.8	26.2	26.5	25.5	25.4	25.3	25.0	24.5	24.3	24.0	23.7	24.1	23.3	24.2	
IX		27.0	26.7	26.8	26.3	26.2	26.5	25.9	26.1	26.8	25.4	25.4	25.3	25.4	25.2	25.3	25.0	24.7	24.6	23.8	24.0	
X		27.1	26.5	26.6	26.6	26.4	26.6	26.9	26.7	25.8	25.7	26.0	26.3	25.8	25.8	25.6	25.5	25.9	27.0	25.7	25.3	
XI		28.9	28.9	27.1	26.7	26.8	27.1	27.1	26.4	25.9	25.9	26.1	26.3	26.2	25.8	25.9	25.6	25.6	25.0	25.6	25.6	
XII		27.8	26.1	26.7	27.1	27.0	27.0	26.9	27.9	27.5	26.0	26.4	25.6	26.4	26.2	25.9	26.5	27.0	26.0	26.1	26.7	

[1] Intermediate values, which were introduced to determine upwelling. They were accounted for in the means, although they were not included in this table.

AVERAGE WIDTH OF THE TWO-

I			27.3	27.2	27.0	25.9	26.3	26.4	26.7	26.8	26.3	26.6	26.2	26.1	26.0	25.9	26.3	26.3	26.7	26.5	26.4	
II				27.3	27.1	27.1	27.4	26.9	26.8	27.0	26.6	26.3	26.4	27.0	27.0	27.0	26.9	27.8	25.1	25.0	26.2	
III				27.5	27.4	28.2	27.4	27.2	27.7	27.3	26.7	27.3	27.2	27.2	27.3	27.3	27.5	27.7	26.5	26.1	26.8	
IV				28.0	27.2	27.1	27.6	27.1	27.7	27.5	27.2	27.5	27.4	27.6	27.5	27.6	27.3	27.0	26.9	27.8	27.8	
V				27.6	27.4	27.7	27.9	28.0	27.6	27.3	27.0	26.9	26.9	27.0	26.6	26.9	26.2	26.3	26.6	26.4	26.3	
VI				28.0	27.7	27.3	27.1	26.9	26.3	26.3	26.1	26.2	26.2	26.1	25.5	25.4	25.0	25.9	24.5	24.2	24.1	
VII			27.7	27.6	26.3	25.2	25.3	26.2	25.7	25.9	25.7	25.3	24.9	24.8	24.2	24.5	24.1	23.7	21.4	22.0	21.5	
VIII			27.9	26.7	26.3	26.0	26.2	25.7	25.9	25.3	25.3	25.2	24.4	24.4	24.2	23.9	23.5	23.0	24.2	22.2	22.3	
IX				26.7	26.0	26.2	25.7	25.8	25.4	25.4	25.2	25.3	24.9	24.8	24.8	24.5	24.5	24.2	23.6	22.3	23.3	
X				27.5	26.8	26.3	26.4	26.0	26.1	25.8	25.5	25.6	25.4	25.5	25.1	25.3	25.1	24.9	24.9	21.4	24.4	
XI			27.9	24.7	26.9	26.5	26.0	25.9	26.7	26.3	25.7	25.9	26.0	25.7	26.1	25.2	25.6	25.3	25.3	25.2	24.9	
XII				27.2	26.8	26.3	26.7	26.8	26.6	26.6	26.1	26.2	25.8	26.1	25.8	25.7	25.7	26.3	26.0	25.9	25.7	

AVERAGE WIDTH OF THE TWO-

I		27.2	26.9	26.5	26.3	26.3	26.4	26.3	26.7	26.3	26.0	25.9	26.5	26.2	26.0	25.9	24.9	25.9	25.1	26.0	26.8	
II	27.0	27.0	27.3	27.2	26.6	26.9	26.8	26.9	26.4	26.9	27.1	26.8	27.0	27.5	26.7	26.5	26.6	26.7	26.5	26.9	26.7	
III			27.2	27.4	27.1	27.0	27.5	27.3	27.5	27.4	27.3	27.4	27.7	27.8	27.8	27.5	27.4	27.7	28.5	28.3	28.7	
IV	27.4	27.1	27.6	27.9	27.3	27.2	27.7	27.6	27.6	27.6	27.6	27.5	27.2	27.5	28.1	27.6	28.4	27.9	27.6	27.8	27.7	
V		27.4	27.6	27.8	27.0	27.1	27.2	27.1	27.2	27.0	26.8	27.0	26.6	26.1	26.3	26.2	25.8	26.3	26.3	27.9	27.8	
VI	27.2	26.6	26.9	26.9	26.3	26.3	26.4	26.5	26.2	26.2	26.0	25.7	25.6	24.7	24.8	24.9	24.5	24.8	23.6	23.3	26.1	
VII	26.8		25.5	25.8	25.8	25.9	25.3	25.3	25.0	24.4	24.6	24.8	24.7	25.1	23.0	23.9	22.4	22.5	22.3	21.6	21.9	
VIII	26.4	26.2	25.9	25.9	25.4	25.2	25.4	24.7	24.7	24.4	23.9	23.9	23.6	23.2	23.1	22.1	23.8	22.7	22.0	22.6	21.4	
IX		25.1	25.7	25.9	25.3	25.2	25.3	25.1	24.8	24.7	24.4	24.3	24.1	23.6	23.3	22.5	22.5	23.0	22.7	22.0	22.9	
X	27.2 26.8	26.0	25.6	26.1	25.6	25.8	25.5	25.4	25.3	25.4	25.0	24.8	24.5	24.3	24.1	24.1	24.8	23.9	23.7	23.9	24.3	
XI		26.4	26.0	25.8	25.8	25.8	26.0	26.0	25.6	26.4	25.8	24.9	24.8	24.9	24.6	24.2	24.8	24.8	24.2	24.4	25.5	
XII			26.3	26.1	25.9	26.0	26.1	26.1	26.1	26.3	25.3	25.4	25.3	25.7	25.4	25.2	25.1	24.8	25.0	24.9	25.1	

AVERAGE WIDTH OF THE TWO-

I				26.9	26.6	26.5	26.2	26.1	26.3	26.1	26.3	25.7	25.6	26.4	25.6	25.4	25.2	26.0	25.5	25.0	25.2	
II			27.1	27.1	26.8	26.6	26.7	26.8	26.9	26.9	26.4	26.8	26.6	26.9	26.6	26.2	26.2	26.1	26.8	26.5	27.2	
III				27.2	27.1	27.2	27.5	27.5	27.5	27.9	27.0	27.2	27.1	27.3	27.0	27.0	26.9	27.0	27.2	27.1	26.8	
IV			27.1	27.4	27.3	27.5	27.5	27.6	27.5	27.7	27.7	27.5	27.4	27.1	28.2	28.1	27.6	27.6	27.4	26.7	27.1	
V				27.4	27.1	27.1	27.4	27.2	27.2	27.0	27.1	26.8	26.9	26.7	26.0	25.7	25.4	25.9	25.9	25.2	25.5	
VI				26.4	26.4	26.5	26.9	26.7	26.5	25.7	26.7	26.4	26.3	26.1	26.0	25.1	25.7	25.4	24.9	24.2	23.9	
VII				26.0	25.9	25.9	25.7	25.8	25.3	25.3	25.2	25.0	25.2	25.1	24.9	25.1	24.5	22.2	23.6	23.3	23.5	
VIII				25.4	25.4	25.4	25.3	25.1	24.9	24.7	24.2	24.4	24.3	23.7	23.6	21.3	22.7	23.1	22.7	22.1	22.4	
IX				25.4	25.4	25.4	25.4	25.0	24.7	24.5	23.9	24.4	24.1	23.4	23.5	23.4	22.7	22.9	22.8	22.5	22.1	
X				25.7	25.6	25.7	25.5	25.2	25.1	25.0	24.6	24.6	24.2	23.9	24.2	24.0	24.3	24.1	23.5	23.3	23.3	
XI				26.0	25.7	25.8	25.9	25.9	25.5	26.1	25.0	24.8	24.5	24.3	24.1	23.6	23.9	24.5	23.8	23.4	24.5	
XII				26.7	26.0	26.2	26.0	26.0	26.2	26.1	24.8	25.2	25.2	25.2	25.0	24.9	24.6	24.4	24.5	24.1	24.2	

AVERAGE WIDTH OF THE TWO

I				26.8	26.5	26.3	26.5	26.0	26.3	26.0	25.8	25.9	25.4	25.0	25.4	24.3	24.0	24.3	24.7	24.9	24.4	
II				27.1	26.7	26.9	26.8	26.1	26.9	26.9	26.5	26.1	26.4	26.2	26.5	26.0	25.6	26.1	25.8	26.7	26.2	
III				27.2	27.2	27.4	27.4	27.4	27.6	27.1	26.9	26.3	26.8	26.7	26.8	26.6	26.8	26.5	26.9	26.9	26.0	
IV				27.2	27.3	27.5	27.5	27.3	27.5	27.4	27.5	27.7	27.3	27.0	26.8	27.0	27.6	26.8	27.3	26.5	26.0	
V				27.0	27.0	27.3	27.3	27.4	27.0	27.1	27.5	26.9	26.7	26.5	26.1	26.0	25.7	25.9	25.9	25.7	24.8	
VI				26.3	26.4	26.7	26.9	26.8	26.5	26.4	26.2	26.5	26.3	26.0	25.6	26.2	25.7	25.4	25.3	25.0	24.0	
VII				25.5	25.8	25.7	26.0	26.2	26.2	25.5	24.9	24.9	25.4	25.0	24.4	24.1	23.8	23.3	24.0	23.4	22.8	
VIII				25.4	25.4	25.4	25.1	25.1	24.7	24.8	24.4	24.5	24.2	24.0	23.5	23.3	21.8	22.8	22.7	22.6	21.9	
IX				25.3	25.3	25.5	25.2	24.8	24.8	24.2	23.1	24.4	24.0	23.9	23.3	23.0	22.9	22.8	22.9	22.4	22.1	
X				25.7	25.6	25.6	25.4	25.3	25.0	24.5	24.4	24.5	24.1	23.8	23.1	23.0	23.1	23.2	23.2	22.8	22.2	
XI				25.9	25.9	25.9	26.0	25.5	24.6	25.3	25.1	24.6	24.3	23.9	24.2	23.0	23.0	23.1	23.6	23.0	22.1	
XII				26.4	26.2	26.3	26.1	26.0	25.8	25.8	25.3	24.8	24.5	24.6	24.5	24.3	24.0	24.3	23.4	23.8	23.7	

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 1° N. LAT.

20°					10°					0°					10°					20°					E. Long. 30°	Tm
26.8	27.1	27.2	27.0	26.8	28.0	27.3	27.1	27.6																		26.9
27.8	27.9	27.5	27.7	27.0	28.0	28.0	27.2	28.0																		27.0
28.0	27.9	28.0	28.1	28.5	28.7	28.3	27.9	29.0	27.9																	27.8
28.1	27.9	28.1	27.9	27.8	28.0	27.4	28.0	28.0																		27.7
27.5	27.3	27.7	27.7	28.0	27.5	27.7	28.0	28.1	27.8																	27.5
24.6	24.3	24.6	25.8	24.7	26.2	26.6	26.9	25.8	25.5																	26.1
21.6	23.5	24.6	23.8	23.4	24.5	24.8	24.6	26.0	26.0																	25.1
23.1	22.1	22.9	23.3	25.0	24.4	23.5	25.0	25.3	25.0																	25.0
23.8	24.1	24.2	24.4	24.5	24.6	24.9	25.0	24.0	24.1																	25.2
24.5	24.6	25.3	25.3	25.5	25.5	25.5	25.5	25.5																		25.9
25.5	25.4	25.9	25.8	25.9	26.3	26.9	26.3	26.0	26.0																	26.3
26.7	26.9	26.8	26.8	26.8	26.6	27.4	27.8	27.6	27.0																	26.8

DEGREE ZONE: 1° S. LAT.

26.5	25.9	26.3	26.8	26.7	26.6	26.6	26.3	26.9	26.8																	26.5
27.3	26.5	27.8	27.1	27.2	27.4	27.2	27.8	27.6	28.1																	26.9
27.4	27.7	28.3	27.7	27.9	28.0	28.2	27.8	27.5	27.3																	27.6
27.8	27.5	27.1	27.4	27.4	27.6	27.6	27.5	28.0																		27.5
26.3	26.9	26.7	26.5	26.0	26.6	26.7	26.5	26.9																		26.9
24.3	23.7	23.9	24.4	24.4	24.4	24.8	24.5	24.5	22.5																	25.4
21.9	21.2	23.7	25.6	24.1	22.9	22.2	21.3	23.0																		24.2
22.7	22.2	21.8	21.5	21.9	23.5	23.5	23.0	25.3																		24.2
22.9	22.6	22.6	23.3	23.5	23.8	23.9	24.4	23.7																		24.5
24.3	23.7	24.1	24.7	25.0	24.9	25.4	25.6	25.9	26.0																	25.3
24.8	24.7	25.2	25.4	25.5	25.7	25.3	25.3	26.2	25.2																	25.7
24.5	25.9	26.1	26.5	26.3	26.3	26.6	26.0	26.9	26.8																	26.2

DEGREE ZONE: 3° S. LAT.

26.7	26.9	26.9	26.8	26.4	26.8																					26.4
27.0	26.9	27.2	27.2	27.5																						26.9
28.0	27.9	27.8	27.5	27.2																						27.6
27.6	27.2	27.5	27.6	27.8																						27.6
27.0	26.2	25.9	26.0	26.1	26.3																					26.9
24.1	24.0	23.9	23.5	23.2	21.5																					25.2
22.2	23.3	22.3	21.3	21.6																						23.9
21.1	21.4	22.0	22.0	24.9																						23.8
23.2	23.2	23.2	23.4	23.4																						24.0
24.5	24.6	24.5	24.6	25.3																						25.0
25.1	25.2	25.7	25.6	25.7																						25.3
25.8	26.2	26.2	26.9	25.2	24.0																					25.6

DEGREE ZONE: 5° S. LAT.

25.3	26.0	26.4	26.8	27.1	26.4	25.3																				26.0
27.2	27.5	27.2	27.1	27.0	26.9	26.2																				26.8
27.5	27.5	27.8	28.1	28.0	27.5																					27.3
27.8	27.5	27.0	27.8	27.6	27.6																					27.5
25.6	26.2	26.6	26.9	26.1	26.1																					26.5
22.7	23.1	25.0	24.0	23.8	22.8	22.8																				25.2
23.5	22.9	23.3	22.9	22.5	21.0	20.6																				24.2
21.2	20.2	21.2	21.3	22.0	21.5	20.4																				23.2
21.6	22.7	23.1	23.2	22.9	22.7																					23.7
24.5	24.7	24.8	24.7	24.9	25.2																					24.6
24.6	25.0	24.4	25.2	25.6	25.7																					24.9
24.7	25.1	26.2	26.3	26.5	25.5	24.8																				25.4

DEGREE ZONE: 7° S. LAT.

25.0	26.0	25.5	25.5	25.6	26.0	24.8																				25.5
26.4	27.1	27.2	27.2	27.1	27.0	27.2																				26.6
27.1	27.0	26.9	27.9	28.2	27.7	26.7																				27.1
26.8	26.9	26.4	26.9	27.7	27.8	27.1																				27.1
24.5	25.1	25.9	26.1	25.6	25.0	25.7																				26.3
23.6	22.7	22.8	23.2	25.1	23.4	22.1																				25.2
23.4	23.5	22.9	22.2	22.8	21.6	21.7																				24.2
22.0	20.9	20.6	20.5	20.7	19.9	20.8																				23.2
21.2	21.5	21.6	21.7	22.6	22.4	23.2																				23.4
22.0	23.7	23.2	22.9	24.1	25.0	25.7																				24.0
23.6	24.1	24.2	24.4	25.3	26.0	26.1																				24.5
23.8	24.0	24.9	25.5	26.1	26.1	25.3																				25.0

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO

Month	70° W. Long.	60°					50°					40°					30°					20°
I				26.6	26.8	26.4	26.1	26.1	26.5	25.8	26.3	25.7	25.2	24.7	24.4	24.7	24.6	24.7	24.5	24.7	24.5	
II				26.9	26.9	27.0	26.7	26.9	26.3	26.5	26.3	26.1	25.5	25.6	25.5	25.7	25.1	24.9	25.1	24.9	25.1	
III				27.1	27.2	27.4	27.3	27.3	27.3	26.9	27.2	26.8	26.3	26.2	26.1	26.3	26.1	26.0	25.5	26.2	26.0	
IV				27.1	27.6	27.4	27.3	27.0	27.1	26.8	26.9	26.9	27.0	26.6	26.4	26.2	26.2	25.8	25.9	26.0	26.2	
V				26.8	27.0	27.3	27.0	27.2	26.8	27.0	26.8	26.9	26.3	25.3	26.0	25.8	25.2	24.7	26.1	25.2	24.4	
VI				25.9	26.4	26.8	26.6	26.4	26.6	26.7	26.8	25.5	25.9	26.8	25.3	25.0	25.6	25.1	24.3	24.1	24.1	
VII				25.3	25.7	25.8	25.8	26.1	25.2	25.3	25.9	25.2	24.6	24.8	24.4	24.2	23.1	22.3	24.6	23.0	23.1	
VIII				25.0	25.5	25.2	25.0	25.0	24.8	25.2	24.5	24.6	24.5	23.8	23.6	23.1	22.3	21.8	22.3	22.3	21.8	
IX				25.1	25.4	25.3	25.0	24.8	24.4	23.3	23.6	24.3	24.3	23.3	23.1	22.7	22.4	22.2	22.3	22.1	21.8	
X				25.9	25.8	25.6	25.4	25.2	24.9	24.7	24.5	23.7	23.5	23.7	23.2	22.5	21.9	21.9	22.3	22.2	21.7	
XI				25.8	26.0	25.9	26.0	24.9	24.4	25.1	24.8	24.4	24.0	23.6	23.5	23.8	22.3	22.0	24.0	22.4	21.8	
XII				26.2	26.5	26.4	26.2	25.9	25.3	24.9	24.9	25.0	24.5	23.8	23.8	23.4	23.4	23.5	22.8	23.0	23.6	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°					20°
I			27.0	26.5	26.7	26.2	25.8	25.6	25.1	25.7	25.3	25.4	24.9	24.4	24.1	23.8	24.1	23.5	23.3	24.1	23.2	
II			27.3	26.8	27.0	26.8	26.7	26.1	26.7	26.2	26.2	26.1	25.8	25.0	25.2	25.0	24.6	24.4	24.5	24.5	24.5	
III			27.3	27.0	27.3	27.1	27.2	27.1	25.2	26.9	26.6	26.2	26.6	26.1	25.6	25.6	25.5	25.5	25.4	25.0	25.5	
IV			27.0	27.1	27.3	27.2	27.0	26.9	26.8	26.6	26.4	25.9	26.5	26.3	26.0	25.7	25.2	25.3	25.3	26.2	25.3	
V			26.9	26.5	26.8	26.9	26.9	26.9	26.8	26.7	26.3	25.9	25.6	25.6	25.4	25.0	24.6	24.5	24.2	24.3	23.9	
VI			25.6	25.8	26.6	26.5	26.2	26.1	25.7	25.4	26.4	26.1	26.0	24.8	24.8	24.3	24.1	24.5	23.1	23.1	23.4	
VII			25.0	25.1	25.3	25.7	25.7	25.6	24.7	24.1	24.4	25.0	25.1	24.1	23.9	23.3	22.8	22.7	22.0	22.9	22.1	
VIII			24.6	24.9	25.6	24.8	24.8	24.6	24.5	25.6	24.3	23.7	23.4	21.5	23.0	22.6	22.3	21.4	21.2	21.3	21.3	
IX			24.8	24.9	25.0	25.0	24.6	24.6	24.2	23.6	23.3	23.0	23.9	23.3	22.8	22.3	22.0	21.2	21.9	21.5	21.1	
X			25.9	25.4	25.7	25.4	25.4	24.9	24.2	24.3	24.8	24.6	24.1	22.7	22.6	22.4	21.7	21.1	21.2	21.5	21.0	
XI			25.7	25.7	25.9	25.8	25.9	24.8	24.3	24.8	24.5	24.1	23.5	22.9	22.7	22.6	22.2	21.5	21.3	22.5	21.4	
XII			25.7	26.2	26.5	26.4	25.9	25.2	24.8	24.4	24.3	24.8	24.1	23.9	23.1	23.0	22.8	22.7	22.6	22.2	22.3	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°					20°
I		29.0	26.5	26.5	26.6	26.2	25.9	24.9	25.4	24.5	24.1	24.5	24.4	24.1	24.0	23.4	23.0	22.8	22.9	22.7	23.0	
II		26.4	26.9	26.7	27.2	26.8	26.0	26.1	26.2	26.1	26.3	25.4	25.6	25.4	24.6	24.8	24.5	23.9	23.9	24.0	23.7	
III		27.1	26.9	27.1	27.2	26.9	26.9	27.3	25.5	25.5	25.8	26.2	25.9	26.0	25.9	25.0	25.0	24.8	25.4	24.7	24.7	
IV		27.1	27.0	27.0	27.3	26.9	26.6	26.5	26.4	26.2	25.7	25.8	25.7	26.1	25.6	25.2	24.9	24.5	24.6	24.4	24.6	
V		26.4	26.4	26.4	26.4	26.7	26.3	26.3	26.4	26.7	25.5	25.4	25.1	24.4	24.6	24.4	24.1	23.7	23.8	23.2	23.1	
VI		25.2	25.6	25.7	26.1	25.8	25.6	25.7	25.2	24.5	24.3	23.9	25.7	25.1	24.0	23.7	23.2	20.9	21.9	22.7	22.0	
VII		24.5	24.8	24.9	25.0	25.3	25.0	25.4	24.0	23.8	23.1	22.9	23.7	23.6	23.1	22.8	22.2	22.0	20.9	21.3	22.1	
VIII		24.3	24.6	24.6	24.5	24.4	24.0	24.0	24.3	23.6	24.3	22.1	22.4	21.9	22.3	22.3	21.3	20.9	20.4	20.1	20.2	
IX		24.5	24.7	24.7	24.7	24.6	24.3	24.0	23.8	22.3	22.9	22.5	21.4	20.9	22.5	21.9	21.3	21.0	20.6	20.2	20.2	
X		25.0	25.3	25.2	25.4	25.3	25.0	24.5	23.8	23.6	22.9	22.4	23.4	23.5	22.5	21.2	21.1	20.5	20.0	20.0	20.0	
XI		25.4	25.6	25.7	25.8	25.8	25.8	25.0	24.2	24.0	23.1	23.1	23.2	23.3	21.9	21.7	21.4	21.0	20.7	20.7	21.2	
XII		25.9	26.0	26.2	26.5	26.2	26.0	25.4	24.7	24.1	23.9	23.7	23.1	24.0	23.1	22.2	21.9	21.6	21.8	22.1	21.9	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°					20°
I		26.6	26.5	26.6	26.5	26.2	25.7	25.0	25.2	24.7	24.1	23.6	23.6	23.3	23.5	23.5	23.0	22.6	22.5	22.6	22.7	
II		26.7	26.7	26.9	27.0	26.5	26.0	26.2	26.0	25.5	25.0	25.2	25.2	24.7	25.1	24.8	24.3	23.8	23.5	23.3	23.5	
III		26.8	26.9	27.3	27.2	26.9	27.0	26.6	25.0	25.7	25.6	25.5	25.3	25.0	25.2	25.3	24.8	24.4	24.1	24.3	23.2	
IV		26.7	26.7	27.4	27.2	26.6	26.5	26.6	26.2	25.8	25.5	25.1	24.5	25.0	24.6	24.7	24.4	24.1	23.8	23.8	24.3	
V		26.2	26.2	26.4	26.3	26.2	25.8	26.1	25.9	26.1	25.7	25.4	24.9	24.2	23.9	23.8	23.7	23.2	22.7	23.4	22.7	
VI			25.3	25.6	25.5	25.6	25.4	25.1	24.7	24.1	23.7	23.4	23.0	22.0	25.0	24.5	22.3	22.5	22.1	22.0	22.1	
VII		24.6	24.6	24.7	24.7	24.8	24.4	24.5	24.3	22.8	22.2	22.5	22.0	22.1	21.5	21.0	21.6	21.4	21.1	20.2	20.4	
VIII		24.1	24.3	24.1	24.1	23.9	23.5	23.5	23.2	22.7	22.1	22.1	21.1	21.0	20.9	21.5	21.0	20.7	20.5	19.4	18.4	
IX		24.3	24.4	24.3	24.4	24.0	23.7	23.4	22.5	22.8	23.3	21.7	21.9	20.8	20.1	20.9	20.9	20.2	19.7	19.5	18.8	
X		24.9	25.0	25.2	25.0	24.9	24.5	24.0	23.7	24.0	22.5	22.2	21.8	21.7	22.4	21.5	20.7	20.1	19.7	19.2	18.9	
XI		25.5	25.5	25.6	25.5	25.6	25.4	25.1	24.2	23.3	23.2	22.9	23.1	22.4	21.5	20.9	20.3	20.3	20.1	20.0	21.6	
XII		26.2	26.0	26.3	26.3	26.2	25.9	25.0	24.6	23.9	23.7	23.4	23.1	23.1	22.3	21.8	21.7	21.2	21.1	21.1	20.9	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°					20°
I		25.9	26.1	26.6	26.5	26.0	25.0	25.1	25.1	24.8	24.0	23.5	23.0	22.9	22.8	22.8	23.1	22.8	22.2	22.1	22.3	
II		26.2	26.5	26.7	27.0	26.6	25.8	25.6	26.1	26.3	25.4	24.5	25.0	24.5	24.2	24.5	24.8	24.0	23.3	22.9	23.1	
III		26.6	26.8	27.2	26.9	27.0	27.2	26.4	26.3	25.0	25.8	25.3	24.9	24.3	24.7	24.3	24.4	24.1	23.8	23.6	23.2	
IV		26.3	26.5	27.4	26.9	26.5	26.5	26.5	26.0	25.4	25.1	24.4	24.5	24.1	24.1	24.4	24.2	23.8	23.3	23.2	23.6	
V		25.9	26.0	26.2	26.0	25.9	25.6	25.7	24.8	25.8	24.3	25.8	24.5	23.7	24.5	23.2	23.4	23.1	22.5	22.2	21.9	
VI		24.8	25.1	25.4	25.0	24.8	25.1	24.9	24.4	24.3	23.4	23.5	22.7	22.2	22.4	22.9	22.4	21.0	21.4	21.4	21.2	
VII		24.1	24.1	24.3	24.3	24.4	24.2	23.5	24.8	22.2	21.4	21.2	21.8	21.3	20.9	20.8	20.7	20.8	20.9	20.5	19.4	
VIII		23.8	24.0	23.7	23.6	23.1	23.1	23.0	21.9	22.3	22.1	21.3	21.3	21.5	20.8	20.3	20.4	20.1	19.6	19.3	18.6	
IX		24.0	24.0	24.1	23.7	23.5	23.0	23.2	21.8	22.5	22.2	21.4	22.1	20.6	20.4	20.1	19.7	20.0	19.6	19.0	19.1	
X		24.7	24.8	24.4	24.3	24.6	24.0	23.1	23.5	23.2	22.7	21.7	21.5	20.2	20.3	20.7	20.4	19.5	19.5	19.2	18.2	
XI		24.9	25.2	25.4	24.9	25.3	24.9	24.9	24.3	23.8	23.1	22.7	22.2	21.1	20.7	21.0	20.0	19.9	19.8	19.7	20.1	
XII		25.3	25.7	26.1	26.2	25.9*	25.5	25.2	24.9	23.9	23.6	23.3	23.1	22.9	22.6	22.5	20.8	20.9	20.8	20.7	21.5	

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE : 9° S. LAT.

20°					10°		0°		10°		20°		E. Long. 30°	Tm
25.3	25.3	25.0	25.4	26.9	27.4	24.7								25.5
25.4	25.5	26.0	26.2	26.6	26.4	26.2								26.0
26.1	26.2	25.9	26.4	27.2	27.0	26.1								26.6
25.3	26.0	25.7	25.9	26.5	26.9	28.8								26.6
23.8	24.0	24.6	25.1	26.1	25.8	27.0								25.9
22.7	23.6	22.6	22.7	22.9	22.8	23.6								25.0
22.5	22.1	21.5	21.4	21.5	21.3	20.0								23.9
21.2	20.9	20.1	19.9	20.1	21.0	19.5								22.9
21.2	19.8	20.0	20.5	21.3	22.1	21.1								22.9
21.4	21.0	21.7	21.7	22.6	23.5	23.0								23.3
21.9	22.6	23.0	23.2	24.7	25.0	23.6								24.0
24.0	24.4	24.9	24.1	25.3	24.9	24.3								24.6

DEGREE ZONE: 11° S. LAT.

22.5	25.0	24.9	26.9	25.2	25.0	24.5								25.0
24.4	24.1	24.5	25.0	25.6	26.0	25.9								25.6
25.7	25.6	25.4	25.8	26.4	25.7	26.7								26.1
24.9	24.9	25.1	25.0	25.9	26.2	26.5								26.1
23.9	23.2	24.1	24.6	25.2	25.1	25.0								25.4
22.9	22.1	21.7	22.1	22.4	22.2	21.9								24.4
22.3	21.9	20.9	20.4	20.6	20.6	20.9								23.4
20.9	20.3	19.7	19.2	19.5	20.0	19.7								22.5
20.8	19.6	19.7	19.4	20.6	21.5	22.5								22.6
20.8	20.2	20.0	20.3	21.6	22.7	23.1								23.0
20.9	20.8	21.3	21.6	22.2	23.7	23.3								23.3
22.3	22.4	22.9	23.1	25.2	25.5	24.2								24.5

DEGREE ZONE: 13° S. LAT.

22.5	22.0	23.0	23.3	23.1	23.2	22.2								24.1
24.0	24.2	23.4	23.7	24.5	24.5	25.1								25.2
24.5	25.1	24.8	25.1	24.0	24.0	25.6								25.7
24.3	24.5	23.6	24.0	25.7	25.0	25.0								25.6
22.6	22.5	22.7	23.1	23.9	23.2	23.7								24.7
22.3	21.4	21.0	20.8	20.9	20.8	21.1								23.5
20.8	21.2	20.4	19.9	19.0	18.9	19.8								22.7
19.5	19.5	19.2	18.2	18.5	19.3	19.0								21.9
19.7	19.0	18.2	18.0	19.3	21.5	22.8								21.9
19.1	19.3	19.1	19.1	20.0	20.6	22.6								22.2
20.3	20.5	20.0	20.1	21.2	21.9	23.5								22.8
20.5	21.4	21.4	21.7	22.7	24.0	23.8								23.5

DEGREE ZONE: 15° S. LAT.

22.3	21.8	21.9	22.2	21.6	22.0									23.8
23.2	23.7	22.7	22.7	22.8	22.1									24.7
24.1	23.6	23.8	24.0	23.4	23.9									25.2
24.5	23.6	22.8	22.3	23.0	22.1									24.9
22.1	21.6	21.7	21.2	22.0	21.9									24.2
20.9	20.8	20.1	19.4	19.8	18.9	17.8								22.8
19.9	19.7	20.4	18.8	17.7	17.6									21.9
18.7	18.3	18.5	16.8	17.1	16.7									21.1
18.7	18.2	17.9	17.0	18.0	18.7									21.2
18.9	18.3	18.1	17.8	18.5	20.4									21.7
19.4	19.0	19.9	19.1	19.7	20.1									22.3
20.5	20.4	20.3	20.1	20.9	21.7									23.0

DEGREE ZONE: 17° S. LAT.

22.4	21.7	20.9	20.4	19.9	19.2									23.4
22.4	22.8	22.8	22.1	21.7	20.0									24.5
22.8	23.0	22.8	23.1	22.7	21.3									24.8
24.1	23.0	23.4	20.8	20.8	18.7									24.4
22.1	21.5	21.1	20.0	19.8	19.9									23.7
20.5	20.2	20.4	18.7	17.6	15.5									22.4
19.3	18.7	19.2	17.9	16.9	15.5									21.3
17.8	17.6	17.6	16.4	15.8	16.2									20.6
18.1	18.0	17.5	16.1	16.1	15.1									20.6
17.7	18.0	17.4	17.0	17.1	15.4									20.9
19.2	18.8	18.4	18.7	17.7	15.7									21.6
20.5	19.5	19.6	19.1	18.9	18.8									22.6

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.			60°					50°					40°					30°					20°
I				25.6	25.8	26.5	26.5	25.7	25.8	25.4	24.7	25.1	24.1	23.6	23.4	23.3	23.3	22.9	22.7	23.4	23.1	21.8	21.6	
II				26.0	26.9	26.9	26.8	26.4	25.9	25.4	26.5	26.5	26.4	25.3	24.6	24.1	23.7	23.8	23.5	24.5	23.2	22.9	22.4	
III				26.3	26.9	27.3	26.8	26.9	26.9	26.7	25.2	24.9	26.0	24.4	24.9	24.2	23.2	24.5	24.1	24.0	23.3	23.2	23.2	
IV				25.8	27.0	27.0	26.7	26.5	26.4	26.3	26.0	25.4	24.9	24.4	23.6	23.9	23.6	23.6	22.6	20.9	22.7	22.7	22.5	
V				25.2	25.8	25.8	25.7	25.6	25.5	25.3	24.5	25.0	23.9	23.7	23.6	24.5	23.9	22.5	23.2	22.5	21.4	22.0	21.7	
VI				24.3	24.6	24.6	24.6	24.6	24.8	24.4	24.4	24.1	23.5	23.5	23.0	23.1	22.0	21.6	22.2	21.8	20.6	20.7	20.8	
VII				23.4	23.7	23.5	24.0	24.3	23.8	22.9	23.3	22.0	22.2	20.3	20.4	21.0	20.7	20.9	20.0	20.4	20.2	20.2	19.9	
VIII				23.4	23.3	23.2	23.4	22.9	22.6	22.3	22.0	22.0	21.7	21.4	21.1	20.7	20.5	20.8	20.8	19.0	19.3	19.1	18.8	
IX				23.4	23.2	23.3	22.8	23.3	22.7	23.1	22.4	22.3	22.0	21.2	21.4	21.0	20.2	20.0	19.7	20.7	18.9	19.0	18.4	
X				23.8	24.1	23.9	23.4	24.0	23.3	23.1	23.4	22.8	22.5	22.1	21.6	21.1	20.4	19.7	20.5	20.3	19.0	19.0	18.8	
XI				24.4	24.8	24.6	24.4	24.5	24.5	24.2	23.9	23.7	23.7	22.7	22.2	21.9	20.1	20.1	19.4	19.7	19.3	19.3	19.6	
XII				25.0	25.4	25.7	26.1	25.3	24.9	25.2	25.0	23.9	23.7	23.2	23.0	22.7	22.4	22.3	22.3	21.8	20.8	20.6	20.4	

AVERAGE WIDTH OF THE TWO-

I			24.3	25.5	26.5	26.3	25.9	25.7	25.3	24.8	25.2	25.2	24.7	24.1	24.0	24.1	24.1	23.0	22.6	22.2	22.9	23.1	21.7	
II			24.7	25.9	27.0	26.6	26.8	26.5	26.4	26.0	26.7	27.4	26.3	25.3	25.0	24.5	23.9	23.1	22.6	23.2	24.3	22.3	22.4	
III			25.3	26.3	26.9	27.3	26.8	26.5	26.6	26.4	26.0	25.0	25.3	24.9	24.5	24.0	24.1	22.9	24.0	23.4	23.7	22.1	22.8	
IV			25.0	25.9	27.0	26.7	26.1	26.2	26.4	26.0	25.4	25.3	25.0	24.6	24.0	24.6	23.6	22.8	22.8	22.3	20.3	22.2	22.0	
V			24.1	24.9	25.3	25.2	25.2	25.1	25.1	25.0	24.4	24.6	23.7	23.2	23.3	23.1	23.7	23.4	22.7	22.8	22.4	20.5	21.3	
VI			23.0	23.8	24.1	24.0	23.9	23.8	23.6	23.9	24.1	24.3	23.1	23.1	22.5	21.9	22.1	21.6	20.8	21.2	21.5	20.9	20.2	
VII			22.3	23.1	23.6	22.9	23.5	23.3	23.3	22.2	22.6	21.9	21.9	22.1	22.1	20.6	20.6	20.4	19.4	19.6	19.4	19.4	19.6	
VIII			22.1	22.9	22.5	22.7	22.5	22.2	22.0	22.1	20.0	21.8	21.7	21.1	20.8	20.5	20.6	20.3	19.7	19.3	19.4	19.2	18.7	
IX			22.1	22.9	21.9	22.5	22.6	22.3	22.2	22.7	21.9	21.8	21.6	20.9	21.1	21.0	20.6	19.1	19.6	19.4	18.6	18.0	18.1	
X			22.4	23.1	23.3	23.1	22.8	23.2	22.5	23.0	22.2	21.9	22.2	21.6	20.9	20.5	20.4	19.8	19.4	19.2	18.9	19.1	18.3	
XI			23.3	23.9	24.6	23.5	23.4	23.6	23.9	23.4	23.4	22.6	22.1	23.1	22.4	22.2	21.2	20.9	20.5	19.6	19.0	19.0	19.2	
XII			23.9	25.0	25.3	25.0	25.4	25.0	24.6	24.4	24.2	24.4	23.6	23.1	22.8	22.6	21.7	21.5	21.8	21.5	21.6	20.6	20.3	

AVERAGE WIDTH OF THE TWO-

I	25.2	23.4	23.7	25.6	26.2	26.4	25.8	25.5	25.3	24.7	26.1	25.4	25.1	25.0	25.0	24.9	24.2	23.0	22.6	22.2	22.1	22.1	22.2	
II	24.6	23.0	23.7	26.1	26.1	26.4	26.9	26.2	27.1	26.3	26.3	27.4	27.9	25.7	24.6	25.0	24.9	23.5	23.0	22.7	22.9	22.8	22.4	
III	24.3	24.5	24.9	26.5	26.7	26.7	26.6	26.2	26.5	25.8	25.6	26.8	25.3	25.2	25.1	24.4	24.0	23.5	22.6	22.5	23.0	22.6	21.8	
IV	24.4	23.9	24.3	26.0	26.4	26.1	25.7	25.8	26.0	25.3	25.5	25.2	25.0	24.2	23.8	23.4	22.9	22.6	23.1	22.2	22.0	21.2	21.3	
V	22.0	22.4	23.4	24.4	24.8	24.4	24.3	24.3	24.3	24.1	24.3	23.8	23.7	23.5	23.1	23.1	22.2	22.1	22.9	22.1	22.1	21.5	20.1	
VI	21.2	21.7	22.4	23.9	23.0	23.2	23.2	23.0	23.0	23.4	23.0	22.9	23.0	22.5	21.9	21.4	20.9	21.6	21.4	20.7	20.4	20.0	20.2	
VII	20.1	20.8	21.6	22.8	22.9	22.5	22.5	22.4	22.5	21.8	22.0	21.8	21.7	21.1	21.4	21.3	21.1	19.6	19.2	19.9	19.4	18.8	19.3	
VIII	19.9	20.3	21.1	21.6	21.7	22.0	21.4	21.5	21.5	21.3	21.3	21.3	21.5	20.7	20.4	20.1	19.8	19.6	20.0	19.4	19.1	18.3	18.6	
IX	19.9	20.3	21.2	22.2	21.1	21.6	22.5	21.8	21.7	21.5	21.7	22.0	21.2	21.1	20.8	20.5	20.4	20.1	19.7	19.2	18.7	18.4	17.3	
X	20.2	20.4	21.6	22.7	22.7	22.9	22.4	22.3	21.7	22.2	22.1	21.7	21.0	21.2	20.7	20.3	19.8	19.6	19.5	19.2	18.7	18.3	18.7	
XI	22.1	21.8	22.6	23.6	23.5	22.2	22.9	23.0	23.2	22.7	22.7	23.3	22.4	22.5	22.6	22.0	22.0	20.8	20.6	20.3	19.5	18.7	18.4	
XII	22.6	23.3	23.2	25.0	24.4	24.6	25.0	24.6	24.4	24.0	23.6	23.4	23.6	23.1	22.8	22.6	22.4	21.8	20.7	21.1	21.1	20.9	19.9	

AVERAGE WIDTH OF THE TWO-

I				25.3	24.8	24.7	24.5	26.8	24.7	25.9	25.9	25.2	25.0	24.8	25.8	26.3	26.0	25.0	24.8	24.7	25.5	23.7		
II				26.2	25.3	24.9	25.8	26.1	25.7	25.9	26.4	26.8	26.1	26.9	26.5	27.8	25.8	25.6	25.2	24.9	24.6	24.8		
III				24.3	24.8	25.4	25.6	26.1	25.9	26.3	26.3	26.3	26.2	25.6	26.1	26.8	25.5	25.4	25.2	24.9	24.2	23.4		
IV				23.9	24.5	24.6	25.3	25.7	25.5	25.3	25.3	25.0	25.7	25.1	25.4	25.1	24.3	23.9	23.7	23.3	23.1	22.7		
V				22.5	23.1	23.7	24.3	23.3	23.6	23.5	23.3	23.7	23.7	23.3	23.2	23.5	23.1	22.7	22.1	21.8	22.1	22.3		
VI				20.0	21.7	22.9	22.8	22.6	22.2	22.2	22.5	22.0	22.7	22.4	21.4	21.9	22.3	22.4	21.8	21.3	20.7	20.0		
VII				19.0	20.3	21.7	22.1	22.2	21.6	21.4	21.5	21.5	21.6	21.4	21.1	21.5	21.4	20.2	20.0	20.2	20.2	20.0		
VIII				18.8	20.6	21.8	22.1	19.7	21.5	21.3	20.7	20.4	20.4	19.8	20.6	20.6	21.0	19.7	19.8	19.4	19.3	19.2		
IX				19.3	20.4	21.8	22.1	22.2	21.8	20.6	20.5	20.9	20.9	20.6	20.7	20.7	19.2	16.2	19.7	19.8	20.0	20.1		
X				20.2	20.8	21.8	21.7	21.9	22.7	21.3	20.8	21.3	20.9	20.7	21.3	21.1	20.3	20.7	20.7	19.7	19.4	19.2		
XI				21.9	22.4	22.5	23.1	23.0	22.1	21.0	21.7	22.3	22.3	22.2	21.8	21.9	20.8	21.7	21.6	21.3	21.6	21.0		
XII				23.3	23.9	24.1	24.2	23.4	24.2	23.2	23.5	23.7	23.6	23.3	22.8	22.5	23.4	23.5	22.6	22.5	22.3	22.1		

AVERAGE WIDTH OF THE TWO-

I				24.4	24.9	24.5	25.0	25.9	23.7	23.8	24.4	25.2	25.1	24.5	24.9	25.3	25.2	24.7	24.4	24.3	24.0	25.5	24.5	
II				26.1	25.6	24.8	25.1	24.9	24.7	24.2	26.0	26.5	26.8	26.0	25.4	26.8	27.6	26.0	25.1	24.7	24.3	24.0	24.1	
III				23.6	24.0	25.0	25.7	25.4	25.3	25.7	25.0	25.6	25.4	25.3	25.3	24.6	25.5	25.3	25.1	24.9	24.4	23.9	22.9	
IV				23.1	23.8	24.1	24.1	23.9	24.3	24.7	24.2	23.9	24.1	23.9	24.0	24.0	24.2	24.6	24.0	23.8	23.2	23.0	23.3	
V				21.4	22.0	23.1	23.1	22.4	22.1	22.4	22.6	22.9	22.5	22.6	22.5	21.8	22.2	22.7	21.7	21.0	20.9	21.8	21.3	
VI				18.3	19.5	22.1	21.1	21.3	21.2	22.1	20.8	21.0	21.1	21.3	21.6	20.7	20.8	20.6	21.5	21.3	20.8	20.4	19.9	
VII				17.3	18.3	21.0	21.2	21.0	20.9	20.7	20.3	19.9	20.2	20.0	20.3	20.2	20.4	20.9	20.5	21.1	19.6	18.7	18.8	
VIII				16.8	18.9	21.3	21.2	20.0	20.2	20.2	20.3	19.9	19.3	19.7	19.5	19.3	18.5	18.3	18.7	18.3	18.5	18.4	18.3	
IX				18.0	19.0	21.1	21.0	20.3	21.1	21.6	19.3	19.9	19.3	20.1	19.8	19.1	19.3	19.5	17.8	18.3	18.6	18.9	18.9	
X				19.0	19.9	21.1	21.2	21.1	20.0	19.7	20.3	19.8	19.9	19.9	20.0	19.8	19.3	19.3	19.9	18.0	18.9	18.7	18.6	
XI				20.7	21.6	21.9	22.4	22.0	22.2	21.1	20.5	21.0	20.5	21.5	21.4	20.8	21.0	19.8	20.6	20.7	20.1	19.9	20.0	
XII				23.3	23.3	23.8	23.1	23.7	23.7	22.6	22.0	22.4	23.3	22.9	22.7	22.7	22.3	22.9	21.3	21.6	22.1	22.1	21.9	

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 19° S. LAT.

20°					10°					0°					10°					20°					E. Long. 30°	Tm
21.8	21.8	21.4	20.0	19.4	18.7	17.9																				23.4
21.9	22.3	22.4	22.7	21.3	21.3	18.3																				24.4
23.2	22.4	22.6	22.5	22.3	19.3	19.4																				24.5
22.6	23.0	22.2	21.7	19.3	18.8	16.2																				23.8
21.4	21.1	20.7	20.0	18.3	17.3	15.5																				23.1
20.6	19.2	19.6	20.2	17.9	15.9	14.0																				22.0
19.4	18.6	18.3	18.3	16.2	15.7	13.3																				20.8
18.8	17.2	17.2	17.1	15.7	15.1	15.0																				20.2
18.3	17.5	17.0	16.7	16.3	14.9	14.8																				20.2
17.8	18.0	17.6	17.2	16.2	15.5	14.9																				20.5
19.4	18.7	18.1	18.4	17.5	16.4	15.3																				21.2
20.4	20.0	19.0	18.8	18.3	17.7	17.0																				22.5

DEGREE ZONE: 21° S. LAT.

21.3	21.1	21.6	20.3	20.3	18.9	18.4																				23.3
22.0	22.0	22.0	21.7	23.8	20.5	19.5																				24.4
22.7	22.5	22.3	21.7	21.5	19.6	17.8																				24.0
22.0	22.0	21.8	21.6	19.7	18.9	17.0																				23.5
21.2	21.3	20.9	20.4	19.1	19.5	16.3																				23.0
20.3	20.2	19.5	18.8	18.7	15.5	14.5																				21.7
19.3	18.7	18.4	17.9	18.8	15.1	14.3																				20.6
18.1	18.1	17.0	16.9	16.3	15.2	13.7																				29.9
18.1	17.3	16.9	16.6	16.5	15.0	13.7																				19.8
18.5	17.8	17.4	17.4	17.1	15.7	14.9																				20.2
18.9	18.9	18.2	17.6	18.5	17.2	15.7																				21.1
20.3	20.0	19.6	18.9	18.3	17.8	17.0																				22.2

DEGREE ZONE: 23° S. LAT.

21.5	21.1	20.9	20.7	19.8	19.3	17.5	16.4																			23.4
22.1	21.6	21.3	21.1	21.4	19.5	19.5	16.5																			24.1
22.3	22.3	22.1	22.1	21.2	21.1	18.3	14.6																			23.9
21.4	21.3	21.2	21.4	20.8	19.0	17.6	15.5																			23.2
20.8	20.6	20.6	20.4	19.2	18.7	15.9	13.9																			22.1
19.7	19.7	19.5	18.9	18.2	16.8	13.5	13.0																			21.2
19.1	18.6	18.3	17.7	17.2	17.0	13.8	13.0																			20.2
18.4	17.9	17.3	17.0	16.8	15.8	14.7	12.0																			19.5
17.7	17.4	17.1	16.7	16.2	16.6	14.1	12.3																			19.6
18.1	18.0	17.5	17.1	16.8	16.0	14.4	13.9																			19.8
18.9	18.4	18.5	17.5	17.4	18.5	15.7	12.3																			20.8
19.8	20.1	19.8	19.3	18.7	17.7	16.5	14.6																			21.9

DEGREE ZONE: 25° S. LAT.

22.8	22.3	21.5	20.9	21.5	21.7	21.3	20.7	20.4	20.3	19.6	16.1	15.2														23.2
24.6	23.2	22.4	22.0	21.7	22.5	21.9	21.2	20.6	20.9	20.4	18.3	15.0														24.2
23.8	22.1	21.7	22.0	21.4	21.5	21.7	21.7	21.4	20.9	20.3	18.7	14.4														23.8
22.2	22.1	22.4	21.4	20.8	21.3	20.8	20.7	20.5	20.4	19.6	17.0	14.4														23.1
21.3	21.5	21.4	20.8	20.2	19.2	20.3	20.0	19.9	19.5	18.2	18.0	12.8														22.0
19.9	20.2	20.5	19.7	19.3	19.1	18.7	18.9	19.0	17.9	17.3	14.8	12.5														20.6
19.6	19.3	18.9	19.2	19.3	19.4	18.6	17.8	17.7	17.2	16.4	14.4	12.3														19.8
19.1	18.9	18.3	18.1	17.8	18.2	17.8	17.5	17.0	16.1	15.6	14.8	11.6														19.1
21.0	19.4	19.1	18.5	18.0	18.2	16.8	16.7	16.6	16.2	15.6	14.7	10.9														19.2
19.1	18.9	18.6	18.2	18.2	17.7	17.8	17.5	17.1	16.6	15.8	14.7	11.7														19.4
20.7	20.3	20.0	19.6	18.4	17.8	18.3	18.0	17.4	17.1	16.7	15.0	13.6	12.5													20.2
24.5	20.9	21.3	22.0	20.3	20.9	19.6	19.8	19.3	19.9	17.9	17.9	12.6														22.0

DEGREE ZONE: 27° S. LAT.

23.4	22.7	22.1	21.0	20.3	20.0	20.4	20.9	20.4	19.9	19.8	19.3	17.1	13.1													22.9
24.1	24.1	22.4	21.7	21.5	21.6	22.1	21.2	20.8	20.2	20.6	19.9	19.1	14.0													23.7
22.5	23.7	23.6	21.2	21.0	20.3	20.0	21.0	21.1	20.9	20.4	20.0	13.5														23.4
22.6	23.4	20.9	20.9	21.1	21.2	20.1	20.4	20.1	20.0	19.9	19.5	17.2	12.3													22.4
20.7	21.0	21.0	21.0	19.8	20.2	18.8	19.5	19.4	19.2	18.5	17.9	14.4														22.0
19.3	19.1	19.3	19.5	19.0	19.0	18.7	17.9	18.4	18.3	17.4	17.2	13.2														19.9
18.7	18.6	18.2	18.2	18.5	18.4	18.6	17.2	17.4	16.9	16.5	15.8	13.7														19.0
18.3	18.1	17.9	17.9	17.5	17.4	17.3	17.2	15.9	16.1	15.9	15.7	12.0														18.3
18.7	18.5	18.4	18.3	18.0	16.7	16.7	16.2	16.3	16.0	15.5	15.3	11.9														18.5
18.7	18.5	18.2	18.0	17.7	17.1	16.7	16.5	16.8	16.5	16.0	15.5	11.7														18.7
20.0	19.7	19.6	19.2	19.3	18.5	17.5	17.8	17.7	17.2	17.3	16.5	12.3														19.9
21.6	23.5	20.3	21.6	19.5	21.0	19.6	19.2	19.1	19.2	18.7	17.9	11.9														21.6

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°				20°
I		23.7	24.2	23.6	24.7	23.5	22.6	22.4	23.8	23.9	23.6	23.9	23.7	23.8	23.9	23.0	23.2	23.4	23.0	22.2	22.1
II		24.5	24.7	24.6	24.1	23.3	25.5	23.3	25.0	25.6	25.4	25.8	25.4	25 1	25.1	25.2	24.4	24.1	23.8	23.5	23.4
III		23.3	24.4	24.8	24.5	24.3	25.4	24.5	24.2	24.8	24.4	24.3	24.1	24.6	24.2	24.7	24.0	23.8	23.6	23.1	22.5
IV		21.9	23.5	23.1	21.9	22.3	22.8	23.3	22.7	22.8	22.5	22.9	23.2	23.4	23.2	22.9	22.0	23.0	22.8	22.1	20.6
V		20.8	22.2	22.4	21.2	22.0	21.6	21.0	21.0	21.6	21.3	21.6	21.3	21.4	20.8	20.9	21.2	20.7	20.0	18.2	18.8
VI		17.9	21.0	21.8	21.1	20.6	19.8	19.7	21.2	19.8	19.6	20.0	20.0	20.1	19.9	20.0	20.3	20.0	18.9	19.0	19.1
VII		16.5	19.5	20.1	19.9	19.2	19.6	18.7	19.7	19.6	19.4	19.1	18.7	19.0	19.1	19.3	18.1	18.4	18.4	18.5	17.8
VIII		16.5	19.8	20.2	18.8	18.8	18.9	18.7	18.4	18.9	18.5	18.6	18.2	18.6	18.5	17.8	17.9	17.7	17.3	17.6	17.1
IX		17.2	19.8	20.5	19.4	17.5	19.1	18.0	17.5	18.4	18.0	18.2	18.1	18.7	18.1	17.5	18.3	17.5	17.1	17.9	18.4
X		18.2	20.3	20.8	19.4	17.9	19.0	18.2	18.7	18.6	19.0	18.7	18.7	19.2	18.5	18.7	18.6	18.1	17.8	18.2	18.0
XI		20.2	21.4	21.2	21.3	20.0	20.2	21.3	19.7	19.8	19.2	20.5	20.0	20.3	19.8	19.9	19.7	20.3	19.1	18.7	18.5
XII		22.0	23.3	22.9	21.9	21.8	24.4	23.3	20.2	21.5	22.5	22.5	22.2	21.5	21.9	21.2	20.8	21.1	21.3	21.6	21.1

AVERAGE WIDTH OF THE TWO-

I	22.8	23.2	23.1	23.4	22.1	21.6	21.0	21.1	21.8	22.4	22.0	22.3	23.1	22.5	22.5	22.2	23.3	23.1	21.8	23.9	21.2
II	23.3	24.0	23.9	23.9	22.6	21.8	21.9	22.6	24.0	23.3	24.7	23.8	24.1	23.7	23.2	24.4	23.7	23.5	23.2	22.9	22.3
III	22.4	23.6	24.2	22.5	23.2	22.5	23.1	22.8	22.8	23.4	22.9	23.2	22.9	23.5	23.6	23.2	23.1	22.8	22.7	22.5	22.2
IV	21.2	22.1	21.5	21.1	21.9	21.8	22.1	20.8	21.9	21.8	21.8	21.8	21.9	21.9	22.5	21.8	21.9	21.7	21.0	20.7	21.2
V	19.4	20.7	21.9	21.0	20.3	19.9	19.1	20.5	20.0	19.8	20.8	20.2	20.8	20.6	20.2	20.1	20.1	19.9	20.0	19.5	18.7
VI	15.8	18.7	20.1	19.4	19.6	18.3	19.7	18.9	18.2	18.6	18.4	18.7	18.8	18.8	18.3	18.6	18.6	18.4	18.4	18.1	17.0
VII	14.4	16.8	19.0	18.5	17.8	17.6	14.7	19.4	17.9	18.3	17.9	18.1	17.6	17.8	17.9	18.2	18.0	17.8	17.7	16.9	17.1
VIII	14.5	17.1	19.3	18.2	17.5	17.8	16.7	17.3	17.6	17.8	16.9	17.6	17.2	17.0	16.9	16.9	16.7	16.6	16.5	16.6	16.9
IX	15.2	17.1	18.5	18.2	16.9	17.5	17.0	17.2	16.7	16.3	16.8	17.4	17.0	17.0	17.3	17.1	17.0	16.7	16.2	16.7	17.8
X	16.8	18.5	19.2	17.7	18.1	18.7	17.0	17.2	17.6	16.9	17.8	17.5	17.8	17.8	17.9	17.7	17.7	17.1	16.9	16.7	17.0
XI	19.0	20.2	20.3	20.2	19.2	18.2	18.2	18.3	18.0	18.5	18.3	17.5	18.5	18.5	18.6	18.9	18.6	18.8	19.3	17.4	17.6
XII	21.2	22.0	22.3	21.4	21.4	21.0	19.5	21.6	21.5	20.7	20.8	20.8	20.5	20.4	20.6	20.4	20.2	20.0	20.6	20.4	20.5

AVERAGE WIDTH OF THE TWO-

I					21.6	22.2	22.5	22.4	21.2	20.1	20.5	21.0	21.6	20.7	21.8	21.3	21.1	21.6	21.7	21.7	21.7
II					22.4	22.7	23.6	22.5	21.8	20.9	20.8	21.0	21.9	22.1	21.4	24.3	22.4	22.0	22.7	22.6	22.7
III					21.5	22.2	23.6	22.9	22.0	21.9	22.4	22.0	21.3	21.3	21.1	21.2	22.2	21.9	21.7	21.1	22.3
IV					20.1	20.8	20.6	21.7	21.7	21.7	20.9	20.2	19.9	20.5	20.6	20.9	20.6	20.6	20.3	20.8	20.7
V					17.4	18.5	20.1	20.2	20.0	19.9	18.1	19.3	19.9	18.4	19.0	18.9	19.4	19.0	19.5	19.3	19.1
VI					13.6	15.7	19.3	19.0	18.0	18.3	18.5	19.5	19.5	17.9	17.9	17.8	17.3	17.5	17.7	17.6	17.1
VII					12.1	13.6	19.0	18.7	18.2	18.1	18.5	17.8	17.4	17.6	16.7	16.9	17.1	17.3	16.6	16.5	16.5
VIII					12.0	13.6	17.3	17.2	16.8	16.6	17.0	14.4	14.0	16.2	17.3	16.9	15.5	16.1	15.9	15.7	15.7
IX					12.6	14.1	16.3	16.3	16.1	16.2	16.2	16.5	17.5	16.7	16.5	16.2	16.1	16.3	16.0	15.8	15.9
X					14.8	16.1	18.4	17.9	17.7	16.4	16.3	16.3	16.2	15.7	15.9	15.1	15.8	16.1	16.5	16.7	16.4
XI					17.5	18.4	19.3	18.9	17.8	17.6	17.2	17.1	17.2	16.1	17.7	17.1	17.6	17.6	17.7	17.5	17.4
XII					19.7	20.6	21.2	21.4	20.8	19.8	19.5	18.5	19.1	18.8	20.0	21.0	19.1	18.9	18.9	18.7	18.8

AVERAGE WIDTH OF THE TWO-

I		22.5	20.7	20.9	21.4	21.4	20.8	20.8	20.8	21.3	21.2	20.6	18.5	19.9	20.8	19.5	19.4	20.5	20.0	19.6	
II		21.0	21.7	21.9	22.1	20.5	23.8	21.1	20.3	20.1	20.3	20.8	21.6	20.7	21.1	21.4	21.7	20.9	20.5	21.3	
III		19.2	21.1	21.2	22.3	21.9	21.2	20.1	20.8	20.5	20.2	19.9	19.7	20.3	19.3	20.3	19.4	20.0	20.7	20.8	
IV		17.9	19.5	19.2	21.6	20.5	20.1	19.6	19.8	18.2	19.0	19.3	19.0	19.2	19.8	19.5	19.1	19.5	19.2	19.2	
V		16.2	15.5	17.0	19.1	20.0	19.2	17.7	17.2	18.2	20.0	17.1	17.6	17.7	17.8	17.9	18.5	17.4	17.6	18.1	
VI		11.5	12.7	13.3	17.4	17.8	19.8	16.3	15.3	16.3	16.0	17.6	17.4	17.8	17.0	17.3	16.5	16.1	15.5	16.1	
VII		10.7	10.9	11.5	15.8	16.5	16.6	17.0	15.6	15.3	15.9	15.5	15.8	15.2	15.8	16.0	15.6	15.1	15.2	15.6	
VIII		11.3	11.1	11.4	13.4	16.3	16.3	14.5	16.1	13.6	14.0	15.9	16.2	14.5	15.3	15.1	14.9	15.0	14.8	14.3	
IX			11.8	12.0	13.8	15.6	15.1	15.0	15.7	16.7	14.7	14.1	15.1	14.5	16.1	15.7	14.7	14.7	14.6	14.7	
X			13.7	14.1	17.5	16.7	16.4	15.7	15.3	15.5	15.4	19.1	15.3	16.5	14.7	14.3	14.4	14.3	15.5	15.5	
XI			16.8	16.9	18.6	17.8	17.4	17.4	16.7	16.0	16.0	16.2	15.3	17.3	16.3	17.1	17.0	16.7	16.6	16.3	
XII		22.1	19.8	19.5	20.3	18.2	20.7	20.1	19.2	18.5	18.8	18.4	17.5	18.5	18.1	17.9	17.7	17.5	17.7	17.6	

AVERAGE WIDTH OF THE TWO-

I		19.9	19.6	20.0	21.0	21.3	21.7	20.0	20.1	18.7	18.2	18.3	17.6	18.3	17.6	19.7	18.5	18.1	18.1	17.4	
II		20.0	18.8	21.3	19.7	20.0	21.1	20.0	19.0	18.6	19.0	21.1	20.1	19.6	19.5	19.2	19.2	19.8	20.0	18.8	
III		18.7	16.8	19.4	20.1	19.5	19.9	18.5	19.9	17.0	19.1	17.1	19.1	18.9	17.6	17.2	17.7	17.5	17.3	17.9	
IV			16.1	18.2	19.7	19.3	18.6	18.2	18.5	17.4	18.2	17.7	17.6	18.0	18.1	18.0	17.7	17.3	18.0	17.6	
V			14.9	16.5	19.3	17.4	16.6	16.6	16.2	16.2	16.5	17.0	19.7	16.9	17.2	15.8	14.8	16.1	16.1	16.3	
VI		12.2	11.4	14.4	16.1	16.2	14.7	17.2	16.3	14.7	17.1	16.6	15.3	17.3	14.7	16.4	15.3	14.5	14.9	14.3	
VII		8.9	9.9	11.2	14.5	14.9	14.6	14.9	14.1	13.8	14.7	14.8	14.1	14.5	14.8	16.5	15.2	14.4	13.9	14.0	
VIII		10.0	10.2	16.9	15.5	14.2	13.4	15.4	16.3	11.3	13.4	15.0	13.7	15.0	13.7	14.2	14.5	14.0	14.1	13.5	
IX		10.1	8.6	10.3	14.4	15.3	14.0	15.1	13.5	13.4	9.5	13.8	12.6	14.1	13.2	14.4	13.3	13.4	13.0	13.1	
X		11.8	9.4	12.9	15.4	13.0	15.2	14.8	14.3	14.0	14.1	14.3	13.5	14.9	13.5	14.4	14.1	13.5	13.5	14.0	
XI		14.9	12.7	15.2	18.2	16.0	17.2	16.7	15.6	14.6	14.6	15.4	15.0	15.0	14.0	15.6	16.6	15.6	15.2	15.0	
XII			17.3	19.4	19.1	17.9	19.9	19.8	18.2	17.5	16.9	17.1	16.9	16.0	16.4	17.8	17.4	16.2	16.1	15.4	

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 29° S. LAT.

20°					10°					0°					10°					20°					E. Long. 30°	Tm
22.6	22.7	22.2	21.0	20.3	19.6	19.5	20.6	20.1	20.0	19.9	19.7	18.4	13.2													22.1
23.5	23.2	22.6	22.1	21.7	21.2	20.7	20.6	20.5	20.4	20.5	20.4	19.0	14.3													23.1
22.3	22.1	21.4	23.1	22.7	21.2	20.4	19.2	20.5	20.6	20.4	20.2	17.1	13.0													23.0
19.7	21.4	20.7	20.2	19.9	21.3	20.4	19.5	19.9	19.5	19.4	19.1	18.3	12.9													21.2
20.5	19.8	20.0	20.0	19.4	20.3	20.4	19.2	18.7	18.7	18.5	18.1	17.6	15.6													21.3
19.0	18.3	18.4	18.7	18.4	19.3	18.0	17.2	17.4	17.4	17.0	16.9	15.5	13.9													19.0
17.9	17.6	17.2	17.1	17.2	16.5	17.1	16.6	16.9	16.6	16.3	15.8	15.0	14.3													18.0
17.1	17.2	17.1	17.1	16.2	17.1	16.9	16.7	16.7	16.8	15.8	15.7	14.3	13.6													17.6
17.8	17.3	17.0	16.9	18.1	17.2	16.4	16.6	15.5	15.5	15.7	14.5	14.6	13.9													17.5
18.0	17.9	17.8	17.6	17.3	17.1	16.9	16.7	16.3	16.2	16.4	15.8	15.1	14.5													17.9
18.5	18.5	18.7	18.7	18.0	19.3	18.6	17.6	17.0	17.1	17.3	16.9	16.4	16.4	13.3												19.0
21.2	21.1	20.7	20.4	19.2	20.0	18.5	19.2	18.6	18.7	18.6	18.9	18.0	14.7													21.0

DEGREE ZONE: 31° S. LAT.

21.0	21.8	21.8	20.9	20.4	19.7	18.9	18.7	18.9	19.5	19.5	19.9	19.5	18.6													21.4
22.4	22.2	22.1	21.7	21.4	21.3	21.1	20.6	20.1	20.0	20.2	20.4	19.7	18.4													22.4
21.7	21.2	20.9	20.4	20.2	21.2	21.5	20.4	19.2	19.8	20.1	19.9	19.7	16.7													21.9
21.3	20.6	20.2	20.3	20.5	20.1	19.9	20.2	19.7	19.0	19.3	18.9	18.6	16.1													20.8
19.2	19.5	19.5	19.2	18.5	18.3	18.7	18.8	18.5	18.1	18.0	18.2	17.4	16.3													19.5
18.7	17.3	17.1	17.0	17.6	17.4	17.2	18.2	17.1	16.5	16.8	16.5	16.3	15.3													18.0
15.4	16.6	16.7	16.6	16.6	16.6	16.5	16.3	15.4	16.1	16.0	16.0	15.3	14.9													17.0
15.9	17.7	16.4	17.2	16.6	16.4	15.6	16.7	15.2	16.4	15.7	15.5	15.1	14.2													16.7
18.0	17.2	15.8	15.7	15.7	15.8	15.9	15.8	15.1	14.3	15.5	15.3	15.2	14.2													16.5
17.3	17.9	17.8	17.4	15.7	16.1	15.9	15.0	15.5	16.2	15.9	16.0	16.0	15.4													17.1
17.3	17.5	17.4	17.7	17.5	17.2	16.9	17.0	17.0	16.3	17.2	17.1	16.9	16.4													18.0
20.3	20.7	20.3	20.2	20.0	19.0	18.9	18.8	17.6	18.3	18.6	18.4	18.6	18.5													20.2

DEGREE ZONE: 33° S. LAT.

21.1	20.9	21.3	21.1	22.7	21.2	20.6	21.0	20.2	20.1	19.6	18.9	18.3	18.2	18.0	18.9	19.1	19.9	19.8	17.2							20.6
22.2	23.8	22.0	21.4	20.8	20.9	20.8	19.4	20.0	18.9	18.4	20.3	20.1	20.0	19.2	19.9	20.1	20.2	19.3								21.3
22.1	21.9	22.0	21.9	21.8	22.0	21.4	19.9	20.1	19.7	19.6	19.1	19.2	20.5	19.5	19.4	19.9	19.6	18.7	16.7							21.0
20.9	20.5	20.1	20.3	19.4	20.2	20.2	20.1	20.0	20.0	19.8	19.7	18.4	19.3	19.5	18.8	18.8	18.9	18.2								20.2
19.1	18.9	18.8	18.8	17.9	18.5	17.9	18.4	18.8	17.1	17.3	17.8	18.1	18.3	18.2	18.0	17.9	17.7	17.2	12.8							18.6
17.0	17.3	17.2	17.0	16.5	17.1	16.9	16.7	16.6	16.5	15.8	16.8	16.5	16.5	16.2	15.3	16.4	16.4	17.6								17.2
16.6	16.6	16.4	16.0	16.1	16.2	16.1	16.0	15.9	15.9	15.9	16.0	16.1	15.6	15.5	16.1	15.7	15.8	15.4								16.5
15.5	15.5	15.5	15.3	15.0	15.5	14.8	15.5	15.9	16.5	16.9	15.3	15.2	15.2	15.2	15.5	15.5	15.5	15.2								15.0
15.8	15.4	15.0	15.2	15.7	15.0	13.8	14.4	15.6	14.8	13.6	14.3	14.6	14.5	14.4	15.4	15.4	15.4	15.1								15.4
16.2	16.1	16.0	16.3	16.1	16.3	17.0	16.4	16.0	15.7	15.8	15.2	15.7	14.6	14.7	14.9	15.8	15.9	15.8								16.1
17.7	17.6	17.4	17.5	17.2	17.7	17.1	16.7	16.7	16.7	16.6	16.5	16.5	16.4	16.1	13.5	17.0	17.7	16.9	13.9							17.2
18.8	18.7	19.0	19.1	19.4	19.3	18.9	18.3	18.6	18.5	17.5	18.0	18.5	17.8	18.2	17.9	18.3	18.5	18.6	14.2							19.0

DEGREE ZONE: 35° S. LAT.

19.9	20.0	20.0	20.3	20.4	19.6	18.9	18.9	18.4	18.4	18.4	17.8	18.4	18.6	18.3	17.4	18.1	19.2	19.9	20.4							19.8
21.0	21.7	20.6	20.2	19.5	19.8	20.2	19.6	19.1	18.6	18.9	18.7	19.1	17.9	17.5	18.5	19.4	19.8	20.1	20.3							20.4
20.3	19.4	20.6	20.4	20.7	20.4	19.6	20.0	18.6	18.4	18.6	18.9	20.3	19.9	19.1	18.3	19.4	19.6	19.5	19.5							20.0
18.8	19.0	19.3	18.9	19.1	19.5	18.2	18.5	19.1	18.7	18.8	18.7	18.2	18.0	16.4	17.8	18.2	18.8	18.7	18.8							19.0
17.8	17.8	17.8	17.9	17.6	17.1	16.7	16.5	16.3	16.4	16.4	17.0	17.2	17.0	17.6	17.9	18.0	17.9	17.8	17.5							17.6
16.0	16.2	16.5	16.1	15.8	15.9	15.6	15.5	15.2	15.1	14.9	14.8	15.7	16.2	15.9	15.7	16.3	16.0	16.3	15.7							16.0
15.2	15.0	15.6	15.2	15.0	14.6	14.7	14.4	14.1	14.4	14.1	14.9	14.5	14.7	15.2	15.8	15.5	15.9	16.0	15.2							15.0
14.2	14.2	14.4	14.3	14.4	14.4	14.1	13.5	13.8	13.7	13.8	15.1	13.3	13.4	13.9	14.8	15.1	15.5	15.4	15.4							14.4
14.3	14.4	14.3	14.5	14.3	14.1	13.7	12.9	13.1	13.2	13.4	14.1	13.3	13.0	14.9	14.5	14.4	15.3	15.4	15.6							14.4
15.3	15.1	15.4	15.0	15.1	15.0	14.8	14.8	15.8	14.7	15.4	15.7	15.6	15.5	16.0	15.8	15.7	16.4	16.0	16.3							15.5
16.2	16.4	16.4	16.6	16.0	15.8	16.9	16.5	16.6	16.3	16.1	16.1	15.8	15.3	16.1	16.1	17.0	17.3	17.3	17.3							16.6
17.2	17.2	17.2	17.4	17.5	17.3	16.9	17.2	17.4	16.4	16.9	16.7	16.7	16.5	17.0	17.1	17.9	18.8	18.8	19.1							18.1

DEGREE ZONE: 37° S. LAT.

17.5	17.7	17.6	17.8	17.7	16.9	16.9	16.9	17.1	17.3	16.8	16.9	16.9	16.7	17.0	17.7	18.7	19.1	19.5	20.5							18.4
19.1	18.9	19.2	19.4	19.0	18.7	18.3	17.3	16.9	16.8	17.3	17.9	18.7	17.9	18.4	17.9	19.1	20.1	19.4	21.2							19.2
18.6	18.2	17.9	18.2	17.4	17.2	17.6	16.9	16.8	17.0	16.5	16.1	15.4	15.5	15.7	17.2	18.3	18.5	19.3	20.2							17.9
17.5	17.7	17.2	17.3	17.1	17.0	18.6	16.5	16.4	16.3	16.7	16.3	16.2	16.5	16.0	15.8	17.5	17.5	18.1	19.4							17.4
16.2	15.7	15.9	16.0	15.7	15.7	15.4	15.0	15.2	15.0	15.2	15.1	14.5	15.2	14.9	15.3	15.7	17.6	17.8	17.7							16.2
14.4	13.7	14.2	14.7	14.2	14.2	14.0	13.6	13.6	13.8	13.7	13.5	12.9	13.1	13.2	14.2	14.8	15.5	16.4	16.9							14.7
13.7	13.6	12.2	13.7	13.5	13.0	13.4	13.3	12.8	12.6	12.7	12.7	12.3	12.3	12.8	13.8	13.8	15.3	15.9	16.1							13.7
13.4	12.9	13.1	13.0	13.0	12.6	12.7	12.4	12.3	12.4	12.8	12.2	12.2	12.7	12.4	13.0	13.7	14.3	15.9	16.3							13.5
12.8	13.0	13.2	13.4	13.2	12.8	12.6	12.3	12.2	12.2	12.3	11.7	12.3	11.4	12.0	13.1	13.8	14.1	15.0	15.6							12.9
13.8	13.2	13.4	13.9	13.2	13.0	13.3	13.2	13.1	12.9	12.6	12.2	11.7	13.0	13.8	13.3	15.2	15.4	16.6	17.7							13.7
14.7	14.4	14.4	15.2	14.8	14.6	13.9	13.7	14.2	14.5	14.2	14.7	13.7	13.4	14.4	14.7	15.8	16.1	16.3	17.6							15.1
15.6	15.9	15.9	16.0	15.7	15.6	15.4	15.0	16.3	15.7	15.5	15.3	15.5	15.5	15.4	15.8	16.2	17.9	17.8	19.0							16.8

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.	60°					50°					40°					30°					20°
I			17.6	16.8	13.3	19.0	18.8	17.7	17.2	18.5	18.2	17.2	16.8	17.3	16.7	16.2	16.2	15.7	16.9	17.2	17.3	16.3
II		18.2	17.8	15.9	14.7	18.7	19.3	19.7	19.1	17.9	16.9	17.0	18.5	19.4	17.8	18.8	19.4	19.2	18.9	18.4	17.8	16.6
III		17.7	16.1	16.4	16.1	21.3	19.7	17.8	18.2	17.4	18.5	14.9	18.1	12.4	16.6	17.2	19.0	16.7	15.7	15.8	15.6	16.0
IV		15.0	15.4	16.7	15.2	18.1	17.9	17.7	17.0	14.8	15.7	17.0	16.3	16.5	16.2	17.2	16.1	16.5	15.4	16.2	16.5	16.1
V			13.3	13.2	9.4	16.4	16.8	15.9	16.5	15.6	15.3	11.0	14.3	15.3	14.4	15.2	14.7	14.7	15.3	16.1	14.1	14.2
VI			13.1	11.9	8.8	12.6	14.6	12.1	14.9	16.4	14.2	12.2	13.3	13.9	12.0	15.6	15.1	14.3	14.6	13.1	14.0	14.7
VII			9.1	8.7	8.6	10.3	10.7	12.6	12.3	12.0	12.2	13.0	12.8	12.1	13.6	13.9	14.0	12.9	13.1	14.2	14.4	12.8
VIII			9.5	9.9	10.8	15.7	15.8	12.9	9.6	10.2	12.6	11.7	13.5	13.3	13.1	13.4	13.2	11.8	11.9	14.5	13.0	11.5
IX			8.0	8.7	6.9	8.4	15.3	15.3	12.8	14.7	14.1	11.3	11.4	11.6	12.9	12.7	12.3	12.3	12.2	11.9	12.1	12.8
X		11.5	9.7	9.9	9.2	12.1	11.0	15.5	13.4	13.5	13.1	12.8	13.0	12.1	10.9	13.5	10.2	12.4	12.1	12.0	13.2	12.4
XI			12.5	12.3	11.0	14.1	13.9	14.8	15.7	14.8	13.7	12.9	13.2	15.7	12.2	13.1	12.6	13.9	14.9	13.9	11.5	12.8
XII		16.9	15.8	14.4	13.4	14.4	15.3	19.0	19.5	20.0	16.6	15.9	15.1	14.9	15.1	15.7	15.1	16.5	16.3	15.9	16.0	15.4

AVERAGE WIDTH OF THE TWO-

I	17.2	17.0	15.0	14.0	13.0	18.8	18.5	15.8	16.2	14.9	14.1	17.0	16.1	17.6	16.5	15.3	14.6	14.6	13.7	14.0	13.8	13.9
II		17.2	14.8	14.6	15.9	16.8	17.3	16.5	16.1	15.3	14.9	16.6	17.2	16.8	17.0	14.8	15.0	16.0	15.6	15.1	14.8	14.6
III		16.6	15.0	12.2	14.0	20.0	17.5	17.1	16.2	15.8	12.7	14.2	15.0	11.8	15.6	12.9	15.4	14.5	14.9	14.8	14.6	14.2
IV		14.6	14.7	14.2	12.8	15.0	16.2	15.9	13.7	13.0	13.6	16.1	13.0	16.1	15.4	15.0	15.8	14.3	14.7	14.2	14.0	14.2
V		12.5	10.7	8.5	10.3	14.3	15.6	14.6	13.5	14.7	15.7	12.6	13.3	14.7	11.2	13.6	13.0	15.1	12.6	12.9	10.7	13.1
VI		10.1	9.4	7.2	8.4	13.4	12.1	12.9	14.5	10.7	12.8	11.7	11.4	12.4	11.7	12.7	13.1	13.6	12.3	11.9	11.4	11.4
VII		9.1	9.6	7.7	7.5	13.3	12.2	10.9	10.9	10.4	10.3	12.2	11.6	11.1	12.2	11.5	11.1	11.4	11.5	11.4	11.3	11.3
VIII		8.8	7.2	4.8	9.6	13.4	13.7	11.2	9.0	10.0	9.9	10.9	10.1	11.5	9.4	10.9	10.2	10.7	11.1	11.0	10.9	10.9
IX		7.5	7.8	6.2	7.8	8.2	12.0	10.9	10.0	10.4	9.1	10.3	11.0	10.2	9.8	12.5	10.3	10.7	10.4	10.1	9.8	9.4
X		11.1	9.6	8.8	9.5	13.1	11.9	11.2	10.7	10.9	10.1	11.6	13.0	11.2	10.3	10.8	11.1	11.2	11.2	11.1	10.9	10.9
XI		12.1	10.6	9.9	10.2	12.8	16.4	13.4	13.2	12.0	11.9	12.2	11.9	12.7	12.0	11.7	11.9	12.3	13.0	12.6	11.6	11.5
XII		15.4	14.1	13.4	10.1	12.6	16.0	15.5	14.5	14.6	13.9	13.2	13.0	13.3	13.2	12.6	13.0	12.3	12.9	14.1	13.7	14.5

AVERAGE WIDTH OF THE TWO-

I	16.6	15.1	14.0	14.5	12.2	13.6	14.5	13.7	13.8	14.2	13.7	12.1	12.5	13.1	12.2	12.1	11.2	13.3	11.9	11.7	11.9	11.8	11.8
II		16.7	16.2	14.2	12.5	15.0	15.5	14.7	14.2	14.7	14.2	15.4	14.5	15.7	15.2	13.4	13.0	13.1	13.6	13.1	12.9	12.5	12.0
III		15.4	13.5	12.1	12.5	15.5	18.5	15.8	14.9	14.2	12.0	12.7	14.2	11.0	13.2	12.9	13.1	12.3	11.9	12.0	12.4	13.0	12.9
IV		13.6	13.8	11.7	12.5	13.2	14.8	13.0	13.0	12.6	12.8	14.3	13.1	12.1	12.8	14.6	12.3	15.0	14.1	12.2	13.0	11.3	11.5
V		12.4	12.6	7.5	7.0	11.2	11.6	11.6	12.4	12.0	10.2	11.7	10.8	11.1	11.3	10.9	9.4	10.3	8.9	10.4	10.9	10.0	10.7
VI		11.8	6.8	6.0	7.9	9.8	11.4	9.3	10.5	10.8	9.4	8.9	9.6	9.2	9.3	12.0	10.8	11.7	10.9	10.9	10.6	10.0	9.5
VII		8.9	9.3	6.4	5.6	7.5	10.7	10.4	9.6	9.1	9.3	9.3	8.9	8.8	9.9	10.0	9.0	9.7	10.0	10.1	10.1	10.1	10.1
VIII		8.1	7.7	6.3	9.5	8.0	10.9	8.0	8.2	9.4	8.7	9.1	8.9	8.6	9.3	9.8	8.0	8.2	8.9	9.5	9.8	9.7	9.8
IX		8.0	7.5	6.4	5.1	7.6	9.8	9.8	8.8	8.0	8.1	8.3	8.6	7.6	8.5	8.8	8.1	8.0	8.4	8.2	8.0	7.9	7.7
X		9.9	8.8	7.0	7.8	7.0	11.4	10.4	9.8	9.2	9.0	8.2	10.4	9.3	8.6	8.4	8.9	9.1	9.1	8.9	8.7	8.5	8.4
XI		11.7	10.6	10.3	9.9	9.2	11.0	11.7	11.8	10.8	10.8	11.0	9.4	9.8	10.1	9.8	10.2	10.9	11.2	10.9	10.5	10.5	10.9
XII		14.8	14.0	13.7	9.8	10.6	14.4	14.5	13.6	12.7	11.5	11.0	11.1	11.2	11.8	11.1	10.9	10.9	10.9	11.1	13.5	12.0	12.6

AVERAGE WIDTH OF THE TWO-

I	14.4	13.8	13.5	11.5	11.8	12.8	12.3	12.0	12.6	13.0	12.5	11.9	11.5	10.7	10.1	9.5	8.8	8.6	8.7	9.4	10.0	10.3	10.2
II	13.9	15.6	14.5	11.9	12.6	13.9	13.9	13.3	14.7	14.7	13.2	12.7	11.5	10.6	10.1	9.8	8.8	9.1	9.2	9.8	10.0	10.3	10.9
III	14.0	14.6	13.6	11.9	13.0	11.7	14.7	13.8	13.2	12.9	12.2	12.6	11.2	11.3	11.4	11.6	9.0	9.3	9.4	9.4	9.7	9.9	9.2
IV	12.1	13.2	13.8	8.2	9.6	9.0	12.0	13.4	13.2	13.2	13.5	12.5	12.5	11.5	11.6	10.5	9.6	9.5	9.8	10.1	10.2	10.1	11.0
V	10.2	11.2	8.9	7.2	8.6	10.5	12.0	11.2	9.7	10.2	10.0	10.6	9.9	10.4	9.0	8.8	9.9	8.6	8.4	8.9	8.7	7.9	7.1
VI	9.2	7.7	6.9	5.2	8.4	9.2	9.4	9.3	10.0	9.4	8.9	9.0	9.2	8.7	9.9	9.7	9.4	8.9	9.0	8.9	8.5	8.0	7.7
VII	8.3	7.8	5.4	5.4	6.6	7.0	8.9	8.1	8.0	8.9	8.5	7.7	7.8	7.9	7.4	7.3	7.7	8.0	8.3	8.5	8.7	8.8	8.8
VIII	7.2	6.3	9.7	6.2	10.0	7.0	7.5	8.5	8.9	8.6	8.3	8.0	7.5	7.2	7.9	6.8	6.3	6.3	6.7	7.5	8.0	8.3	8.4
IX	7.6	7.1	6.7	5.1	6.5	7.0	7.9	7.7	7.3	6.9	8.2	7.8	7.5	6.8	6.7	7.1	6.8	6.6	6.8	6.9	6.8	6.6	6.2
X	9.1	7.9	7.9	6.0	6.8	9.0	9.7	9.2	8.7	9.0	8.0	8.0	7.6	7.8	7.1	6.9	7.0	7.3	7.4	7.2	7.0	6.6	6.4
XI	10.8	10.3	10.2	8.9	8.0	9.3	10.6	10.9	10.0	9.9	9.7	8.5	7.7	8.3	8.5	8.6	8.6	8.7	8.9	8.7	8.2	7.6	7.4
XII	12.5	13.8	11.9	9.1	10.1	12.0	12.7	12.2	11.9	11.1	10.7	10.4	10.3	10.2	10.5	10.1	9.7	9.6	9.6	9.3	8.9	8.8	8.7

AVERAGE WIDTH OF THE TWO-

I	11.5	12.5	14.6	10.7	10.4	10.6	10.6	11.1	13.1	12.2	11.2	10.1	9.9	9.3	8.5	7.6	6.0	5.5	6.3	7.2	8.1	8.4	8.0
II	13.0	14.4	13.0	10.8	10.3	11.7	12.1	13.1	12.9	13.1	12.9	7.8	7.9	9.5	9.2	8.5	8.4	8.3	8.4	8.4	8.3	8.2	8.4
III	13.3	13.9	12.5	9.6	9.5	11.4	12.4	12.6	11.1	11.8	12.2	10.8	10.9	11.5	11.1	9.0	7.6	6.9	7.2	7.8	7.8	7.5	7.1
IV	10.4	11.3	9.1	8.2	9.2	8.8	10.2	12.2	13.4	13.5	10.0	9.8	12.0	11.9	9.8	8.2	6.9	6.5	6.9	7.6	8.0	8.2	8.3
V	3.9	8.4	8.5	6.7	7.1	7.6	8.1	9.7	9.5	9.9	9.9	9.1	9.9	8.5	8.8	7.1	6.3	6.7	7.0	6.9	6.2	5.3	4.6
VI	7.0	7.6	6.9	5.3	7.8	7.8	8.2	9.0	9.7	8.8	9.4	7.8	7.2	7.2	7.2	7.0	7.1	7.4	7.6	7.4	7.1	6.4	5.9
VII	8.6	6.7	6.0	4.9	6.1	4.0	11.8	6.8	8.6	8.8	7.5	8.3	6.9	6.4	6.1	5.8	6.0	6.5	7.0	7.1	7.2	7.1	7.1
VIII	6.6	10.0	10.0	7.1	4.9	5.2	6.3	7.9	8.8	7.3	7.8	4.8	7.4	6.3	5.4	5.2	4.5	4.4	4.6	5.4	6.2	6.7	7.0
IX	6.4	6.6	6.5	4.8	4.8	5.2	5.5	6.1	5.9	7.8	7.4	6.9	5.6	5.9	5.3	5.6	5.4	5.3	5.9	6.1	6.0	5.3	4.8
X	7.5	7.5	6.6	7.0	5.6	7.1	7.9	7.9	7.6	8.6	6.5	7.2	7.1	6.2	5.4	5.3	5.5	5.1	4.9	4.3	4.0	4.0	4.3
XI	8.6	9.4	9.5	7.4	7.2	7.4	9.0	8.9	9.1	8.6	8.9	6.7	6.8	6.8	7.3	7.4	7.0	6.9	6.6	6.0	5.3	4.6	4.6
XII	11.4	11.9	9.8	8.9	10.7	11.2	10.7	10.4	10.0	10.3	10.1	9.6	9.5	9.0	9.2	8.6	7.4	6.6	6.7	6.3	6.1	5.9	5.7

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 39° S. LAT.

20°				10°					0°					10°					20°					E. Long. 30°	Tm
16.6	16.3	15.9	15.8	15.7	15.2	15.1	15.2	14.4	14.3	14.0	14.1	14.2	14.4	14.1	15.3	16.7	17.1	18.9	19.0						16.3
16.5	16.2	16.8	16.5	15.7	14.4	15.1	15.3	15.8	15.2	14.9	15.2	14.8	15.2	15.7	16.6	16.4	17.6	18.5	19.9						17.1
16.1	15.7	15.9	15.7	15.8	14.9	14.6	14.9	15.4	14.9	14.5	14.7	14.8	14.8	15.2	15.5	16.3	17.7	19.1	19.9						16.4
15.7	15.9	15.6	15.4	14.8	14.5	14.1	14.1	14.1	13.9	14.4	13.9	14.2	13.4	13.8	14.0	15.2	16.4	18.7	19.8						15.7
14.5	14.1	14.4	14.4	14.1	13.7	13.5	13.3	13.4	13.2	13.1	13.1	13.1	13.6	13.5	14.5	15.3	16.3	17.5	18.5						14.6
13.6	13.2	12.1	12.6	12.0	12.1	12.3	11.7	11.7	11.8	11.8	11.2	11.6	11.5	11.7	13.1	14.0	14.8	15.6	15.9						13.1
12.2	11.8	11.7	11.9	12.1	12.0	11.4	10.9	10.7	11.2	11.3	10.9	10.6	10.9	11.8	12.4	13.1	14.4	15.1	16.5						12.2
12.3	12.1	11.8	11.9	11.4	11.2	10.9	10.4	10.6	10.5	10.9	10.6	10.3	10.6	10.9	11.6	12.5	13.7	15.0	15.9						12.1
11.4	12.5	12.3	12.4	11.8	11.6	10.7	10.5	10.6	10.3	10.6	10.4	10.1	10.3	11.3	12.4	13.3	13.8	14.6	16.0						11.9
12.0	11.8	11.9	11.8	11.6	11.4	11.9	11.7	11.5	11.3	11.4	11.3	11.4	11.1	10.9	12.0	13.1	14.6	16.0	16.9						12.2
14.4	13.6	13.0	12.8	12.8	12.3	12.6	12.2	12.1	12.1	12.2	12.3	12.6	12.5	13.1	13.2	13.2	15.9	16.8	17.6						13.4
13.8	14.2	14.1	14.0	13.8	13.8	13.5	13.1	13.3	13.3	13.1	13.3	13.3	13.6	13.4	14.2	15.4	16.6	17.4	19.1						15.2

DEGREE ZONE: 41° S. LAT.

13.3	13.7	14.3	13.5	13.6	12.9	13.1	12.6	12.7	12.6	12.6	12.1	12.0	11.9	11.7	11.9	13.1	14.1	15.9	15.9						14.4
14.6	15.1	14.5	14.3	14.0	14.4	13.5	12.8	12.8	12.5	12.7	12.1	11.5	11.5	11.9	13.5	14.7	15.4	16.5	16.8						14.8
13.8	13.7	13.7	13.5	13.0	13.4	13.5	13.0	13.0	12.7	12.9	12.6	13.0	13.1	12.9	13.8	13.4	13.9	15.1	16.0						13.7
14.0	13.6	13.8	13.3	13.0	12.7	12.3	12.1	12.6	12.3	11.7	11.5	11.3	11.1	11.6	13.5	14.5	14.3	15.8	16.3						13.9
13.0	12.5	12.7	12.3	12.5	12.7	12.0	11.4	11.5	11.3	11.2	11.3	11.4	11.7	11.8	12.7	13.7	14.5	14.5	14.7						12.7
12.9	12.8	12.4	11.6	11.1	10.9	10.1	10.5	10.5	10.1	10.2	9.9	10.0	9.9	10.5	11.3	12.0	12.8	13.4	13.7						11.5
11.3	11.9	11.1	10.7	10.2	10.4	9.5	10.5	10.0	9.4	9.7	9.4	9.3	9.6	9.9	10.6	11.4	11.8	13.3	13.7						11.0
10.8	11.0	11.3	10.3	9.9	9.8	10.6	10.1	9.9	9.5	9.6	9.3	9.3	9.2	9.5	9.8	10.5	11.6	12.8	13.4						10.3
10.7	11.0	10.3	12.1	10.0	9.7	9.4	9.3	9.7	9.9	9.2	9.0	9.2	9.4	9.6	9.9	11.1	11.2	12.6	13.3						10.0
10.9	10.7	10.7	10.1	9.6	9.8	10.1	10.1	9.7	10.1	9.7	10.1	10.2	10.0	10.3	10.9	11.9	12.5	14.1	14.5						10.9
11.2	11.3	11.7	11.7	11.8	11.5	10.5	11.0	10.8	10.5	10.8	10.6	10.4	10.7	10.6	11.2	12.3	14.0	14.3	15.9						11.9
13.9	13.7	12.7	12.6	12.2	12.3	11.6	11.5	11.7	11.6	11.5	11.5	11.0	11.4	11.3	11.5	12.9	14.4	15.1	15.3						13.1

DEGREE ZONE: 43° S. LAT.

10.2	12.4	12.6	13.0	12.7	11.5	10.8	10.6	10.7	11.0	11.0	10.8	9.9	10.0	9.9	10.7	10.6	10.8	11.1	12.4						12.2
11.8	11.6	11.5	11.9	13.2	13.1	11.7	11.5	11.3	11.2	10.8	10.5	10.0	9.7	9.9	11.4	12.0	12.1	11.7	13.5						13.0
11.9	12.7	12.1	12.3	13.4	12.1	10.9	11.2	11.2	11.1	11.1	11.0	10.9	11.1	10.4	11.6	11.5	12.4	12.8	13.8						12.7
11.7	11.5	11.8	12.5	11.8	11.4	11.1	10.7	10.4	10.4	10.6	10.2	10.0	10.2	10.1	9.9	10.5	11.6	11.7	13.7						12.1
9.7	9.2	8.7	10.1	11.3	10.7	10.4	9.4	9.6	9.7	9.7	9.5	9.5	9.4	9.5	10.4	10.5	11.3	11.5	12.1						10.4
9.3	9.3	9.5	9.7	9.7	9.3	9.2	8.6	10.3	9.8	8.6	9.2	8.4	8.3	8.1	9.2	10.0	10.6	11.3	10.9						9.7
10.1	10.1	11.3	10.5	9.9	9.2	9.0	8.6	8.2	8.2	8.2	8.8	8.1	8.0	7.9	8.3	8.7	9.6	10.4	10.2						9.1
9.9	10.0	10.1	9.8	10.0	10.0	10.0	9.3	8.8	9.0	8.5	8.0	7.4	7.5	6.9	8.4	8.2	9.3	10.0	10.0						8.9
7.7	7.9	9.0	9.2	8.5	9.9	9.8	8.5	8.0	8.4	8.7	8.2	8.2	8.0	7.8	8.2	9.0	9.5	9.4	9.7						8.4
8.2	8.1	8.1	8.3	8.4	9.3	8.6	8.5	8.3	7.5	8.6	7.6	8.5	8.9	9.3	8.5	9.0	9.7	10.6	10.5						8.8
9.8	9.1	9.5	9.9	9.5	10.4	9.8	9.4	9.1	9.6	9.3	9.0	8.8	8.9	8.7	8.8	9.6	10.2	10.6	11.4						10.1
11.5	10.3	9.5	9.0	9.1	11.9	11.1	10.9	10.3	10.0	9.6	9.6	10.0	10.2	9.3	9.7	10.5	11.3	11.3	11.5						11.3

DEGREE ZONE: 45° S. LAT.

9.5	9.3	7.6	7.7	7.5	7.2	7.6	7.4	8.2	8.5	7.6	8.0	7.9	7.7	7.4	8.1	8.7	8.8	8.9	9.2						9.8
10.3	10.3	10.2	9.6	9.5	9.2	9.0	8.6	9.0	9.9	9.0	9.1	9.1	8.1	7.7	8.4	8.3	8.3	8.8	9.3						10.6
8.7	8.0	7.9	8.7	9.8	9.8	9.2	9.7	9.6	10.0	9.0	9.3	8.7	8.2	8.6	8.5	8.8	9.0	8.9	9.2						10.4
10.3	10.1	9.6	9.2	8.7	8.4	8.2	7.9	8.2	7.9	7.0	7.5	8.7	8.2	7.0	7.2	7.8	7.9	8.2	8.4						9.9
6.4	6.0	6.3	7.0	7.8	8.0	7.8	7.1	7.4	8.3	6.8	7.4	8.6	7.1	7.8	8.4	8.0	8.6	8.6	8.5						8.7
7.3	7.1	7.2	7.6	7.9	8.0	7.8	7.8	7.0	7.5	7.7	7.8	5.7	5.9	6.3	6.5	7.1	7.7	7.6	7.9						8.1
8.8	8.7	8.6	8.3	8.1	7.8	7.4	7.0	6.9	8.8	8.2	8.4	7.8	7.9	7.4	7.8	8.0	8.0	8.9	8.7						7.9
8.6	8.7	8.7	8.5	8.0	7.3	6.9	6.6	6.7	6.6	6.6	5.9	8.0	6.6	6.2	6.6	6.3	7.2	7.5	6.6						7.5
6.0	5.9	6.1	6.4	6.6	6.4	6.4	6.1	8.6	8.9	6.1	7.5	9.7	7.4	6.0	5.8	7.1	7.5	7.5	7.1						7.0
6.4	6.3	6.1	6.0	5.7	5.3	5.1	5.2	5.6	5.8	7.6	7.5	7.4	7.1	6.8	7.5	7.8	7.9	7.8	8.4						7.2
7.2	6.7	6.4	6.6	7.1	8.8	9.0	7.1	7.5	7.9	8.6	8.8	8.4	7.6	7.4	6.7	6.9	7.3	7.6	7.6						8.4
8.3	7.6	6.8	6.3	6.1	6.2	6.6	7.2	7.7	7.4	9.7	9.6	8.6	8.2	8.2	7.9	8.3	8.6	8.4	8.2						9.3

DEGREE ZONE: 47° S. LAT.

7.1	6.5	6.0	5.7	5.5	5.5	5.5	5.6	5.8	5.8	6.1	6.0	5.9	5.6	5.9	6.7	6.1	5.9	5.3	5.9						7.9
8.5	8.3	8.2	7.8	7.1	6.7	6.5	6.9	7.7	7.5	7.0	6.1	5.9	5.6	6.1	8.2	7.2	7.6	7.3	6.8						8.9
6.6	6.0	5.6	5.3	3.9	5.7	6.1	6.5	6.7	6.6	6.4	6.1	6.1	6.3	6.6	6.9	7.5	7.0	6.2	6.7						8.4
8.6	7.6	7.5	4.5	6.3	5.9	5.0	4.4	4.2	6.5	4.4	4.8	4.8	4.7	4.6	4.7	4.8	4.8	5.1	5.4						7.7
4.0	3.8	4.0	4.4	4.7	5.0	5.1	4.8	5.0	7.4	6.5	7.2	7.8	7.7	7.4	7.8	6.5	6.9	5.9	6.0						6.8
5.7	5.6	5.6	5.7	5.9	6.1	6.4	6.5	6.3	7.5	4.2	4.8	5.6	5.2	4.9	4.9	3.9	5.2	6.0	6.4						6.6
7.0	7.0	7.0	6.9	6.5	6.2	6.0	5.7	5.4	5.0	4.6	4.3	4.2	4.3	4.5	4.4	4.4	5.0	4.6	4.7						6.3
7.1	7.1	7.1	7.0	6.8	6.1	5.2	4.6	4.1	4.0	4.1	4.1	3.8	5.8	5.8	4.6	5.9	6.0	5.2	4.6						6.0
4.4	4.1	3.9	3.9	4.1	4.1	3.8	3.3	3.1	3.0	2.9	2.8	2.6	2.7	2.9	4.0	6.5	5.3	4.6	4.4						4.9
4.7	4.7	4.3	3.9	3.4	3.0	2.9	2.8	2.9	3.0	3.4	3.6	3.9	4.0	4.1	4.2	4.3	4.5	4.5	4.5						5.1
4.9	5.0	4.8	4.7	4.9	5.2	5.4	5.1	4.8	4.7	4.9	4.9	4.9	4.8	4.8	5.2	5.2	4.8	4.4	4.2						6.2
5.5	5.1	4.7	4.3	4.1	4.0	3.9	3.9	3.9	3.8	3.9	4.2	5.1	7.9	8.2	5.8	5.9	5.7	5.6	6.3						7.2

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.					60°					50°					40°					30°					20°
I						11.1	11.3	11.2	10.7	10.3	9.5	8.4	8.4	9.4	10.1	11.9	10.0	6.1	4.0	3.2	3.7	4.1	3.5	3.8
II							12.6	11.8	11.4	10.6	9.1	8.9	9.9	9.3	9.6	8.6	7.5	9.5	8.3	7.4	7.2	7.2	7.3	7.3
III							10.2	12.3	10.5	9.0	8.3	8.2	8.0	8.5	7.2	8.0	9.6	7.7	8.8	9.0	8.1	6.5	5.4	5.0
IV						9.5	10.1	9.8	9.4	8.4	7.7	7.9	8.3	8.1	11.9	8.0	8.6	7.0	8.8	8.8	7.4	5.3	4.4	4.0
V						3.1	6.3	7.8	7.5	6.4	6.0	5.9	6.5	6.2	7.1	7.4	6.8	5.7	4.7	4.3	4.9	4.8	4.3	4.0
VI							4.2	6.7	5.6	5.6	5.3	6.1	4.2	6.5	6.8	5.8	5.8	5.7	5.0	4.9	4.9	4.7	4.8	5.3
VII							6.6	6.1	5.9	5.1	5.2	4.8	3.6	6.4	6.9	6.2	5.1	4.4	4.2	4.6	4.6	4.3	4.4	4.8
VIII						6.1	6.0	10.0	8.4	5.1	4.8	6.0	6.3	5.7	4.5	3.0	3.1	3.6	3.0	4.8	3.9	3.2	2.9	2.7
IX							6.1	5.5	4.1	5.1	4.8	3.8	3.5	4.0	6.6	6.2	6.5	3.6	3.9	4.3	4.1	3.9	3.7	3.8
X						5.4	6.3	7.0	5.7	4.9	4.9	5.4	5.4	4.8	11.2	4.1	5.8	5.0	4.1	3.1	3.1	3.8	4.2	3.5
XI						8.3	7.9	7.5	6.7	6.7	6.2	5.3	6.0	6.4	8.0	6.5	3.8	5.6	9.0	5.2	5.3	5.4	5.0	4.6
XII						9.7	11.0	11.0	9.4	8.1	8.5	7.7	7.9	8.1	8.0	7.4	7.1	7.0	6.0	4.6	4.9	4.7	3.8	3.5

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.					60°					50°					40°					30°					20°
I	9.2	10.0	10.2			10.0	9.7	10.0	10.6	9.6	9.9	8.9	7.7	7.0	6.7	6.6	6.5	5.8	5.1	4.1	3.3	3.0	2.6	2.7	2.8	
II	9.3	9.3	9.4			11.7	11.7	11.0	9.9	9.5	9.7	8.4	7.7	7.8	7.6	7.2	7.6	7.4	7.5	6.9	5.6	4.7	4.2	4.1	4.7	
III	9.6	9.7				10.6	10.5	9.5	9.5	9.3	8.4	7.6	7.4	7.4	7.0	7.0	7.0	6.6	6.4	6.3	5.7	4.6	4.2	3.3	2.9	
IV	7.8	8.2				8.3	9.2	8.6	8.4	7.9	7.0	6.5	5.9	6.4	6.1	5.3	5.9	6.8	6.5	6.1	5.6	4.1	2.9	1.8	1.6	
V	7.6	7.2				7.8	7.7	7.5	7.1	6.5	6.0	5.3	5.4	5.0	4.8	4.5	4.4	4.1	3.6	3.2	3.2	3.6	3.5	3.1	2.7	
VI	6.8	7.0				6.0	6.7	7.1	6.3	6.1	5.5	4.9	4.9	4.7	4.4	3.9	3.5	3.1	2.7	2.3	2.1	2.0	2.2	2.3	2.7	
VII	5.3	4.9				4.6	5.2	5.8	6.0	5.7	5.2	5.1	4.0	3.8	4.2	4.5	3.8	2.8	2.6	2.7	2.9	2.9	2.8	2 9	3.0	
VIII	5.8					4.5	5.2	5.6	5.1	5.0	4.9	4.4	3.9	4.0	3.6	2.8	2.3	2.4	2.2	2.4	2.3	1.6	1.1	1.0	1.0	
IX	6.1	6.1				4.6	5.8	5.8	5.2	5.2	5.0	4.8	3.9	3.4	3.5	3.3	2.8	2.5	2.2	2.3	2.2	1.8	1.6	1.9	2.3	
X	6.6	7.3				6.1	6.1	5.6	5.1	5.1	5.1	4.6	4.3	4.4	4.4	4.0	2.9	2.0	1.6	1.2	1.4	1.9	2.0	2.3	1.7	
XI	6.7	7.0	7.9			7.6	8.1	7.3	6.1	6.0	6.3	5.9	5.0	4.8	4.9	4.9	4.4	3.8	3.5	3.3	3.0	2.3	1.6	1.1	1.3	
XII	8.0	9.0	9.5			8.9	8.9	8.8	8.9	8.2	7.5	7.3	6.7	6.3	5.9	5.5	4.6	5.0	4.4	3.1	2.9	2.6	2.4	2.0	1.9	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.					60°					50°					40°					30°					20°
I	8.2	8.3	9.0	9.7	9.2	9.2	8.0	8.5	8.7	8.1	7.8	7.7	7.2	6.7	6.2	5.6	5.2	4.4	3.6	2.7	2.0	1.6	1.6	1.9	2.1	
II	8.6	8.6	8.8	9.1	8.8	10.5	10.5	9.9	8.9	7.6	8.0	7.7	7.4	7.1	6.7	6.9	6.2	5.7	5.4	5.0	3.7	2.7	2.1	1.9	2.3	
III	7.9	8.0	8.6			9.4	8.9	7.8	7.0	7.7	7.4	7.0	6.7	6.7	6 5	6 0	5.1	4.6	4.0	3.7	3.6	2.8	2.6	2.2	2.1	
IV	7.2	7.7	8.0			8.6	8.3	7.5	7.2	7.2	6.5	5.9	5.5	5.3	5.0	3.9	3.7	3.6	3.0	3.0	3.0	2.6	1.8	1.0	0.9	
V	6.8	6.5	6.2			7.2	7.2	6.8	5.9	5.3	5.0	5.3	5.1	4.4	4.1	3.7	3.2	2.4	1.6	1.4	1.6	1.5	1.3	1.3	1.5	
VI	5.9	6.3	6.3			4.7	5 5	6.2	5.8	5.2	5.1	4.7	4.4	4.2	4.0	3.3	2.5	1.7	1.1	0.6	0.3	0.3	0.3	0.7	1.1	
VII	5.1	4.7	5.2			2.9	4.0	5.0	5.1	5.2	4.6	4.2	3.7	3.5	3.4	3.2	2.5	1.7	1.1	0.9	1.0	1.1	1.2	1.3	1.4	
VIII	5.5	6.0	6.1			3.9	4.2	5.0	4.7	4.3	4.0	3.8	3.4	3.2	3.3	3.0	1.8	0.9	0.8	0.8	0.8	−0.8	−1.3	−1.0	−0.7	
IX	5.3	5.3	5.6			4.5	5.1	5.3	4.8	4.5	4.3	4.2	4.1	3.6	3.2	2.3	1.3	1.0	0.8	0.6	0.0	0.0	−0.2	0.0	1.0	
X	6.2	6.4	7.0			6.1	6.1	5.5	4.9	4.8	5.1	4.8	4.3	4.0	3.3	2.3	1.2	0.6	0.2	0.4	0.9	0.2	0.0	0.0	−1.0	
XI	6.1	6.2	6.7			7.1	7.2	6.7	5.6	5.1	5.5	5.4	5.2	4.7	4.4	4.1	3.3	2.6	1.7	0.4	−0.1	−0.2	−0.3	−0.7	−0.8	
XII	7 2	7.8	8.0			8.2	7.4	7.8	7.4	6.5	6.9	6.7	6.3	5.9	5.2	4.3	3.4	3.0	2.3	2.0	1.6	1.6	1.4	0.9	.9	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.					60°					50°					40°					30°					20°
I	7.4	7.4	7.5	7.3	8.0	8.1	7.3	7.2	6.7	6.6	6.6	6.2	6.4	6.0	4.9	4.4	4.6	4.5	3.6	2.7	2.1	1.5	0.9	1.0	1.3	
II	7.6	7.7	7.8	7.9	8.6	8.4	8.0	8.7	7.8	6.8	7.0	7.1	6.2	5.5	5.7	5.6	4.4	3.4	2.9	2.9	3.1	3.0	2.2	1.1	0.5	
III	7.2	7.3	7.5	8.0	8.2	7.8	7.9	7.7	6.8	6.7	6.8	6.6	6.3	5.5	5.1	4.2	3.3	2.7	2.3	2.0	2.1	2.3	2.2	1.6	1.3	
IV	6.6	6.3	6.8	7.7	7.5	7.4	7.0	6.6	5.8	5.5	6.0	6.1	5.0	3.6	2.8	2.7	2.9	2.4	2.2	2.1	2.1	2.2	2.0	0.8	0.3	
V	6.1	5.9	6.0	6.1	6.3	6.3	5.3	5.6	4.7	4.9	5.1	5.0	4.2	3.4	2.9	2.0	1.2	0.6	0.2	0.0	0.0	0.1	0.3	0.4	0.6	
VI	5.3	5.6	5.4	5.7	5.8	5.6	5.2	5.3	4.8	4.1	4.2	4.0	3.4	3.2	2.9	2.1	1.3	0.5	−0.2	−0.8	−1.0	−1.0	−0.6	−0.2	0.0	
VII	4.2	4.0	4.7	5.2	5.7	5.6	5.0	4.3	4.1	4.0	3.5	3.1	2.8	2.7	2.4	1.9	1.1	0.4	0.0	−0.1	0.1	0.2	0.3	0.5	0.7	
VIII	4.7	4.9	4.7	5.1	5.7	5.4	5.2	4.5	3.9	3.7	3.8	4.1	3.3	2.2	2.2	2.2	1.2	0.2	−0.6	−0.8	0.1	0.0	−1.0		−1.3	
IX	4.7	4.8	4.7	5.0	5.3	5.3	4.8	4.4	3.8	3.8	4.0	3.6	2.6	2.3	2.5	1.7	0.8	0.2	0.1	−0.2	−0.7	−1.0	−1.3	−1.6	−1.1	
X	5.2	5.3	5.4	5.4	5.9	5.8	5.4	5.2	5.1	4.7	4.3	4.3	4.2	3.7	2.1	1.0	0.0	−0.3	−0.6	−0.1	0.1	−0.2	−1.1	−1.2	−1.6	
XI	5.6	5.7	5.7	5.9	6.0	5.9	5.6	5.7	5.2	4.9	4.4	4.2	3.8	3.9	4.1	4.1	3.7	3.0	2.2	0.9	−0.1	−0.3	−0.6	−1.0	−1.3	
XII	6.0	6.7	6.7	6.8	6.9	6.8	6.7	6.3	5.7	5.9	6.2	5.9	5.4	5.3	4.6	3.4	2.1	1.4	0.8	0.4	0.7	0.9	0.9	0.4	0.2	

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.					60°					50°					40°					30°					20°
I	7.0	7.1	7.0	6 8	7.0	7.2	6.9	6.1	5.5	5.9	5.4	4.5	4.9	4.0	2.9	2.2	2.4	2.9	2.8	2.5	2.1	1.4	0.6	0.0	0.0	
II	7.1	7.2	7.1	7.0	7.1	7.0	7.2	6.9	6.1	6.1	6.3	6.2	5.2	3.9	3.6	3.5	2.7	1.9	1.6	1.5	1.4	1.2	1.3	0.8	−0.2	
III	6.3	6.2	6.3	6.6	6.7	6.9	6.9	6.3	6.1	6.1	5.4	4.4	4.1	3.6	3.2	2.6	2.0	1.5	1.0	0.8	0.9	1.2	1.5	1.2	0.7	
IV	5.9	5.9	5.6	6.1	5.9	5.7	5.6	4.9	4.4	3.7	3.7	3.8	3.3	2.1	1.4	1.0	1.0	1.2	1.3	1.4	1.4	1.6	1.3	0.5	−0.1	
V	5.0	5.0	5.1	5.2	5.3	5.2	4.2	4.0	3.7	3.0	3.6	3.4	2.8	1.9	1.0	0.2	−0.3	−0.5	−0.6	−0.7	−0.5	−0.4	−0.2	−0.1	0.0	
VI	4.7	4.7	4.7	4.9	5.1	5.0	4.3	3.5	3.3	3.5	3.9	3.6	2.7	1.8	1.0	0.3	−0.2	−0.7	−1.1	−1.3			−1.3	−1.0	−0.6	
VII	4.1	3.8	4.0	4.4	4.4	4.4	3.5	2.6	2.1	2.2	1.1	−0.2	0.1	0.7	0.9	0.3	−0.2	−0.8	−1.1	−1.1	−1.0	−0.8	−0.5	−0.3	−0.1	
VIII	4.1	4.0	4.2	4.2	4.3	4.4	4.4	3.9	2.9	2.8	2.8	2.9	2.8	1.3	0.3	0.0	−0.3	−1.0	−1.3	−1.3	−1.1	−0.9	−1.1			
IX	4.2	4.0	4.1	4.0	3.9	3.7	3.4	3.5	2.8	2.3	2.6	2.7	1.9	0.8	0.7	0.6	0.1	−0.3	−0.7	−0.9	−1.1					
X	4.2	4.5	4.3	4.3	4.6	4.9	4.3	3.2	2.4	2.3	2.6	2.6	2.3	1.2	0 2	−0 7	−1.1	−1.2	−1.1	−1.0	−1.1	−1.3				
XI	5.1	5.1	5.0	5.1	5.1	5.0	4.3	3.6	3.1	3.9	3.3	1.3	1.3	1.9	2.3	2.4	2.0	1.6	1.2	1.3	0.9	0.4	0.0	−0.6	−1.1	
XII	6.0	5.9	5.9	6.0	5.7	6.0	5.9	5.3	4.8	5.0	5.7	5.0	4.6	4.5	3.5	2.2	1.3	0.4	−0.1	−0.4	−0.5	−0.3	−0.2	−0.2	−0.3	

* Intermediate values, which were introduced to determine upwelling. They were

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 49° S. LAT.

20°					10°					0°					10°					20°					E. Long. 30°	Tm
3.9	4.6	5.1	5.6	5.7	5.3	4.8	4.4	4.2	4.0	3.8	3.9	4.0	4.1	4.5	4.8	4.9	4.6	4.5	5.2	7.4	6.0	6.2	6.7	6.6		6.3
7.4	7.4	7.2	7.0	6.9	6.9	6.7	6.1	5.3	4.7	4.2	4.1	4.4	4.6	4.8	4.7	4.4	4.1	4.3	5.0	5.2	4.9	4.9	4.8	4.8		6.3
5.3	6.1	6.2	5.7	4.7	3.7	3.1	3.0	3.1	3.3	3.4	3.5	3.6	3.6	3.7	3.8	3.9	4.0	4.1	4.4	4.7	5.0	5.1	5.1	5.1		6.0
3.9	4.3	4.9	5.4	5.5	5.7	5.6	4.8	4.3	4.5	3.8	3.2	3.0	3.1	3.7	3.6	4.8	3.7	3.8	3.4	4.5	4.6	4.3	4.0	3.4		5.9
4.0	4.1	4.0	3.6	3.1	2.8	2.7	2.8	2.9	3.0	3.1	3.2	3.2	3.2	3.1	3.2	3.4	3.8	4.1	4.3	4.2	4.1	4.0	3.9	3.9		4.5
5.6	5.5	5.0	4.7	4.2	3.9	3.6	3.3	3.4	3.8	4.1	4.5	4.7	4.4	4.2	4.2	4.5	3.9	3.9	3.9	4.1	4.1	4.6	4.3	5.2		4.8
5.1	5.4	5.6	5.6	5.5	5.4	5.4	5.3	5.1	4.9	4.7	4.5	4.2	3.9	3.5	3.1	2.9	2.8	2.7	2.7	2.6	2.6	2.7	2.7	2.7		4.5
2.8	3.1	4.0	4.7	5.1	5.4	5.4	5.4	5.3	5.1	4.6	4.1	3.4	2.9	2.6	2.4	2.3	2.1	2.1	2.1	2.2	3.0	3.6	2.8	2.5		4.2
4.3	4.5	4.4	3.9	3.3	2.9	2.7	2.6	2.5	2.4	2.3	2.2	2.1	2.0	1.9	1.7	1.6	1.5	1.6	1.7	1.8	2.0	2.3	2.6	2.8		3.4
2.8	2.6	2.3	2.4	3.0	3.4	3.5	3.4	3.1	2.4	2.0	2.0	2.1	2.1	2.2	2.3	2.4	2.4	2.6	2.8	2.9	2.9	2.8	2.7	2.7		3.7
4.2	3.2	2.1	1.9	2.0	2.8	3.1	3.0	2.9	3.0	3.4	3.6	3.7	3.5	3.2	3.0	2.7	2.6	2.9	2.8	2.8	3.1	3.4	3.7	3.3		4.4
3.5	3.6	3.7	3.7	3.5	3.4	3.2	3.0	2.7	2.2	1.9	1.8	1.7	1.7	1.8	3.4	2.7	1.6	1.9	2.3	2.6	2.7	3.0	3.6	5.1		4.7

DEGREE ZONE: 51° S. LAT.

3.2	3.5	3.8	4.0	4.0	3.9	3.7	3.5	3.3	3.0	2.9	2.8	2.7	2.5	2.4	2.5	2.9	3.1	3.2	3.3	3.3	3.7	4.1	4.0	3.7		4.8
5.2	5.1	5.1	5.0	4.7	4.4	4.1	3.6	3.1	2.8	2.7	2.6	2.7	2.9	3.1	3.2	3.2	3.1	3.2	3.7	4.0	4.0	3.8	3.7	3.7		5.5
3.1	3.5	3.8	3.3	2.5	1.8	1.6	1.6	1.7	1.7	1.8	1.8	1.8	1.8	1.7	1.7	1.7	1.9	2.0	2.2	2.6	3.0	3.3	3.7	3.8		4.5
1.7	2.2	2.8	3.3	3.8	3.9	3.8	3.5	3.0	2.6	2.2	1.9	1.8	1.7	1.7	1.7	1.8	1.9	2.0	2.2	2.3	2.5	2.5	2.4	2.3		4.7
2.6	2.7	2.6	2.4	2.2	2.0	1.8	1.8	1.9	2.0	2.1	2.2	2.2	2.2	2.3	2.3	2.4	2.6	2.8	2.9	3.0	3.1	3.0	2.9	2.9		3.6
3.1	3.3	3.1	2.9	2.7	2.5	2.3	2.2	2.2	2.3	2.5	2.6	2.7	2.8	2.8	2.8	2.7	2.6	2.4	2.3	2.2	2.3	2.4	2.5	2.7		3.3
3.3	3.7	4.0	4.1	4.1	4.2	4.1	3.9	3.8	3.5	3.2	3.0	2.7	2.3	2.1	2.0	1.9	1.8	1.7	1.7	1.7	1.7	1.6	1.6	1.6		3.3
1.1	1.2	1.5	2.2	2.7	3.2	3.6	3.7	3.5	3.2	3.0	2.6	2.2	2.0	1.8	1.6	1.4	1.4	1.3	1.3	1.3	1.3	1.3	1.3	1.4		2.6
2.7	2.9	2.8	2.7	2.6	2.4	2.2	2.0	1.8	1.6	1.5	1.4	1.3	1.2	1.2	1.1	1.0	0.8	0.9	0.9	1.0	1.1	1.2	1.3	1.4		2.5
1.0	0.9	0.9	1.2	1.7	2.1	2.5	2.4	2.0	1.5	1.1	0.9	0.8	0.7	0.9	1.1	1.3	1.5	1.6	1.7	1.8	2.0	2.1	2.1	2.0		2.4
1.1	0.5	0.1	0.0	0.3	0.9	1.1	1.3	1.2	1.2	1.4	1.9	2.1	2.1	1.9	1.3	1.1	1.1	1.4	1.2	1.4	1.9	2.1	2.3	2.3		2.8
1.9	2.0	2.1	2.1	2.1	2.0	1.9	1.8	1.6	1.3	1.1	1.0	0.9	0.7	0.5	0.3	0.2	0.1	0.1	0.2	0.4	0.6	0.8	0.8	0.8		3.1

DEGREE ZONE 53° S. LAT.

2.5	2.7	2.9	3.1	3.2	3.1	3.0	2.8	2.6	2.3	2.1	2.0	1.8	1.6	1.3	1.1	1.2	1.4	1.7	1.8	1.9	2.0	2.2	2.1	1.8		3.6
2.7	2.9	2.9	2.8	2.6	2.5	2.3	2.0	1.9	1.8	1.8	1.7	1.9	2.0	2.2	2.4	2.4	2.4	2.5	2.7	3.0	3.1	3.2	3.2	3.1		4.2
2.2	2.4	2.6	2.3	1.5	1.0	0.9	0.9	1.0	1.1	1.1	1.1	1.1	1.0	0.9	0.9	0.8	0.8	0.8	0.8	0.9	0.9	1.1	1.4	1.7		3.2
0.8	1.1	1.4	1.8	2.0	2.2	2.2	2.0	1.9	1.7	1.6	1.4	1.3	1.3	1.2	1.2	1.2	1.3	1.3	1.4	1.5	1.6	1.7	1.7	1.6		2.9
1.8	1.9	1.8	1.6	1.3	1.0	0.9	0.8	0.9	1.0	1.1	1.2	1.3	1.3	1.4	1.4	1.5	1.7	1.8	2.0	2.0	2.1	2.1	2.2	2.2		2.5
1.6	1.7	1.8	1.8	1.8	1.7	1.7	1.6	1.5	1.6	1.7	1.7	1.8	1.9	1.9	1.9	1.8	1.8	1.7	1.6	1.6	1.6	1.7	1.7	1.8		2.3
1.6	1.7	1.8	2.0	2.1	2.1	2.0	1.9	1.8	1.7	1.6	1.4	1.3	1.2	1.1	1.0	1.0	1.0	0.9	0.9	0.8	0.8	0.8	0.7	0.7		2.0
−0.5	−0.2	0.0	0.4	0.9	1.0	1.2	1.4	1.6	1.4	1.3	1.2	1.1	1.0	0.9	0.7	0.6	0.5	0.4	0.4	0.3	0.2	0.2	0.1	0.2		1.3
1.7	2.0	2.1	2.1	2.0	1.9	1.6	1.4	1.2	1.0	0.8	0.7	0.6	0.5	.0.5	0.4	0.4	0.3	0.3	0.3	0.3	0.4	0.4	0.5	0.6		1.7
−1.0	−0.9	−0.8	−0.7	−0.4	0.3	1.2	1.3	1.0	0.7	0.4	0.1	−0.1	−0.3	−0.5	−0.8	−0.9	−0.8	−0.5	−0.1	0.1	0.3	0.6	0.7	1.0		1.2
−0.6	−0.7	−0.7	−0.6	−0.3	−0.1	0.1	0.1	0.0	−0.1	−0.2	−0.2	−0.1	0.1	0.0	−0.1	−0.2	−0.2	−0.1	−0.1	0.0	0.4	0.7	0.9	1.0		1.5
0.9	1.0	1.2	1.3	1.2	1.1	1.1	1.0	0.8	0.6	0.3	0.0	−0.4	−0.7	−0.9	−1.0	−1.0	−1.1	−1.0	−0.9	−0.7	−0.4	−0.3	−0.2	−0.3		2.0

DEGREE ZONE: 55° S. LAT.

1.8	2.0	2.2	2.3	2.3	2.4	2.4	2.2	2.0	1.6	1.4	1.3	1.2	1.0	0.8	0.6	0.4	0.4	0.6	0.8	0.9	0.9	0.9	0.7	0.6		2.8
1.2	1.6	1.7	1.7	1.7	1.7	1.7	1.6	1.5	1.4	1.4	1.4	1.5	1.6	1.7	1.9	1.9	1.9	1.9	2.0	2.3	2.5	2.6	2.7	2.7		3.2
1.3	1.7	1.9	1.7	1.0	0.7	0.4	0.3	0.3	0.4	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.6	0.5	0.4	0.4	0.4	0.4	0.5	0.6		2.4
0.2	0.3	0.6	0.9	1.0	1.2	1.3	1.3	1.3	1.2	1.1	0.9	0.8	0.7	0.7	0.7	0.7	0.8	0.8	0.9	0.9	1.0	1.0	1.0	0.9		2.2
0.7	0.8	0.8	0.7	0.4	0.2	0.1	0.0	0.1	0.2	0.3	0.4	0.5	0.6	0.7	0.7	0.8	0.8	0.9	1.0	1.1	1.1	1.2	1.3	1.3		1.5
0.3	0.7	1.0	1.1	1.2	1.2	1.1	1.0	0.9	0.9	0.9	1.0	1.1	1.2	1.3	1.3	1.2	1.1	1.0	0.9	0.8	0.8	0.9	1.0	1.1		1.5
0.7	0.8	0.8	0.9	0.9	0.9	0.9	0.8	0.7	0.7	0.6	0.5	0.4	0.3	0.2	0.2	0.2	0.2	0.2	0.1	0.1	0.1	0.0	0.0	0.0		1.2
−1.3	−1.2	−1.0	−0.7	−0.4	−0.2	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.1	−0.2	−0.3	−0.3	−0.4	−0.4	−0.5	−0.5	−0.6	−0.7	−0.7	−0.7		0.6
0.0	0.9	1.1	1.3	1.2	1.2	1.0	0.9	0.6	0.3	0.1	0.0	−0.1	−0.2	−0.2	−0.3	−0.3	−0.4	−0.4	−0.4	−0.4	−0.3	−0.3	−0.2	−0.2		0.9
−1.3	−1.3	−1.2	−1.2	−1.2	−1.3	−1.6	−1.7	−1.2	−1.8	−0.9	−0.7	−0.8	−0.9	−1.1	−1.3	−1.5			−1.3	−1.2	−1.1	−0.9	−0.7	−0.4		0.3
−1.0	−1.6	−1.3	−1.2	−1.0	−0.7	−0.6	−0.7	−0.8	−1.0	−1.1	−1.2	−1.2	−1.1	−1.1	−1.0	−0.9	−0.9	−1.0	−1.1	−1.1	−1.0	−0.8	−0.6	−0.3		0.8
−0.1	0.0	0.2	0.5	0.6	0.6	0.4	0.2	0.1	−0.1	−0.5	−0.9	−1.2	−1.2							−1.3	−1.2	−1.7	−1.1	−1.3		1.6

DEGREE ZONE: 57° S. LAT.

0.6	1.1	0.9	0.4	0.7	1.0	1.4	1.6	1.2	0.8	0.7	0.6	0.5	0.4	0.4	0.3	0.0	−0.2	−0.3	−0.3	−0.2	−0.2	−0.1	−0.2	−0.2		1.8
−0.3	0.0	0.4	0.5	0.6	1.1	1.3	1.3	1.2	1.0	1.0	1.0	1.1	1.2	1.3	1.4	1.4	1.5	1.6	1.6	1.7	1.9	2.0	2.1	2.1		2.3
0.6	0.8	1.1	1.3	0.9	0.6	0.2	−0.1	−0.2	−0.1	0.0	0.1	0.2	0.1	0.1	0.1	0.2	0.2	0.1	0.0	−0.1	−0.1	−0.2	−0.2	−0.1		1.6
−0.3	−0.3	−0.1	0.1	0.4	0.6	0.7	0.8	0.7	0.7	0.6	0.4	0.3	0.1	0.1	0.1	0.2	0.2	0.3	0.3	0.3	0.3	0.3	0.3	0.3		1.1
0.2	0.2	0.0	−0.1	−0.2	−0.3	−0.4	−0.5	−0.5	−0.5	−0.4	−0.3	−0.2	−0.1	−0.1	0.0	0.1	0.2	0.3	0.3	0.3	0.3	0.2	0.2	0.3		+0.6
−0.3	−0.1	0.2	0.5	0.7	0.7	0.6	0.5	0.4	0.3	0.3	0.3	0.4	0.5	0.6	0.5	0.4	0.3	0.2	0.2	0.1	0.2	0.2	0.3	0.4		0.8
0.1	0.1	0.2	0.3	0.3	0.3	0.2	0.1	−0.1	−0.1	−0.2	−0.3	−0.3	−0.4	−0.4	−0.4	−0.4	−0.5	−0.5	−0.5	−0.6	−0.7	−0.7	−0.7	−0.7		+0.1
				−1.4	−1.3	−1.1	−1.0	−0.9	−0.8	−0.7	−0.7	−0.7	−0.8	−0.9	−1.0	−1.0	−1.1	−1.1	−1.2	−1.2	−1.3	−1.3				+0.1
−1.2	−1.0	−0.3	0.1	0.2	0.2	0.2	0.1	−0.1	−0.2	−0.4	−0.6	−0.7	−0.8	−0.9	−1.0	−1.0	−1.1	−1.1	−1.1	−1.0	−1.0	−1.0	−0.9	−0.8		+0.2
								−1.8			−1.6		−1.8	−1.3										−1.3		
−1.2	−1.6				−1.3	−1.3	−1.4	−1.5				−1.5						−1.3	−1.4					−1.3		0.8
−0.4	−0.3	−0.3	−0.1	0.0	−0.1	−0.2	−0.3	−0.4	−0.7	−1.0	−1.2	−1.0		−1.3					−1.5	−1.3	−1.5	−1.5				1.0

accounted for in the means although they were not included in this table.

Standard values of the surface temperatures

AVERAGE WIDTH OF THE TWO-

Month	70° W. Long.					60°					50°					40°					30°					20°				
I	5.7	6.0	6.2	6.1	5.6	5.0	5.2	5.9	5.2	3.9	3.4	2.7	2.2	1.6	0.9	0.6	0.5	1.0	1.2	1.2	0.7	0.2	−0.3	0.6	−0.7
II	5.4	5.5	6.2	6.2	6.1	5.9	5.3	5.3	5.2	4.8	8.9	3.8	3.1	1.7	1.4	1.4	1.1	0.9	0.8	0.5	−0.2	−0.6	−1.1	−1.3	−1.3
III		5.1	5.5	5.7	5.3	5.1	4.7	4.4	4.1	3.7	3.3	3.0	2.6	2.2	1.7	1.1	0.7	0.3	−0.1	−0.3	−0.4	−0.1	0.4	0.3	0.1
IV	4.3	4.2	4.4	5.1	5.1	4.4	3.6	2.7	2.1	1.6	1.3	1.5	1.2	0.7	−0.1	−0.1	0.1	0.3	0.4	0.6	0.7	0.8	0.9	0.8	0.8
V	4.4	4.3	4.4	4.5	4.3	3.7	2.3	2.0	1.4	1.1	1.6	1.4	0.7	0.1	−0.5	−1.0	−1.1	−1.2	−1.2	−1.1	−1.0	−0.8	−0.7	−0.5	−0.4
VI	4.0	4.0	4.1	4.1	3.8	3.2	3.1	2.7	2.3	2.6	3.3	3.3	1.9	0.3	−0.3	−0.7	−1.1	−1.3							−1.1
VII		3.2	3.4	3.6	3.3	3.2	2.1	1.0	0.0	0.2	−0.9	−1.3	−1.1	−0.8	−0.7	−1.0	−1.2	−1.4				−1.3	−1.2	−1.0	−0.8
VIII	3.3	3.7	3.4	2.5	3.1	2.8	2.0	1.5	0.6	0.3	0.6	0.8	0.7	0.0	−0.5	−1.0	−1.1	−1.3							
IX	3.9	3.6	3.1	2.9	2.5	2.2	2.2	2.5	1.7	0.9	0.8	0.7	0.7	0.1	−0.2	−0.4	−0.7	−0.9	−1.2						
X	3.6	3.6	3.0	2.5	2.6	3.4	1.8	−0.6	−1.0	−0.9	−0.7	−0.6	−0.8	−1.0	−1.2	−1.3									
XI	4.3	4.1	4.2	4.1	4.2	4.1	3.2	1.8	1.3	1.6	1.8	0.1	−0.1	0.3	0.7	0.6	0.3	0.1	−0.1	−0.1	0.1	0.3	0.1	−0.3	−0.9
XII	4.7	4.6	4.8	4.7	4.1	4.8	4.9	3.9	3.3	3.8	4.0	3.3	2.7	2.4	2.1	1.5	0.5	−0.2	−0.6	−1.0	−1.2	−1.2	−1.0	−0.8	−0.8

AVERAGE WIDTH OF THE TWO-

I	4.6	4.6	4.2	4.0	3.4	3.0	3.1	3.4	3.4	2.8	2.1	1.7	1.1	0.6	0.0	−0.4	−0.6	−0.4	−0.3	−0.2	−0.3	−0.4	−0.7	−1.0	−1.1
II	4.1	4.3	4.5	3.8	3.8	3.6	3.2	3.3	3.5	2.8	2.0	1.5	1.2	0.3	−0.1	−0.2	−0.4	−0.2	0.3	0.0	−0.9	−1.1	−1.3	−1.3	−1.4
III	4.0	4.4	4.8	4.4	3.7	3.3	2.8	2.5	2.2	1.9	1.9	1.7	1.3	1.0	0.6	0.2	−0.3	−0.9	−1.1	−1.2	−1.1	−1.1	−0.9	−0.7	−0.8
IV				3.3	3.0	2.3	1.7	1.5	1.0	0.7	0.3	0.0	−0.2	−0.4	−0.8	−0.9	−0.9	−0.7	−0.3	−0.2	−0.1	−0.1	−0.1	−0.4	−0.9
V	3.7	3.6	3.9	3.9	3.0	2.0	0.7	0.1	−0.1	−0.1	0.0	−0.3	−0.7	−1.0	−1.2			−1.4				−1.3	−1.0	−0.9	−0.8
VI					2.9	2.2	1.8	1.3	0.9	0.9	1.0	0.4	−0.2	−0.7	−1.0	−1.2	−1.4	−1.8							
VII		1.4	0.6	0.2	0.6	−0.5	−0.7	−1.0	−1.3	−1.2	−1.3							−1.8							
VIII	2.0	2.0	1.5	0.9	0.4	0.1	−0.3	−0.8	−1.0	−1.0	−0.9	−0.8	−0.9	−1.0	−1.2	−1.3	−1.6	−1.8							
IX		2.0	1.4	0.9	0.7	0.7	0.7	0.7	0.5	0.1	−0.3	−0.4	−0.4	−0.7	−1.0	−1.2	−1.3	−1.7							
X	2.7	2.3	1.5	1.0	1.3	1.0	−0.6	−1.4										−1.6							
XI	3.0	2.5	2.2	2.1	2,2	2.1	1.9	0.2	−1.4	−0.5	−0.3	−0.9	−0.7	−0.4	−0,5	−0.9	−1.2	−1.3	−1.2	−1.1	−1.0	−0.7	−0.6	−0.8	−1.1
XII	3.0	2.9	2.6	1.9	1.9	2.2	1.8	1.6	1.9	2.0	1.4	1.3	1.0	0.4	0.9	0.7	−0.1	−0.6	−1.0	−1.3	−1.4	−1.5	−1.5	−1.6	−1.5

*Intermediate values, which were introduced to determine upwelling. They

of the Atlantic Ocean for two-degree fields—Continued

DEGREE ZONE: 59° S. LAT.

20°	10°	0°	10°	20°	E. Long. 30°	Tm
−0.4 −0.3 −0.2 −0.4 −0.3	−0.1 0.3 0.8 0.6 0.1	−0.1 −0.2 −0.2 −0.2 −0.1	−0.1 −0.1 −0.3 −0.7 −1.0	−1.1 −1.1 −1.1 −1.0 −1.0		0.7
−1.0 −0.7 −0.6 −0.8 −0.7	−0.2 0.3 0.6 0.6 0.6	0.4 0.4 0.3 0.4 0.7	0.9 1.0 1.1 1.2 1.2	1.2 1.3 1.2 1.2 1.2		1.2
−0.1 0.1 0.6 0.7 0.7	0.5 0.2 −0.2 −0.4 −0.7	−0.9 −1.1 −1.0 −0.9 −0.7	−0.6 −0.5 −0.4 −0.5 −0.6	−0.7 −0.7 −0.7 −0.7 −0.6		+0.6
−0.8 −0.9 −0.8 −0.4 −0.1	0.1 0.2 0.2 0.1 0.0	0.0 −0.1 −0.3 −0.4 −0.5	−0.5 −0.4 −0.4 −0.3 −0.3	−0.3 −0.3 −0.4 −0.4 −0.4		0.3
−0.3 −0.3 −0.4 −0.5 −0.6	−0.7 −0.8 −0.9 −1.0 −1.1	−1.0 −1.0 −0.9 −0.9 −0.8	−0.7 −0.6 −0.4 −0.3 −0.3	−0.3 −0.4 −0.4 −0.4 −0.4		−0.2
−0.8 −0.6 −0.3 −0.1 0.1	0.2 0.2 0.1 0.0 −0.1	−0.3 −0.3 −0.2 −0.2 −0.1	−0.2 −0.3 −0.4 −0.5 −0.5	−0.6 −0.6 −0.5 −0.4 −0.3		+0.3
−0.7 −0.5 −0.4 −0.3 −0.2	−0.3 −0.3 −0.4 −0.5 −0.7	−0.9 −1.0 −1.1 −1.1 −1.1	−1.1 −1.1 −1.1 −1.1 −1.2	−1.2 −1.2 −1.2 −1.2 −1.3		−0.7
−1.2 −1.0	−0.8 −0.8 −0.7 −0.8 −0.8	−1.0 −1.1 −1.2 −1.3				−0.1
						+0.8
−0.8 −0.7 −0.7 −0.6 −0.5	−0.5 −0.6 −0.7 −0.9 −1.0	−1.3				+0.7

DEGREE ZONE: 61° S. LAT.

−1.0 −0.9 −0.7 −0.8 −0.8	−0.6 −0.2 0.1 0.0 −0.3	−0.6 −0.7 −0.8 −0.8 −0.7	−0.6 −0.6 −0.7 −0.9 −1.1	−1.2		0.0
−1.1 −0.9 −0.9 −1.5 −1.4	−1.0 −0.6 −0.1 0.0 0.1	0.0 −0.1 −0.2 −0.2 −0.2	−0.2 −0.2 −0.2 −0.1 −0.1	−0.1 −0.1 −0.1 −0.1 −0.1		+0.1
−0.9 −0.6 0.9 0.2 0.3	0.3 0.3 0.0 −0.3 −0.7	−1.0 −1.3 −1.3 −1.3 −1.2	−1.2 −1.1 −1.1 −1.1 −1.1	−1.1 −1.2 −1.2 −1.2 −1.1		−0.2
−1.2 −1.4 −1.3 −1.1 −0.9	−0.6 −0.4 −0.4 −0.6 −0.8	−0.9 −0.9 −1.0 −1.0 −1.0	−1.1 −1.1 −1.1 −1.1 −1.1	−1.0 −1.0 −1.1 −1.1 −1.1		−0.5
−0.7 −0.7 −0.8 −0.8 −0.9	−1.0 −1.2		−1.3 −1.2 −1.1 −1.1 −1.1	−1.0 −1.0 −1.0 −1.0 −1.0		−0.7
−1.2 −1.1 −0.9 −0.7 −0.6	−0.6 −0.5 −0.5 −0.6 −0.7	−0.8 −0.9 −1.0 −1.0 −0.9	−0.9 −1.0 −1.0 −1.1 −1.2	−1.2 −1.2 −1.2 −1.1 −1.1		−0.5
−1.2 −1.1 −1.0 −0.9 −0.9	−0.8 −0.9 −0.9 −1.0 −1.2	−1.3				−1.1
	−1.2 −1.1 −1.1 −1.1 −1.3					
						−0.5
−1.3 −1.2 −1.0 −1.0 −0.9	−0.9 −1.0 −1.0 −1.2					−0.2

were accounted for in the means although they were not included in this table.

Two-degree zonal averages of surface

[Bold-face type indicates a maximum for a zone. Italics indicates a minimum for a zone. Parentheses enclose zonal

N. lat.	I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual
0— 2°	26.9	27.0	**27.8**	27.7	27.5	26.1	25.1	*25.0*	25.2	25.9	26.3	26.8	26.4
2— 4°	*27.1*	27.3	27.6	**27.6**	27.6	26.9	26.0	*25.6*	25.7	26.3	26.8	**27.2**	26.8
4— 6°	27.0	*26.9*	27.3	27.4	**27.6**	26.8	26.1	25.8	*25.6*	26.3	26.9	**27.1**	26.7
6— 8°	26.4	*26.3*	26.3	26.7	26.9	**26.9**	*26.8*	26.9	27.1	27.3	**27.4**	27.0	26.8
8—10°	25.9	25.6	*25.5*	26.0	26.4	26.8	26.9	26.8	27.2	**27.5**	27.4	26.8	26.6
0—10°	26.7	*26.6*	27.0	**27.1**	27.3	26.7	26.2	*26.0*	26.1	26.6	26.9	**27.0**	26.6
10—12°	25.4	*25.1*	25.5	25.6	26.0	26.6	26.7	26.7	27.2	**27.4**	27.2	26.4	26.3
12—14°	25.1	24.8	*24.4*	25.2	25.5	26.2	26.6	27.0	**27.5**	27.3	26.9	26.1	26.0
14—16°	24.7	24.3	*24.3*	24.7	25.3	25.7	26.2	26.9	**27.6**	27.2	26.7	25.8	25.8
16—18°	24.5	24.1	*24.0*	24.5	25.2	25.8	26.2	26.8	**27.3**	27.0	26.5	25.8	25.6
18—20°	24.2	23.7	*23.8*	24.3	24.9	25.6	26.1	26.7	**27.2**	26.7	26.0	25.1	25.4
10—20°	24.8	24.4	*24.3*	24.8	25.4	26.0	26.4	26.8	**27.3**	27.1	26.6	25.8	25.8
20—22°	23.8	*23.4*	23.6	24.0	24.7	25.6	26.0	26.4	**26.9**	26.5	25.8	24.7	25.1
22—24°	23.4	23.0	*23.2*	23.5	24.6	25.4	26.0	26.5	**26.8**	26.3	25.4	24.2	24.8
24—26°	22.5	22.3	*22.2*	22.7	23.8	24.9	25.9	26.5	**26.7**	26.0	24.8	23.9	24.4
26—28°	21.8	21.2	*21.1*	21.9	23.0	24.6	25.8	26.5	**26.6**	25.3	23.9	22.8	23.7
28—30°	20.5	20.1	*19.5*	20.6	22.0	23.9	25.4	**26.2**	26.1	24.7	23.0	21.8	22.8
20—30°	22.4	22.0	*21.8*	22.5	23.6	24.9	25.8	26.4	**26.6**	25.7	24.5	23.5	24.1
30—32°	20.2	19.3	*19.1*	19.9	20.9	22.9	24.6	**25.5**	25.3	24.1	22.0	20.7	22.0
32—34°	19.1	18.4	*18.0*	18.6	20.2	22.3	24.2	**25.3**	24.9	23.5	21.3	19.9	21.3
34—36°	18.0	17.4	*17.2*	17.8	19.4	21.5	23.7	**24.7**	24.3	22.8	20.6	19.3	20.6
36—38°	17.0	*16.3*	*16.3*	16.9	18.6	20.6	23.1	**24.1**	23.5	21.7	19.6	18.6	19.7
38—40°	15.4	*14.5*	14.9	15.5	17.1	19.5	22.3	**23.2**	22.7	20.6	18.3	16.5	18.4
30—40°	18.0	17.2	*17.1*	17.8	19.2	21.4	23.6	**24.6**	24.2	22.6	20.4	19.1	20.4
40—42°	13.4	12.7	*12.6*	13.4	15.0	17.7	20.4	**21.4**	20.8	18.6	16.2	14.1	16.4
42—44°	10.7	*10.0*	10.2	11.3	12.6	15.4	18.0	**19.3**	18.8	16.5	14.3	11.7	14.1
44—46°	9.6	*8.9*	9.2	9.8	10.8	13.8	16.3	**17.8**	17.3	15.3	12.7	10.6	12.7
46—48°	*8.8*	9.0	9.7	8.1	9.7	12.2	15.0	**16.7**	15.4	13.6	10.9	9.4	11.6
48—50°	9.6	*8.7*	8.8	8.5	8.9	12.0	14.5	**15.6**	14.3	12.3	9.9	9.3	11.0
40—50°	10.5	*9.9*	10.2	10.3	11.5	14.3	17.0	**18.3**	17.4	15.3	12.9	11.1	13.4
50—52°	8.6	*8.5*	8.9	9.1	9.5	11.1	13.2	**14.5**	13.6	11.7	10.0	10.2	10.8
52—54°	7.3	7.2	*7.1*	7.4	8.2	9.8	11.5	**12.7**	12.2	10.5	9.1	8.4	9.4
54—56°	7.0	*6.2*	6.3	6.7	7.4	8.9	10.5	**11.4**	11.2	9.8	8.1	7.5	8.5
56—58°	6.2	*5.8*	6.2	6.0	6.6	8.0	9.8	**10.6**	10.1	8.9	6.7	6.8	7.7
58—60°	6.0	*5.7*	6.1	5.6	6.3	7.7	9.0	**10.0**	9.0	8.2	6.8	6.3	7.3
50—60°	7.1	*6.6*	6.9	6.9	7.5	9.1	10.7	**11.8**	11.2	9.8	8.1	7.8	8.7
60—62°	5.3	*4.7*	5.8	**4.9**	5.5	6.6	7.8	**8.5**	7.8	7.3	6.5	5.9	6.5
62—64°	4.4	*4.1*	5.9	**5.3**	5.5	6.5	8.4	**9.0**	7.9	6.4	5.6	5.8	6.3
64—66°	(*2.1*)	3.2	3.8	3.2	4.8	5.7	7.3	**7.8**	5.8	5.0	4.4	4.4	5.1
66—68°	(*1.6*)	2.2	(*1.6*)	0.7	3.2	3.9	4.9	**6.9**	5.0	4.2	4.1	(2.7)	(3.8)
68—70°	----------	2.6	----------	----------	(2.7)	2.1	2.7	**5.9**	4.3	(0.5)	----------	----------	----------
60—70°	(4.0)	*3.6*	(4.8)	(4.0)	4.6	5.7	6.6	**7.8**	6.6	5.7	(5.)3	(5.3)	(5.6)
0—70°	17.7	*16.8*	17.4	17.3	17.7	19.2	20.1	**20.8**	**20.8**	20.1	18.9	18.6	18.8

DIX II

temperatures for the months and the year

averages for which the observation material does not extend over the whole width of the ocean in the zone in question]

I	II	III	IV	V	VI	VII	VIII	XI	X	IX	XII	Annual	S. lat.
26.5	26.9	27.6	27.5	26.9	25.4	24.2	24.2	24.5	25.3	25.7	26.2	25.9	0— 2°
26.4	26.9	27.6	27.6	26.9	25.2	23.9	23.8	24.0	25.0	25.3	25.6	25.7	2— 4°
26.0	26.8	27.3	27.5	26.5	25.2	24.2	23.2	23.7	24.6	24.9	25.4	25 4	4— 6°
25.5	26.6	27.1	27.1	26.3	25.2	24.2	23.2	23.4	24.0	24.5	25.0	25.2	6— 8°
25.5	26.0	26.6	26.6	25.9	25.0	23.9	22.9	22.9	23.3	24.0	24.6	24.6	8—10°
26.0	26.7	27.2	27.3	26.5	25.2	24.1	23.5	23.7	24.5	24.9	25.4	25.3	0— 10°
25.0	25.6	26.1	26.1	25.4	24.4	23.4	22.5	22.6	23.0	23.3	24.5	24.3	10—12°
24.1	25.2	25.7	25.6	24.7	23.5	22.7	21.9	21.9	22.2	22.8	23.5	23.7	12—14°
23.8	24.7	25.2	24.9	24.2	22.8	21.9	21.1	21.2	21.7	22.3	23.0	23.1	14—16°
23.4	24.5	24.8	24.4	23.7	22.4	21.3	20.6	20.6	20.9	21.6	22.6	22.5	16—18°
23.4	24.4	24.5	23.8	23.1	22.0	20.8	20.2	20.2	20.5	21.2	22.5	22.2	18—20°
23.9	24.9	25.2	25.0	24.2	23.0	22.0	21.2	21.3	21.7	22.2	23.1	23.1	10—20°
23.3	24.4	24.0	23.5	23.0	21.7	20.6	19.9	19.8	20.2	21.1	22.2	22.0	20—22°
23.4	24.1	23.9	23.2	22.1	21.2	20.2	19.5	19.6	19.8	20.8	21.9	21.6	22—24°
23.2	24.2	23.8	23.1	22.0	20.6	19.8	19.1	19.2	19.4	20.2	22.0	21.4	24—26°
22.9	23.7	23.4	22.4	22.0	19.9	19.0	18.3	18.5	18.7	19.9	21.6	20.9	26—28°
22.1	23.1	23.0	21.2	21.3	19.0	18.0	17.6	17.5	17.9	19.0	21.0	20.1	28—30°
23.0	23.9	23.6	22.6	22.1	20.4	19.4	18.8	18.9	19.2	20.1	21.7	21.1	20—30°
21.4	22.4	21.9	20.8	19.5	18.0	17.0	16.7	16.5	17.1	18.0	20.2	19.1	30—32°
20.6	21.3	21.0	20.2	18.6	17.2	16.5	15.6	15.4	16.1	17.2	19.0	18.2	32—34°
19.8	20.4	20.0	19.0	17.6	16.0	15.0	14.4	14.4	15.5	16.6	18.1	17.2	34—36°
18.4	19.2	17.9	17.4	16.2	14.7	13.7	13.5	12.9	13.7	15.1	16.8	15.8	36—38°
16.3	17.1	16.4	15.7	14.6	13.1	12.2	12.1	11.9	12.2	13.4	15.2	14.2	38—40°
19.2	20.0	19.4	18.5	17.2	15.7	14.8	14.4	14.1	14.8	16.0	17.8	16.8	30—40°
14.4	14.8	13.7	13.9	12.7	11.5	11.0	10.3	10.0	10.9	11.9	13.1	12.4	40—42°
12.2	13.0	12.7	12.1	10.4	9.7	9.1	8.9	8.4	8.8	10.1	11.3	10.6	42—44°
9.8	10.6	10.4	9.9	8.7	8.1	7.9	7.5	7.0	7.2	8.4	9.3	8.7	44—46°
7.9	8.9	8.4	7.7	6.8	6.6	6.3	6.0	4.9	5.1	6.2	7.2	6.8	46—48°
6.3	6.9	6.0	5.9	4.5	4.8	4.5	4.2	3.4	3.7	4.4	4.7	4.9	48—50°
10.1	10.8	10.3	9.8	8.5	8.1	7.7	7.4	6.7	7.1	8.1	9.0	8.6	40—50°
4.8	5.5	4.5	(4.1)	(3.6)	(3.3)	(3.3)	(2.6)	(2.5)	2.4	2.8	3.1	(3.5)	50—52°
3.6	4.2	3.2	(2.9)	(2.5)	(2.3)	(2.0)	(1.3)	(1.7)	1.2	1.5	2.0	(2.4)	52—54°
2.8	3.2	2.4	(2.2)	(1.5)	(1.5)	(1.2)	(0.6)	(0.9)	(0.3)	(0.8)	1.6	(1.6)	54—56°
(1.8)	2.3	1.6	(1.1)	(0.6)	(0.8)	(0.1)	(0.1)	(0.2)	----------	(0.8)	1.0	(1.0)	56—58°
(0.7)	1.2	(0.6)	(0.3)	(—0.2)	(0.3)	(—0.7)	----------	(—0.1)	----------	0.8	0.7	(0.3)	58—60°
(2.7)	(3.3)	(2.5)	(2.1)	(1.6)	(1.7)	(1.2)	(1.0)	(1.1)	(1.0)	(1.4)	1.8	(1.8)	50—60°
15.8	16.5	16.2	15.7	14.8	14.0	13.2	13.1	12.8	13.6	14.3	15.1	14.6	0—60°

Whole ocean 70° N. to 60° S. lat.

I	II	III	IV	V	VI	VII	VIII	IX	X	XI	XII	Annual	
16.7	16.7	16.8	16.5	16.3	16.7	16.8	17.2	17.0	17.0	16.7	16.9	16.8	70° N to 60° S

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