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SUPPLEMENTS TO THE MONTHLY WEATHER REVIEW

During the summer of 1913 the issue of the system of publications of the Department of Agriculture was changed and simplified so as to eliminate numerous independent series of bureau bulletins. In accordance with this plan, among other changes, the series of quarto bulletins—letters from A to Z—and the octavo bulletins—numbered from 1 to 44—formerly issued by the U. S. Weather Bureau have come to their close.

Contributions to meteorology such as would have formed bulletins are authorized to appear hereafter as Supplements of the MONTHLY WEATHER REVIEW. (Memorandum from the Office of the Assistant Secretary, May 18, 1914.)

These supplements comprise those more voluminous studies which appear to form permanent contributions to the science of meteorology and of weather forecasting, as well as important communications relating to the other activities of the U. S. Weather Bureau. They appear at irregular intervals as occasion may demand, and contain approximately 100 pages of text, charts, and other illustrations.

Owing to necessary economies in printing, and for other reasons, the edition of SUPPLEMENTS is much smaller than that of the MONTHLY WEATHER REVIEW. SUPPLEMENTS will be sent free of charge to cooperating meteorological services and institutions and to individuals and organizations cooperating with the bureau in the researches which form the subject of the respective supplements. Additional copies of this SUPPLEMENT may be obtained from the Superintendent of Documents, Washington, D. C., to whom remittances should be made. The price of this Supplement is 30 cents.

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1. INTRODUCTION

Many contributions have been made in an endeavor to throw light on the problem of long-range weather forecasting. These contributions cover studies in a variety of fields such as extraterrestrial influences involving the sun, the moon, and the planets; ice and snow cover; periodicities and recurrences; association of weather conditions in one region with subsequent weather in some other region; strength of the trade winds; statistical relations between weather in one season as indicating weather of a subsequent season in the same locality; volcanic dust; atmospheric ozone content; ocean currents; etc.

All such relations must function through some operative mechanism linked up with the general circulation of the atmosphere. It is evident, therefore, that any sound and satisfactory approach to a solution of the problem must explain how some particular phenomenon operates on the general circulation or is associated with the behavior of the so-called centers of action (the permanent or semipermanent HIGHS and LOWS).

In any event if we are to build on a sound basis, the general physical principle on which the relation operates should be set out, if possible.

The positions of the semipermanent HIGHS and LOWS for a particular season indicate quite plainly the position of the average storm tracks for that season. The track avoids the HIGHS and passes through the LOWS. Examination of world pressure and wind charts, charts 1 and 2, for the months of January and July, respectively, will make this evident. Enormous changes in the pressure fields and general wind systems take place as we pass from the winter to the summer season. The more stable parts of this changing picture are the belts of high pressure with axes about latitude 30° north and south, best established over the oceans. Even in these, however, there is considerable modification. Important changes take place in the seasonal positions and intensities of the ocean high-pressure areas of the Atlantic and Pacific, both in the Northern and Southern Hemispheres. It will be noted that the continental HIGHS of the winter season give place to continental LOWS of summer, particularly over Asia. An examination of the pressure and wind systems from month to month shows less marked changes. In spring, however, in the transition period between winter and summer, or in the fall, passing from summer to winter, changes are quite important.

Instead of the normal charts, suppose we consider the monthly pressure charts for particular years. These will show differences in the intensity and position of the permanent and semipermanent HIGHS and LOWS. Differences in intensity and position are both effective in causing weather abnormalities in adjacent regions. For example, let us take the North Atlantic HIGH with center between the Azores and the British Isles. If this HIGH were south of its normal position it would have the same effect on temperatures of the British Isles as if the intensity of the HIGH in the normal location had decreased. Other nearby regions, like Madeira and the Cape Verde Islands, would, no doubt, be affected somewhat differently.

If we could forecast the intensity and changes in these centers we would be in a position to indicate in a general way the more important characteristics of the weather in areas surrounding the center of action.

In recent years synoptic weather forecasting has undergone a considerable change. Twenty years ago there were relatively few telegraphic reports of kite and airplane

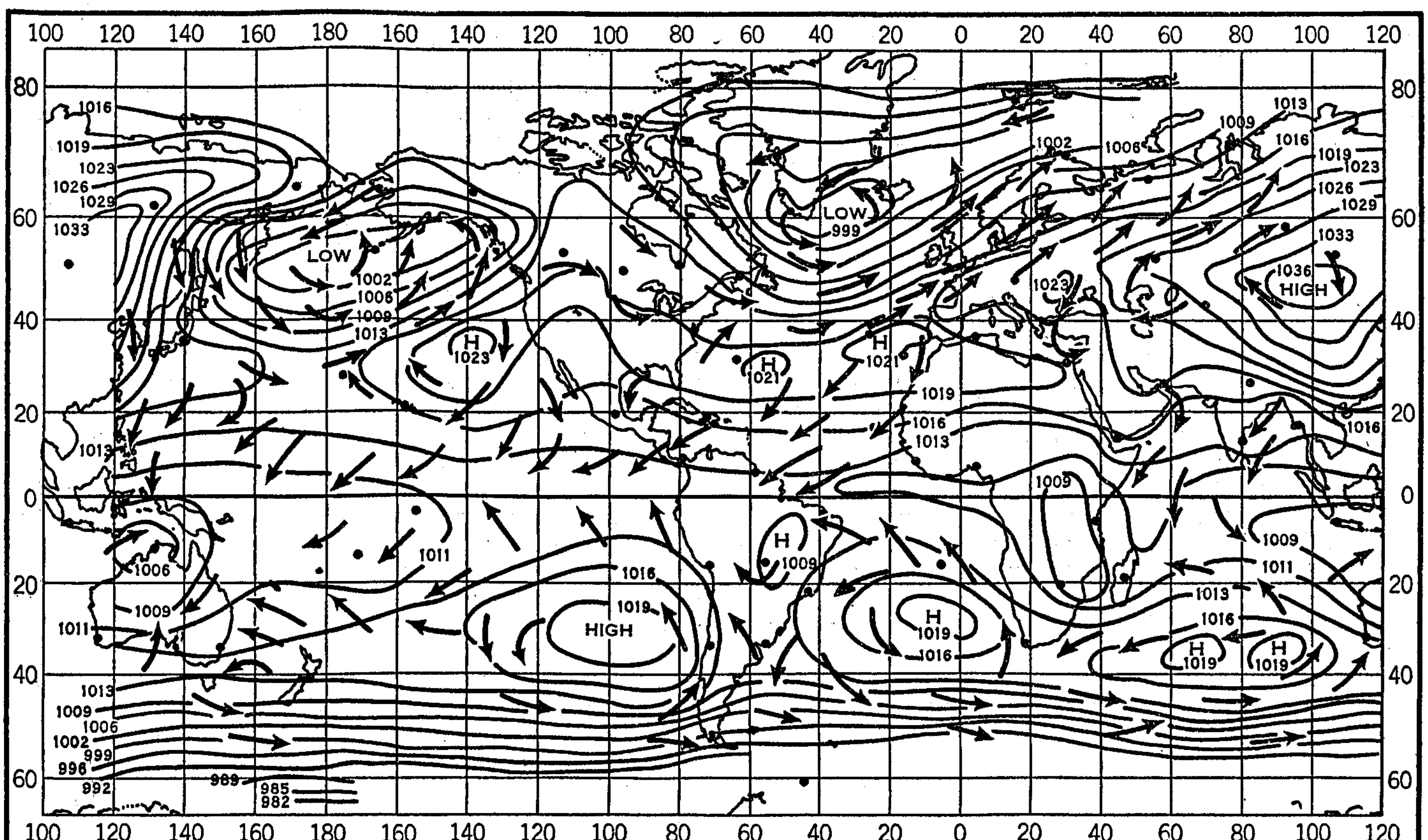

Chart 1. Average pressure and wind chart for January.

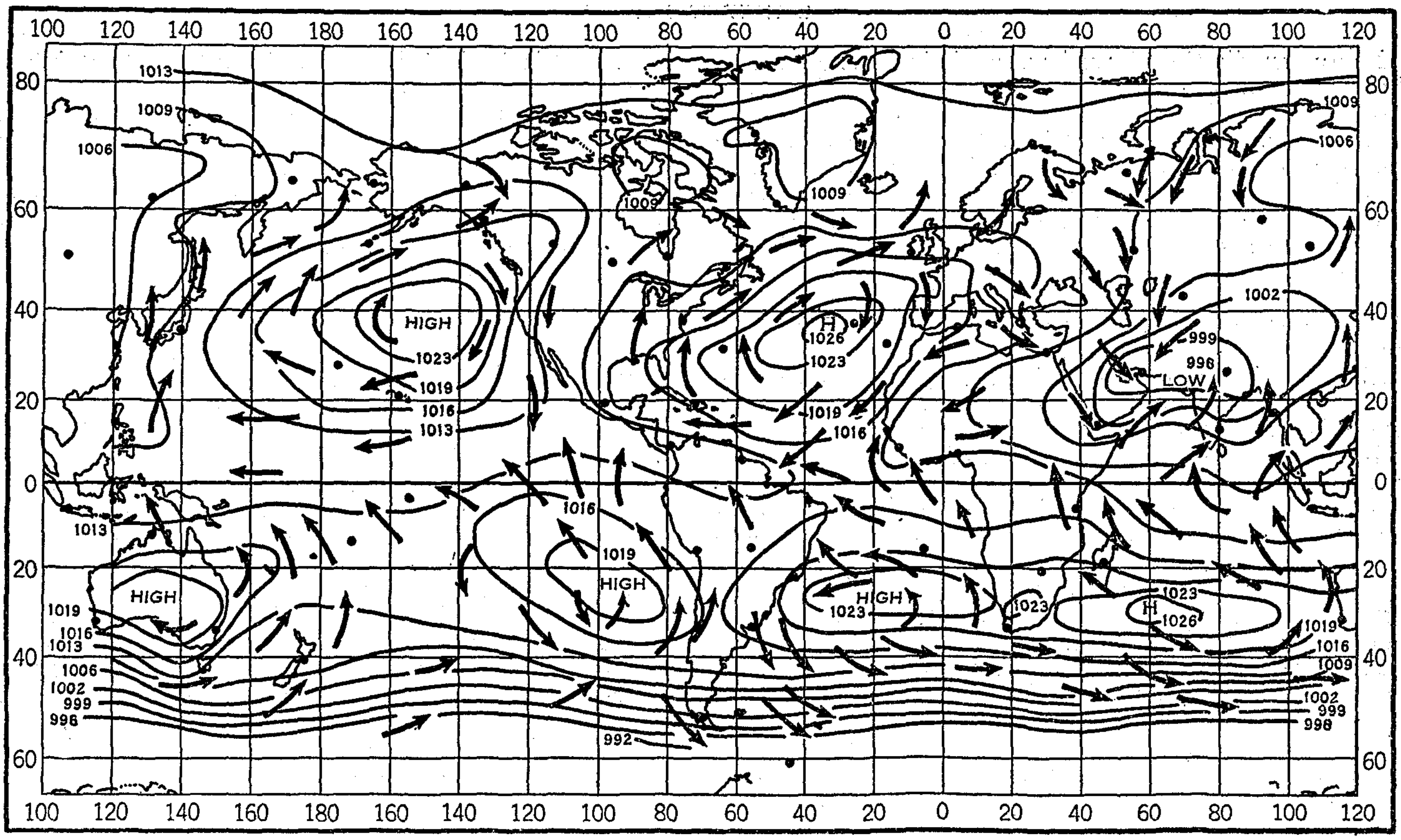

Chart 2. Average pressure and wind chart for July.

observations, although we had a reasonable number of pilot-balloon observations. In other words, forecasting was primarily a two-dimensional problem. Following this period, isolated studies were made involving the third dimension. At the present time, however, with numerous upper-air observations by radiosonde received daily, thereby permitting more thorough understanding of atmospheric properties and processes, forecasting has become progressively more of a three-dimensional problem. Likewise, investigations in long-range forecasting have hitherto been almost exclusively two-dimensional studies. It is not surprising, therefore, that greater progress has not been made in the solution of the problem. Especially is this true since we are concerned with the general circulation of the atmosphere, and only fragmentary upper-air data exist. It is the conviction of the writer that no important progress can be made with the general problem until we consider it from a three-dimensional viewpoint. It seems quite evident that the next step will be to undertake studies, imperfect though they may be on account of availability of data, of the possibilities of long-range forecasting in a three-dimensional aspect, somewhat similar to what has been done in the short-period forecasts.

If we do not look on the problem as a three-dimensional one, what explanation can we suggest for such correlations as were found by Walker, Mossman, Bliss, Hildebrandsson, and others? The part that what I have chosen with some hesitation to call "inertia" plays in our problem is quite important. The term "inertia" by no means suffices to convey the idea without further elaboration. Due to some cause—whatever it is may be left to future consideration—large masses of air, probably of great horizontal extent but of moderate depth, are set in motion. Such mass movements once started take considerable time to stabilize. For example, in the northeastern United States in the spring of some years we have the frequent appearance and persistence of cold-air masses from the Great Lakes eastward to Newfoundland, giving rise to the type of anticyclone that has been denominated the "Hudson Bay HIGH." For such a condition there must be some large-scale cause, possibly snow cover over northern and northeastern Canada or excessive ice to the west of Greenland.

Again in some years the pressure at Honolulu has averaged about 0.10 inch below normal while the interior of Alaska has averaged 0.20 to 0.40 inch above, as in December 1916. In other years just the reverse is found, as in February 1919 when the Honolulu pressure departure was +0.13 and the interior of Alaska −0.20 inch. Such abnormal departures indicate abnormal mass movements which, once started, require considerable time for their adjustment. In the above cases some general mass movement has been initiated that affects an area extending from the western coast of the United States to eastern Asia. The impulse may have started in the upper air, although many of them undoubtedly have their origin in surface conditions, such as the prevalence of extended snow or ice field or the migration of the latter to more southerly latitudes. Such conditions persisting for any considerable length of time would affect the density of, and the pressure gradients in, the free air. It is believed that it is by mass movements at upper levels that such influences are transmitted to remote regions. Otherwise what effect should we expect between pressure departures in South America, October to May, and the monsoon rainfall in India, June to September following?

The Indian monsoon rainfall is associated with the prevalence of the southwest monsoon during the season June to September. An examination of average monthly wind charts in Bartholomew's or some similar atlas will show that the monsoon covers a vast area extending from the African coast in the region of Zanzibar on the west to Sumatra on the east, and from 10° to 20° south of the Equator to 20° north, the latitude of northern India. In other words, there is a broad-scale movement of air from June to September from the Southern Hemisphere across the Equator into the Northern Hemisphere. Nowhere else in the world does a comparable flow from one hemisphere to the other take place.

How does this enormous mass of air get back to the Southern Hemisphere? Possibly by infiltration at the surface through the medium of the migratory HIGHS and LOWS, but such a mechanism seems quite inadequate in this particular case. More likely the return of air to the Southern Hemisphere takes place at levels considerably above the surface. It seems that it would be simultaneous, or nearly so, with the invasion of air from the Southern Hemisphere.

A feature that seems to have been overlooked in practically all long-range forecast investigations is the conditions in the area for which the forecast is to be made at the time of, or preceding the time of, making the forecast. It would seem that such conditions would have an important bearing on the problem. Work of the kind done by Reed, Weeks, Carter, Day, Beals, and others referred to in section 2 (c) shows how important precedent conditions may be, especially when the abnormality is large.

In any investigation of the long-range problem as a three-dimensional one, the data on which we will have to work will be quite fragmentary. The idea suggests itself that by consideration of the critical regions in which marked changes in the general pressure field and general wind circulation occur from season to season, we might find data available either in the form of pilot-balloon observations showing wind speed and wind direction, or in the form of kite, airplane, or radiosonde observations giving pressures, temperatures, and humidities in the free air. From such observations it would seem that a start could be made by studying conditions which precede changes in the general pressure or wind fields. Probably it will be impossible to find data available near our centers of action, and to that extent conclusions will be imperfect. On the borders, however, a long series of carefully made cloud observations might serve in cases in which better data are not available. An extension of this thought is that we might employ indirect evidence where primary evidence is not at hand. By indirect evidence is meant something that will show the results of atmospheric processes on a large scale, such as barometric gradients, or rainfall, or maximum temperatures, over some large area. To this end some effort has been devoted to associations of the rainfall of India with subsequent conditions of rainfall and temperature in the United States. It will be seen in section 7 that results thus far have not been too encouraging, due perhaps to the fact that a number of other factors should be considered and, secondly, due to the remoteness of India from the United States and from the center of action in the Pacific consisting of the North Pacific anticyclone. We are not discouraged in this investigation, however, and hope to pursue the matter further by taking into consideration other factors. The enormous flow at the surface, and at least to the height of the cumulus cloud level a part of which is the Indian monsoon, should have far-reaching effects.

A suggestion was gleaned from a paper by Rossby presented at the Kansas City meeting of the American Meteorological Society in June 1938 entitled, "Isentropic Flow Patterns in Relation to General Atmospheric Circulation." In this and another later paper he pointed out that according to the laws of mechanics, anticyclonic eddies should form to the south of the prevailing westerlies of the Northern Hemisphere and cyclonic eddies to the north of it. It seems quite evident that the strength of the prevailing westerlies would have an influence on the intensities of these cyclonic and anticyclonic eddies. No doubt a study of the strength of the westerlies, as evidenced by pilot-balloon observations in the United States, would prove valuable in throwing light on subsequent weather in the United States. In a still later paper given before the American Meteorological Society (April 1939) Rossby (1) associated differences between pressures on latitudes 35° and 55° N. with the position of the Aleutian LOW.

He has also indicated informally that by following up a suggestion of J. Bjerknes it is possible to indicate whether the ocean high-pressure centers will be to the east or west of their normal positions, depending on the strength of the westerlies. If the latter are stronger than normal, the center will be displaced to the east; and if below normal, to the west.

Other investigators in long-range forecasting have used the pressure differences between the Azores and Iceland as a general index. Hepworth (2) and C. E. P. Brooks (3) have used the strength of the northeast trades of the Atlantic as a general index, and the present author some years ago in an unpublished study used the resultant wind direction and velocity at Honolulu as an index of the North Pacific HIGH.

Many inquiries received by the Weather Bureau regarding long-range weather forecasting indicate that a wide-spread interest exists in this field. Inquiries come not only from individuals but from many firms and organizations interested in a great variety of activities. Of these, many show that some study has already been made of the possibilities of making "outlooks," as well as of the practical applications which a knowledge of the future weather would permit. In many cases it is extremely difficult to answer the inquiry fully and satisfactorily because the literature is so widely scattered. Therefore, while not attempting to make the references exhaustive, endeavor has been made in this publication to cover the principal approaches that have been followed in attempts to solve the problem. Many meteorologists are familiar with the references, but we hope the latter will be of assistance to those who have not had occasion to become well acquainted with the subject and who desire to investigate some phase of it.

2. PREVIOUS INVESTIGATIONS

MEANS OF APPROACH

Looking at the problem in a broad way, there are two general methods of approach, the deductive and the inductive.

In the deductive method we set up our premise based on known physical principles and attempt to show that such principles operate to produce certain future results. For example, heavy ice winters in northern seas should be followed by cold springs in northern latitudes. In 1931 a Weather Bureau committee on long-range forecasting in its report was able to make only a limited number of concrete suggestions in the deductive class. These involved primarily ice fields, snow cover, and ocean currents. Owing to scantiness of data, particularly regarding water temperatures, these suggestions were soon exhausted, and possibility of further progress along these particular lines at the time seemed small. Mention has already been made of three-dimensional studies, especially as related to the general circulation, and in this field there is room for a great deal of work.

The second, or inductive method, leaves open a broad field in which the chances of successful accomplishment are far less certain but in which there are very definite prospects of developing suggestions for deductive approaches. It is for this reason that the writer has been interested in carrying forward a study of inductive nature bearing on conditions over a territory so large as the United States and so diversified as regards climate. Most of the studies to which reference is made in this section are of the inductive type.

1. *Cycles and Periodicities.*—Perhaps more effort has been devoted to this topic than to any other. Shaw (4) in his *Manual of Meteorology* lists more than 100 cycles, ranging in length from a year up to 744 years. In addition, he gives a bibliography for the convenience of those who may care to have more information regarding them. Other cycles (5) or periods less than 1 year in length have also been mentioned. The only cycles in weather that are acknowledged by all investigators are the daily and annual cycles, both associated with the sun. In others, either the phase is so confused or the amplitude so small that there is considerable uncertainty as to their reality. On the whole they are not sufficiently reliable to serve as a basis for prediction.

Most all of the cycles, according to the claims of their advocates, have considerable variations as to period. For example, the so-called Brückner cycle (6) ranges from a minimum of 25 to 30 up to a maximum of 50 years or more, the average being about 35. The same is true regarding the variations in the spottedness of the sun, which has varied from 7 to 17 years with an average of slightly over 11 years. In both cases the minimum value is about 30 percent less than the mean, and the maximum value about 45 percent greater. What tolerance should be allowed in such cases is not plain. Some latitude should be permitted, but a variation of 30 percent or 45 percent of the average period seems rather large. Of course, if the law of variation of the length of the period could be demonstrated, no difficulty would be involved even with greater variations. So many periods have been claimed, most of them of small amplitudes, that doubt is cast on their reality. Further, different parts of a record yield different elemental cycles which, if projected into the future, do not persist.

Vercelli (7) originated a method based on the assumption that the weather is governed by a series of waves in the atmosphere which persist for a few weeks at least, and then die away. He took a curve of the daily pressures for a period of about 2 months and analyzed the curve into its component waves. He then projected these waves for a week into the future, after which he combined them into a single curve. This method met with unusual success for a time, but with longer use did not live up to expectations.

In England, forecasts published by the *Daily Mail* in 1927 were based on 15 cycles, some of which were regarded as permanent and others evanescent. These forecasts, made by Lord Dunboyne, were described by Cave (8).

In connection with cycles it seems logical to mention associations of preceding seasons with some future season. In this connection Wagner (9) showed a 16-year period in the temperature difference between the summer and that of the preceding winter at Vienna and other stations.

Another novel and quite interesting study was made by Griboiedoff (10) who associated winter conditions in Russia with temperatures of the following summer. He found that when during the winter season the activity of the Siberian anticyclone is characterized by a pronounced positive departure in the region of the lower Obi and Yenisei, it is followed by a period of atmospheric activity characterized by almost opposite departures. This phenomenon may be repeated several times, constituting an enormous oscillation of the atmosphere. He therefore separated the data for the season into these two groups, and found that when the greatest oscillations in winter occur in the north, the following summer will be warm; but when the greatest winter oscillations occur in the south, then the following summer will be cold. Attempts have been made to adapt this idea in the United States but results have not been satisfactory. Besson (11) found a correlation between July temperatures at Paris with April temperatures 7 years later.

Douglass, A. E. (12) has associated the width of tree rings with occurrence of past rainfall. The recurrent periods of excess or deficient rainfall do not as a rule occur in fixed cycles.

Keen (13) by means of tree rings, arrived at an index of ancient climatic history of Oregon back to the year 1268.

A bibliography on tree rings was published by the United States Department of Agriculture in 1935 (14).

Weickman's (15) investigations indicated that at times the barograph trace had "points of symmetry," that is, points representing dates at which the pressure, and inferentially weather, fluctuations preceding the date are similar to the fluctuation following the date but in the reverse order.

Berlage (16) has called attention to apparent 3-year and 7-year periods in connection with the monsoon rainfall of Java and has discussed the possibilities of a cause for these, with a relation to conditions off the west coast of South America.

2. *Extraterrestrial influences.*—Many writers have sought to establish a connection between terrestrial weather and extraterrestrial influences. The sun, the planets, and the moon have been the chief objects of attention.

Sun spots: The spottedness of the sun, the period of which averages slightly more than 11 years, has been investigated extensively but no one has been able to suggest the mechanism by which a change in spottedness would affect our weather. Further, the relations that have been demonstrated between sun spottedness and our weather have been small and of a very general character. Köppen's early work was followed and supplemented by that of Mielke (17) who showed that a curve of sunspot numbers and the curve of earth temperatures oppose each other in a general way in the sense that the fewer the sunspots, the higher the temperatures, with, however, puzzling discrepancies in a number of places. Although the discrepancies are marked, the agreement in the curves is sufficient to suggest that there is some sort of apparent connection between sunspots and atmospheric temperatures. However, it should not be supposed that the relation is sufficient to employ as a basis for predicting. The amplitudes of the temperature effects are small; and individual stations and individual years do not always conform to the rule. The relation is most pronounced in the Tropics.

Henry (18) has discussed the sunspot period as related to temperatures in the United States, and finds some indication of a connection between 1870 and 1921, but not before 1870; Alter (19) has made a similar investigation of rainfall in different regions by means of the periodogram, and found little evidence of the 11-year period.

A more detailed treatment of the sunspot period in its relation to terrestrial weather throughout the Northern Hemisphere was undertaken by Baur (**20**) by use of harmonic analysis.

Solar Radiation.—Relations between values of solar radiation and certain phases of weather have been pointed out by Abbot (**21**) and Clayton (**22**). The relatively short record of solar radiation values as well as its broken character due to lack of satisfactory observations (**23–24**) seems to introduce serious doubts as to the reliability of conclusions drawn by the authors. Solar radiation observations are now being reworked for certain days when the so-called short method was employed and any final conclusions will have to await the completion of this work. Periods of about 27 days, corresponding to the solar revolution, have been advocated by W. F. Carothers and others in connection with weather changes, particularly cold waves, but satisfactory proof is lacking.

The Planets.—Numerous attempts have been made to relate one or more of the planets with terrestrial weather. This might more properly be discussed under cycles but we have preferred to reserve it for treatment here. In passing it may be stated that some investigators have attempted to explain the occurrence of sunspots by the positions of the planets, due either to gravitational or electrical action. The average sunspot period of 11.2 years is quite close to that of Jupiter (11⅞ years), and it would seem at first glance that by a judicious combination of Jupiter with some interior planet, a synodic period closely approximating the sunspot period could be worked out. Several attempts have been made along this line. One that has recently come to our attention by William A. Luby entitled "Planets and Sunspots" is found in *Popular Astronomy*, Volume XLVIII, No. 10, December 1940. In this paper it is pointed out that precessional action of the planets on the sun disturbs the solar equilibrium in such a way as to explain the occurrence of sunspots. Sanford (**25**) has called attention to an apparently greater spottedness of the sun when the earth and Venus are on opposite sides of the sun. The polarity of the spots is reversed at intervals averaging a little more than 11 years, which has led to a search for a 23-year cycle.

Many different combinations of planets have been compared with weather in different parts of the world, but without satisfactory results.

3. *Relations between different parts of the world.*—There being no clear indication of the mechanism through which some extraterrestrial influence might operate to cause abnormal weather on our earth, such as a cold winter in the northeastern United States and at the same time a warm winter in western Europe, most investigators have concluded that we have on our terrestrial sphere, and in its oceans of air and water, factors sufficiently effective to explain all the weather including not only the daily and weekly weather changes but probably most, if not all, of the seasonal and longer-period variations of weather as well. Even with a steady intensity of solar radiation, especially in the longer wave lengths, the distribution of land and water surfaces, the variations in intensity and location of the major warm and cold ocean currents, the seasonal interchange of air between oceans and continents, the changing distribution of snow and ice fields, and the rotation of the earth with the annual changes in declination and distance of the sun provide sufficiently varying influences to account for the changes that take place in our weather.

For these reasons we are urged to the conclusion that the most fruitful field in which to search for clues is on the earth itself. We have been led therefore to make the survey described in this publication in the hope, not of completely solving the problem, but of pointing the way to or offering suggestions for a partial solution of a problem that has defied some of the best meteorological minds.

It will not be amiss to invite attention to the works of investigators who have labored in this field. These include Hoffmeyer (**26**), Blanford, Teisserenc de Bort, Hann, Meinardus (**27**), Peterson, Hildebrandsson (**28**), the Lockyers (**29**), Okada (**30**), Hessling (**31**), Mossman, C. E. P. Brooks (**3**), Exner (**32**), Shaw (**33**), Wiese (**34**), Walker (**35**), Bliss (**36**), Braak, Boerema (**37**), Groissmayr (**38**), and many others. Apparently the earliest work in this field was done by Hoffmeyer in 1878, who pointed out the relation between pressures in the North Atlantic Ocean and simultaneous weather in western Europe. Hildebrandsson in 1897 called attention to the "seesaw" or opposition between pressures in Argentina and those in India. The Lockyers in 1909 made this "seesaw" the basis of a classification of pressures over the world according as they oscillated with India or with Cordoba in Argentina. In their investigations (**29**) semi-annual values were employed. Later, Walker (**35**) in 1924 employed correlation coefficients, using quarterly values of pressure, temperature, precipitation and river floods at 32 centers distributed over the world.

The main conclusions reached by Walker are that there are three big swings or surgings: (1) The North Atlantic oscillation of pressure between the Azores or Vienna on the one hand, and Iceland or Greenland on the other; (2) the North Pacific oscillation between the ocean-high pressure belt and the winter depression near the Aleutian Islands; and (3) the southern oscillation, mainly between the South Pacific and the land areas around the Indian Ocean. Of the three oscillations, the South Pacific is more far reaching in its influence than the others. From his tables of correlation coefficients, he found that Port Darwin (Australia) has no less than 76 significant relations with other places, of which 32 are with subsequent seasons. He concluded, therefore, that pressure in the neighborhood of Port Darwin seems to exercise more control over other regions than any other world factor. He further points out that, although it may be some time before we learn the processes by which nature effects these enormous oscillations, and the relation found must in general be regarded as empirical, there is no reason why it should not be utilized when possible for seasonal forecasting. The facts of the southern oscillation have been utilized in predicting the rice crops of Japan (**30**) and the Java rainfall (**39**). Tables have also been presented by Bliss (**36**) showing relations between Nile floods on the one hand and Dutch Harbor (Alaska) temperatures, March-May; Samoa temperatures, December-May; and Port Darwin pressure March to May, on the other.

The most interesting results have been achieved in India, where a formula devised in 1908 was revised in 1919 and 1924. The results of these three formulae have been analyzed by Montgomery (**23–40**); the analysis shows poor results in the later years. In reply Walker (**41**) has pointed out that the 1924 formula was discarded in 1934, and the forecasts promulgated in a more logical form.

Exner (**32**) in 1924, using correlation coefficients, associated pressures and temperatures at 75 stations throughout the world with pressure at Stykkisholm

(Iceland). Iyer (**42**) has also suggested a formula for the monsoon rainfall of Siam.

In many cases the selection of the remote stations has been hit or miss. However, several investigations have been quite systematic and complete as, for example, those of Lockyer, Exner, and Walker.

In Lockyer's studies attention was focused on India and Argentina, in Exner's work on Iceland, while India was the principal focus in Walker's 1924 work. The latter worked out and published cross-correlations, giving suggestions for future studies by others. So far as the United States was concerned, however, Walker used only two stations, i. e., Charleston, S. C., and San Francisco, Calif., neither of which is representative of any considerable area. All such studies involve an enormous amount of detailed and painstaking labor but it is only what confronts any investigation in this field.

Unless a systematic canvass of the whole situation is made, the chances of success are small and the results achieved will be uncertain, due to the fluctuations of sampling.

Suggestions for indicating the rainfall of portions of Australia also have been given by Walker (**43**).

Temperatures in the South Orkneys, April–November, have been associated with rainfall at various places in the Argentine 3 to 4 years later in an inverse sense by Hessling (**31**). He has also found positive correlations 2¼ years later.

Nakashima (**44**) has studied the prediction of January temperatures in Shantung, China, using the pressure in October at Tientsin and the latitude of the high pressure center in October, whether north or south of latitude 40°. He intimates that the relation does not operate when sunspot numbers in October are less than 10.

Hutimoto (**45**) has discussed methods of forecasting weather and temperatures, using certain numerical values calculated from pressure gradients for the month of November.

Braak, Berlage (**39**), and Boerema (**37**) have discussed the possibilities of making monsoon forecasts for western Java. In these studies three precedent local factors are used. On account of a number of failures that have resulted from the formula developed, it has been necessary to take into consideration other factors; and a cycle factor of 3 and 7 years associated with the warm current, El Nino, which occurs in northern Peruvian waters, has been considered.

Chang-Wang Tu (**46**) has shown an association between rains in China and increased activity in the southern oscillation.

In the *Meteorological Report* (**47**) for southern Rhodesia a formula is given for indicating the seasonal rainfall based on Nile flood, August to September, Rio de Janeiro pressure, August to October, Mauritius temperature, October to November, and Bulawayo minimum temperature June to July. The multiple correlation coefficient is 0.77.

In 1932 Bliss (**48**) and Walker pointed out three important oscillations, the North Atlantic, the North Pacific, and the Southern oscillations. Based on the "seesaws" that exist in these regions, indices were worked out that will be discussed in more detail in section 6.

Wagner (**49**) has shown that in considering 10-year averages, there appears between different decades systematic differences in pressures, temperatures, annual temperature amplitudes, and precipitation which, in his opinion, permit the inference of changes in the general circulation as a whole and make it appear probable that those changes have their cause in changes of solar radiation. Baur (**50**), however, points out that numerical comparisons between the changes found by Wagner in the 10-year mean values and the anomalies that we encounter in the monthly means show that such important differences exist as to make it appear doubtful that these anomolies which determine the actual character of the weather are caused chiefly by exterior influences and not by inherent conformity to the law in the individual current systems.

Another field, involving relations between wind conditions over the oceans and weather, has also received attention. C. E. P. Brooks (**51**) associated the seasonal distribution of pressure over the North Atlantic Ocean and western Europe with (1) the strength of the northeast trades 9 to 12 months before (2) the strength of the southeast trades 12 months before, (3) the strength of the northwest winds between Newfoundland and southern Greenland which govern the strength of the Labrador current, and (4) the amount of ice in the east Greenland current and in the neighborhood of Iceland. Shaw (**33**) pointed out a remarkable similarity between annual variations of velocities at St. Helena, and the annual variation of rainfall in southwestern England of the following year.

On the subject of relations connected with ice fields, Wiese (**34**) showed contemporary relations between Barents Sea ice and temperatures over neighboring land areas, some of which gave correlation coefficients of −0.80. The influence extends for some distance, as indicated by a coefficient of −0.58 at Warsaw, and −0.60 at Visby. He also worked out a multiple correlation coefficient of 0.71 between the position of the trough of low pressure off the coast of Norway in January and February and the ice in the previous year in Barents Sea, with the rainfall in April and May in central and eastern Russia.

The ice conditions in Barents Sea have been found by Wiese to depend on a number of antecedent conditions extending at least as far south as the Equator. The relations brought out by Wiese suggested to E. H. Smith (**52**) investigations which showed that a high correlation existed between the amount of field ice in northern waters and the number of icebergs south of Newfoundland, with a coefficient of +0.87. He found also a correlation coefficient of −0.62 between the number of bergs and the pressure difference between Belle Isle and Ivigtut (Greenland) combined with the deviation of the pressure from normal at Stykkisholm during the period December to March. A coefficient of +0.60 was also noted between the number of bergs and the pressure difference Bergen-Stykkisholm during the period October to January inclusive—December being given double weight.

Brooks and Quenelle (**53**) have discussed the effect of Arctic ice on subsequent pressure distribution over the North Atlantic and western Europe. It is impractical to mention numerous other contributions of this particular type.

4. *Ocean temperatures.*—The effect of ocean temperatures on the climate of coastal regions is recognized by all students of climatology. Just exactly how changes in ocean temperatures are brought about and how such changes affect weather as distinguished from climate is a more complicated question. It has been pointed out that the speed of the trade winds affects the water temperature by blowing away the surface layers and causing some upwelling of the cooler water from below. Such results are well marked along coasts, on-shore winds being attended by warm surface water along the shore, and off-shore winds causing cold surface waters. The use of ocean temperatures as a basis of relation with subsequent weather is often coupled with the strength of the winds over the oceans or barometric gradients over the oceans.

A work by C. E. P. Brooks (3) is probably the most comprehensive discussion of the subject; he summarizes the results as follows:

(1) The surface temperature of the North Atlantic Ocean between Florida and Valencia has a positive correlation with synchronous pressure over the area Valencia, Bergen, Berlin, and the Azores, but a negative correlation with pressure at Jacobshavn and Stykkisholm; (2) the pressure at Jacobshavn has a positive correlation with the northeast trade winds 4 months before, this relation not being due to the influence of the Gulf Stream; (3) the surface temperature of the North Atlantic has a positive correlation with the northeast trade winds 12 months before, this relation being due to the influence of the Gulf Stream; (4) the surface temperature has a negative correlation with the northeast trade wind 15 to 21 months before; (5) the correlation between the pressure in western Europe and the North Atlantic and the strength of the northeast trade wind 12 to 21 months before is generally small but the coefficients usually have the signs to be expected from relations (1), (3), and (4); that is, pressure at stations in the area, Valencia, Bergen, Berlin, and Azores tends to have a positive correlation with the northeast trade wind 12 months before, and a negative correlation with the northeast trade wind 12 to 21 months before. (6) The surface temperature of the North Atlantic has a positive correlation with the velocity of the southeast trade wind 12 to 21 months before, this relation being due to the influence of the Gulf Stream. (7) Pressure at Valencia, Paris, Berlin, and Ponta Delgada has a positive correlation with the velocity of the southeast trade wind 15 to 21 months before; pressure at Jacobshavn, Stykkisholm, and Vardo has a negative correlation with the velocity of the southeast trade wind 12 to 21 months before. (8) The surface temperature of the North Atlantic and the pressure at Ponta Delgada have a positive correlation with the Bermuda-Charleston pressure difference 3 to 9 months before and 15 to 18 months before. (9) The surface temperature of the North Atlantic has a positive correlation with the Bermuda-Sydney (Nova Scotia) pressure difference 3 months before; the pressure at Ponta Delgada has a small positive correlation, and pressure at Jacobshavn a small negative correlation with the Bermuda-Sydney pressure difference 3 months before. (10) The pressure in western Europe and the North Atlantic (except the Azores) has a negative correlation with the pressure difference 3 months before between the point 50° N. 20° W. and Vestmanno (Iceland). At the Azores the correlation is positive.

Considerable work of a similar nature has been done by others, among them, Meinardus (26), Hepworth (2), C. F. Brooks (54), and Helland-Hansen and Nansen (55). McEwen (56) and Gorton (57) have shown a relation between water temperatures at LaJolla, California, August–October, with precipitation of the following rainy season at six stations lying in the region between Los Angeles and San Diego. Predictions have been right as to sign in the great majority of cases but there has been considerable discordance between the magnitude of the actual and the predicted departures. Further, the relation holds only for a limited region in southern California.

Prior to 1926 minor attention was given to water temperatures except near the surface. The account of the German scientific voyages which was published by Schott (58), of the Deutsche Seewarte, was discussed by Walker (59). The latter calls attention to the importance of taking into account aspects of the oceanic circulation other than the surface temperatures. It is pointed out that the distribution of temperature indicates clearly that the surface winds have little or no effect at a depth of 200 m., and inasmuch as the general circulation of the ocean extends to depths of over 3,000 m., it would appear that widespread differences of density, not surface winds, provide the greater part of the motive power for that circulation. Variations in salinity have more effect on density than variations in temperature; in other words, saltiness under prevalent conditions makes the water heavier than coldness. The effects within the topmost 100 or 200 m. are, however, vital in the control of air temperatures. As far as seasonal variations are concerned there is abundant evidence of the importance of a knowledge of ocean conditions. Thus, in the very place where the Swedish expedition vessel *Antarctic* was compressed by the ice in the summer of 1903, an Argentine lightly-built vessel moved unhindered in the following spring, meeting no ice. The northern limit of ice in the antarctic may sway backward and forward over 1,500 km. (nearly 1,000 miles). Similar changes occur in the arctic regions, where the limit of ice may travel many hundreds of miles in an east-west direction. Thus, 1892 was comparatively ice-free, but 1882 was badly ice bound.

Some seasonal variations may be explained by variations in temperature of a local current that spends some months in passing from the controlling to the controlled station; but variations in activity of the general oceanic circulation will be much more far reaching and important. An abnormally severe season in the antarctic may produce colder currents in the ocean depths, as well as at the surface, and, when this water rises to the surface near the Equator, it may affect temperatures there many months afterwards.

TOOLS EMPLOYED

A number of different methods have been employed in investigating the possibilities of making long-range weather forecasts.

In the earlier investigations comparisons between groups of data were made in very simple ways, either by charts or by tabulations, but as time progressed more rigorous and more searching methods were utilized:

1. *The periodogram; machines.*—The periodogram of Schuster (60) served to discover hidden periods. Alter (61) has also used the correlation periodogram.

Machines have been constructed to analyze data for periods, such as the harmonic analysers to be found at several of our universities, and the calculator developed by Abbot (62) for unscrambling hidden periods; Douglass (12) has developed an ingenious apparatus called a "cyclograph" for determining whether a series of data shows periods or cycles.

2. *Statistical.*—Ordinary harmonic analysis has also been employed to discover periods as, for example, by Brunt (63).

In discussing trends in precipitation Streiff (64), Schuman (65), and others have utilized the principle of moments and mass curves to investigate the possibilities of forecasting future trends in precipitation.

Some have employed tabulations of two or more groups of data, the results being expressed in general statements of relations without attempting to express them in a mathematical way. Still others have used graphs such as histograms and similar diagrams, as well as curves to show alleged relations. Tabulations and groupings into frequency distributions, etc., with the aid of the mean, the median and the mode have all aided in presenting numerical facts for more searching study and consideration. Conclusions by different investigators based on a comparison of the same tabulations and curves may show differences in interpretation, so that some more rigorous and precise method was desirable.

3. *Correlation coefficients.*—To secure a numerical index of relations that is free from any bias on the part of investigators in estimating associations between two groups of data, the correlation coefficient is used. In its simple form it measures the degree to which variations in one series of data, called the dependent variables, can be expressed as a linear function of the variations of another series called the independent variables. Further developments permit the calculation of coefficients for the expression of the dependent variables as a curvilinear function of the independent variables. When several independent variables are used the process is called multiple correlation. Methods of calculation of the various forms of correlation coefficients, including simple, multiple, curvilinear and partial, can be found in any standard text book on statistics. For readers of the MONTHLY WEATHER REVIEW a simple exposition of the correlation coefficient is given by Marvin (**66**). For multiple correlation which involves a great deal of tedious work, as well as for other types, so-called machine methods, as described by Wallace and Snedecor (**67**), may be utilized. Also "graphical correlation," as described by Bean (**68**), will be found useful in shortening the work.

When a large number of correlation coefficients are to be obtained, the work of computation can be reduced by adjusting the departures to the standard deviation of $\sqrt{20}$, as suggested by Walker (**69**) or by grouping the data into about 30 classes by division, as suggested by Dines (**70**).

The statistical and practical significance of correlation coefficients requires some discussion. R. A. Fisher (**71**) has led in the development of significance tests, especially where the values are obtained from small samples, and his work should be consulted. A fundamental factor which is often overlooked is that the true correlation between two series may not be the same as the correlation obtained from the samples or part of the series which may be at hand. Subsequent years may increase or decrease the value of the coefficient, and hence its usefulness as an indicator for forecasting the dependent variables. If a given regression equation continues to express the relations between the variables, it is possible to calculate the probability of the correct sign of departure based on a given correlation coefficient. Since the probability of the same relation being maintained is less when more independent variables have been used, and is less the shorter the series it is based on, these factors should be considered in applying such calculations. Table 1 gives the probability that the departure estimated by the regression equation will have the same sign as the actual departure for different values of true normal correlation.

TABLE 1 (**72**).—*Probability of correct sign with correlation coefficients of different magnitudes*

Correlation coefficient	Probability of correct sign	Correlation coefficient	Probability of correct sign
0.00	0.500	0.55	0.686
.05	.516	.60	.705
.10	.532	.65	.725
.15	.548	.70	.747
.20	.564	.75	.770
.25	.581	.80	.795
.30	.597	.85	.823
.35	.614	.90	.856
.40	.631	.95	.899
.45	.649	1.00	1.000
.50	.667		

Walker has stated that a forecast or foreshadowing of the sign of the departure based on a regression equation should not be issued unless the chance of success is at least 4 to 1. Since the probability of success will be greater the larger the indicated departure, it is possible to calculate limits outside of which there is a given probability of success in indicating the sign of the departure. Table 2 shows (1) the departure that should be indicated in terms of the standard deviation of the dependent variable in order to have a 4 to 1 chance of success in indicating the correct sign of departure, and (2) the percentage of cases in which it will be possible to make such a forecast with given values of the true normal correlation. Here, again, it must be remembered that the correlations obtained from the available data may not continue. In the table, r is the correlation coefficient; k equals $\sqrt{1-r}$; and .842 is the factor required when expectation of success is to be 4 to 1.

TABLE 2.—*Giving probability that with a given value of r, it will be possible to make a forecast with a 4 to 1 chance of success*

r	Departure that should be indicated by regression equation in terms of the standard deviation of the dependent variable (.842 k/r)	Percentage of cases in which it will be possible to make such a forecast
0.10	8.38	0
.20	4.13	.00004
.30	2.68	.0074
.40	1.93	.054
.50	1.458	.14
.55	1.278	.20
.60	1.123	.26
.65	.9845	.32
.70	.8589	.39
.75	.7421	.46
.80	.6315	.53
.85	.5220	.60
.90	.4077	.68
.95	.2766	.78
1.00	0	1.00

If a still more conservative rule is desired, table 3 gives similar values for a 5 to 1 chance of success.

TABLE 3.—*Giving probability that with a given value of r, it will be possible to make a forecast with a 5 to 1 chance of success*

r	Departure that should be indicated by regression equation in terms of the standard deviation of the dependent variable (.967 k/r)	Percentage of cases in which it will be possible to make such a forecast
0.10	9.62	0
.20	4.74	0
.30	3.08	.002
.40	2.22	.026
.50	1.67	.095
.60	1.29	.197
.70	.986	.324
.80	.725	.468
.90	.468	.640
1.00	0	1.000

Determination of the significance of the correlations in the present study is complicated by the fact that the highest correlations have been chosen from a very large number. We know that in any series of measurements varying according to the ordinary exponential law of errors, the probable value of the largest of the departures will be several times (**73**) the value of an average departure selected at random. Similarly, correlation coefficients between samples of pairs will fluctuate about the true correlation between a very great number of similar pairs. Thus, the correlations we pick out because they are high may be due only to such sampling fluctuations or may be close to the true correlation, i. e., real. The only test is in actual forecasting or in the determination of a physical basis for the correlations.

Walker warns against the use of changes from observation to observation, or year to year, instead of using the actual values. The correlation coefficient may be distorted due to trends in the series, either in the same or opposite directions. Experience shows that on the one hand the magnitude of such trends is occasionally considerable and on the other hand that there is little cause for believing in their reality. In any case, we are interested in the agreement between year-to-year variations and such trends should be removed, whether they are artificial or real. This can be done by eliminating the straight line trend as shown by Brooks (**74**) and as illustrated in section 4. Unfortunately time has not permitted the correction for trend in all series of the present study.

In searching for new factors to add to a regression equation to account for some of the unexplained variability, it may be useful to compute the "error" series, i. e., the series of differences between the computed and actual values. Any new factor (**75**) which is related to the error series will improve the equation and not merely duplicate the part of the variation already accounted for by the other independent variables. Series which show a useful correlation with the error must contain fluctuations of the principal series which do not appear in the regression equation and, even if the correlation with the principal series is small, they will form a useful addition to the equation; on the other hand, series with a high correlation coefficient with the principal series but a poor connection with the error are useless because the fluctuations are already contained in the equation. Correlation of the "error" may therefore serve two useful purposes; first, as a guide to the rejection of apparently suitable factors and, secondly, as a guide to the selection of what might otherwise appear to be useless factors. Further, it will be obvious that a small factor having very little connection with the remainder of the factors improves the equation to a greater extent than a large factor closely related to the remainder. It is a matter of experience that large factors are so closely interrelated that after a certain point is reached little or no improvement is obtained by the addition of such factors to the equation.

Chapman (**76**) in the *Computers Handbook*, has given a collection of correlation coefficients extracted from meteorological papers.

RELATIONS BEARING ON WEATHER CONDITIONS IN THE UNITED STATES

A number of associations have been suggested by different writers, bearing on temperature and precipitation conditions in this country. While these are of fragmentary nature they will here be summarized, not as associations thoroughly established or with assurance that they can be used as a basis for a forecast, but rather as suggestions for further studies along these or similar lines.

Bliss (**77**) has given four rather useful correlation coefficients bearing on winter temperatures for Central North America based on previous conditions over the Indian Ocean, as follows: Pressure at Mauritius, June–August, a correlation of +0.40; temperature at Batavia, September–November, a correlation coefficient of +0.54; the Nile flood, June–August, −0.40; and Indian rainfall, June–August, −0.46. He also found a relation (**78**) with the rainfall in the West Indies June–December, as indicated by Central Siberian pressures March, April, and May, Charleston, S. C., pressure March, April, and May, and St. Vincent temperature March, April, and May, giving a multiple correlation coefficient of 0.69.

Clayton (**79**) pointed out a simultaneous relation between annual river stages of the Parana River at Rosario (Argentina) and annual precipitation in the United States between longitudes 80° and 110°, with correlation coefficient of +0.71.

Since Schostakowitsch found that over the Indian-Australia region, temperature and pressure varied together, while precipitation varied in the opposite direction, Groissmayr (**38**) added Indian temperature and pressure, and Batavia and Egypt pressures, as well as weather conditions of Argentina which have long been associated with other Indian monsoon indicators. He says that pressure and temperature of India prove more influential than the monsoon rains of India.

Groissmayr has contributed a number of correlation coefficients. He has found a multiple correlation coefficient of 0.81 between winter temperature at Winnipeg and January to October pressure at Nagpur (India), July to October temperature in India, January to October rainfall in India, and January to July temperature at Goya (Argentina) (**38**). He also found that the winter temperature in Manitoba is an indicator for the following spring temperatures for the Lake region and the North Atlantic States (**80**). He also related the precipitation at Charleston, S. C., with the Nile flood and the Azores-to-Iceland pressure difference (**81**). In addition he found a relation (**82**) between fall temperatures in the eastern United States, and March, April, and May pressures at Cairo (Egypt) in the spring and with May pressure in Argentina. Groissmayr (**83**) has shown that the best precedent condition for a hot summer in Missouri are cold springs in Alaska, a mild May in the northwestern United States and Canada, and a dry May in Colorado and Missouri. The multiple correlation is 0.70. He pointed out also a relation (**84**) between May pressures in Argentina and temperatures of the following autumn at certain stations in the central and northeastern United States.

Weber (**85**) has indicated an apparent relation of inverse character between Alaskan pressures in October and temperatures in November and December in the eastern United States.

In 1931 a letter from Everett L. Mayhew called to our attention a relation between November storminess at Vineyard Haven, Mass., and the temperature of the following winter, in the sense that stormy Novembers were followed by cold winters. To check this relation, November temperatures in New England, which would vary in a similar way to storminess, were compared with the mean temperature of the winter months, December, January, and February, immediately following, with the result that in 65 percent of the cases a positive relation was found to exist.

Walker (**86**) has worked out correlation coefficients between pressure at Charleston, S. C., and preceding conditions at a number of foreign stations. He has found a multiple correlation (**87**) of 0.72 between winter temperatures in southwestern Canada on the one hand, and precedent Honolulu and Port Darwin pressures, monsoon rainfall of India and temperature at Madras on the other. For winter temperatures in northwestern Canada he found a multiple correlation coefficient of 0.72 with Honolulu pressure, South America pressure, Zanzibar pressure, and Port Darwin pressure.

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Reed (**88**) has called attention to a number of relations bearing on temperature and rainfall in Iowa and adjacent States associated with precedent conditions in the same area. It is pointed out that, while these relations hold for Iowa and a few of the neighboring States, they gradually diminish in somewhat regular zones outside this area. He finds that June temperatures have a correlation of +0.56 with the combined mean temperatures of July, August, and September; also June temperatures have a correlation with July rainfall of −0.49. In an unpublished manuscript he finds that a wet September follows warm January, May, and July. When February, March, and April are dry they are followed by a cold September and vice versa. He also found (**89**) that when June is exceptionally warm, the following May, 11 months later, is likely to be warm, and drier than normal. The sequence was found to be stronger in Minnesota. The same relation applies almost as well at Honolulu.

French (**90**) has published a graph showing March temperature departures and rainfall departures of the subsequent rainy season in San Diego, Calif. The graph indicates that in 64 percent of the cases covering a period from 1852 to 1925, departures were of the same sign; and Los Angeles for the period 1878 to 1925 shows the same sign 74 percent of the time.

H. F. Alciatore, (**91**) former meteorologist at the San Diego office of the Weather Bureau discovered rather interesting alternations of 10 and 20 years in the rainfall records at that station. The 10-year periods 1846–56, 1876–86, and 1906–16 all averaged above normal while the 20-year periods 1856–76, 1886–1906, and 1916–36 all were below normal.

Blair (**92**) has related autumn temperatures in the Missouri and Upper Mississippi Valleys with spring pressure departures at Nome, Alaska, and the South Orkneys, obtaining a multiple correlation coefficient of 0.76. Further, he correlated winter temperatures in district No. 5 (the Plains States) with the preceding summer pressures at Honolulu and autumn pressures at Dutch Harbor, obtaining a multiple correlation coefficient of 0.64. For spring temperatures in district No. 5 he used the previous summer pressure departures at Midway Island and at Lagos (Nigeria), obtaining a multiple correlation of 0.78. Finally, for summer temperature he used pressure departures of the previous winter at Tokyo and the previous autumn at Rio de Janeiro, obtaining a multiple correlation of 0.60.

An unpublished study of temperatures at Chicago was carried out by W. P. Day. He found in a period of 60 years that temperature departures of ±7° or more occurred in January in 13 years, which were followed in 12 cases by departures of the same sign in February. A similar relation was found between December and January but in slightly less degree. He pointed out that the results indicate that the major weather controls, whatever they may be, exert influences over periods long enough to affect 2 consecutive months. The closer relation between January and February as compared to December–January is probably due to the existence or nonexistence of a snow cover in January having a carry-over influence on February temperature.

J. R. Weeks (**93**) has pointed out that when March rainfall at Baltimore is below normal the probabilities are 2 to 1 that April precipitation will also be below normal. Other studies of the 114-year temperature record at Baltimore indicated that a winter departure of temperature whether plus or minus will be followed in 52 percent of the cases by a summer temperature of the same sign. If the mean winter temperature was 5° or more below normal it was followed in every case by a summer with below-normal temperatures. With winter temperatures 4° or more above normal, the following summer was above normal in 78 percent of the cases. Similar relations were found in studying the long temperature record at Philadelphia. Further, he found in connection with the Baltimore record that marked temperature departures in January were followed by temperatures of the same sign in July in 80 percent or more of the cases. The relation between winter temperatures and summer rainfall was not impressive.

Patterson (**94**) has discussed the relation between water temperatures in the Pacific and their effects on winter conditions in western Canada.

Harry G. Carter, in an unpublished manuscript, has shown a relation between Idaho June temperature of 1 year with the temperature in May in the succeeding year. In all cases studied with temperature departures of 4° or more below normal in the month of June, the succeeding May was cold.

Beals (**95**) has pointed out that, when the winter snowfall in the North Pacific States is light and disappears early in the season, the forest fire hazard is greater than when the winter snowfall is heavy and does not disappear until late in the season. Likewise that over a considerable region extending from Portland, Oreg., to the Upper Mississippi Valley, the effect of light winter snowfall is reflected in high spring temperatures, principally in the months of March and April; and below normal precipitation and heavy winter snowfall with low spring temperatures and precipitation above normal.

Henry (**96**) has investigated the relation between Aleutian Island temperatures in the late summer and California precipitation in November and December. Little evidence is found of a relation except a very slight one between August Aleutian Island temperatures and California precipitation in November.

McEwen (**56**) has shown a relation between water temperatures at La Jolla, Calif., August–October and precipitation the following rainy season at six stations lying in the region between Los Angeles and San Diego. Predictions have been correct as to sign in the majority of cases, but there has been considerable discordance between the magnitudes of the actual and the predicted departures. Further, the relation holds for only a limited region in southern California.

Gorton (**57**) has attempted to extend McEwen's work by employing in addition to the water temperatures a 6-year cycle which was obtained by a smoothing process.

Blochman (**97**) found a relation between San Diego summer rains and the rainfall of the ensuing rainy season in southern California.

3. PURPOSE AND SCOPE OF THE PRESENT STUDY

HISTORY

The present investigation was begun in 1931, with the assignment of one assistant for about 6 months. Beginning with December 1933 the project was continued under allotment of funds from the Civilian Works Administration for about a year. At that time three work units took part, one at Des Moines, Iowa, one at Lincoln, Nebr., and one at Washington, D. C. During parts of 2 years, ending in July 1936, allotments from the Works Progress Administration enabled the work to be carried on at three points, namely, Atlanta, Ga., Des Moines, Iowa, and Lincoln, Nebr. The delay in completing correlation coefficients for several of the districts, in checking the data and reducing the whole to form for publication has been due to lack of necessary assistance. It is appropriate to indicate that without the help of the CWA and WPA funds it would have been impossible to have carried out the present study. Occasion is taken to acknowledge the helpful assistance of Thomas A. Blair at Lincoln, Charles D. Reed at Des Moines, and George W. Mindling at Atlanta, without whose cooperation in undertaking and carrying forward this project in addition to the other duties and responsibilities of their respective stations, it would have been impossible to accomplish the great amount of detailed work.

To the workers employed under CWA and PWA funds, most of whom undertook correlation work for the first time, our appreciation is extended.

For suggestions in the text and arrangements, the author is indebted to Humphreys, Rossby, and Woolard; and for suggestions regarding the section on correlation coefficients, to Larry F. Page and Richmond T. Zoch.

It was decided to use pressures at foreign stations as a basis of comparison with conditions in the United States because pressure seemed a more conservative and fundamental element than either temperature or precipitation, both of the latter being affected largely by local conditions. To make the survey complete it would have been desirable, of course, to use also temperature and precipitation at foreign stations. These, however, must be left for later consideration.

The purpose of this investigation has been to make a preliminary survey of associations between pressures at foreign stations, and subsequent temperature and precipitation in the United States, by means of simple correlation coefficients. Such a survey would point out the areas outside the United States in which antecedent pressure conditions might be suggestive of time-lag relations with conditions in the United States. This it is believed has been accomplished. Such a preliminary survey was to have been followed later by investigations with multiple correlation coefficients, similar to the work done by Walker in India, but personnel has not been available to carry out the second step, except in a few cases. Owing to the delays already involved it was thought best to complete the preliminary study and publish it, so that others interested in investigations in this field might have the benefit of the suggestions therein contained, and data in convenient form for pursuing similar studies. Industrial and commercial institutions concerned with the manufacture and distribution of commercial products, with crops, water supply, etc., as well as Government organizations charged with crop control and long-period planning are vitally interested in knowing the future weather. It is our hope that workers in the fields above referred to may carry on and extend investigations of this kind, and it is our hope and expectation that such investigators will find in our results something of value. Certainly there are many problems along this line of research that could be followed up by institutions having personnel qualified in statistics. Results achieved in such a field would be of great value. No doubt universities will find opportunity in this field for worthwhile work by graduate students.

DIVISION OF THE UNITED STATES

The United States was divided into relatively small climatic districts so that other investigators could combine them in any manner desired. Twelve districts were adopted; 9 of them are represented by 10 stations each, and the other 3 by 5 stations each. The districts and stations used are shown on the map, chart 3.

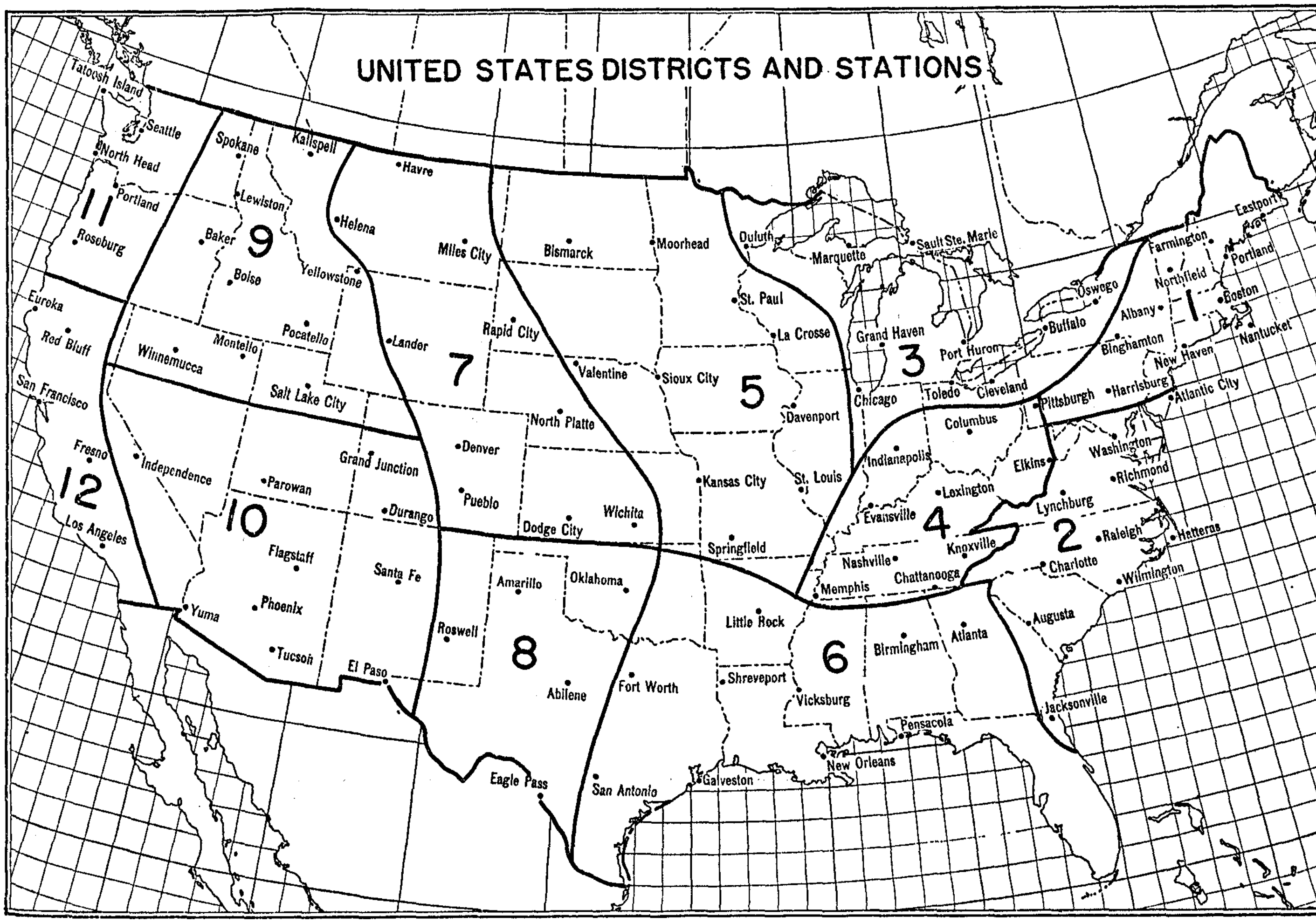

Chart 3. The 12 U. S. districts and the stations employed.

If in further studies it is desired to combine districts, it would seem logical that each district should be weighted according to its area; the following table of relative areas was obtained by means of a planimeter.

TABLE 4.—*Relative areas of United States districts*

District No.		District No.	
1	0.05	8	0.08
2	.07	9	.09
3	.07	10	.13
4	.06	11	.04
5	.14	12	.04
6	.11		
7	.12	Total	1.00

4. THE DATA ON WHICH THE PRESENT STUDY IS BASED

UNITED STATES

Considerable difficulty was experienced in finding well-distributed stations for both temperature and precipitation that had records which began earlier than 1889. In particular, during earlier years three temperature observations a day were taken, but no thermographs were available; the means, computed from the three observations, gave results that differed from those obtained from the averages of the maximum and minimum which have been employed in later years. A few stations have published data from the two classes of record as one continuous series without applying a correction to make the earlier record comparable with the later record. When data were missing for a short period, use was made of Weather Bureau *Bulletin U*, "Temperature Departures, Monthly and Annual in the United States," (1911). Finally, the data from 1889 to 1930 were grouped for each district, and means obtained by months and then by quarters, winter (December-January-February), spring (March-April-May), summer (June-July-August) and fall (September-October-November). Tables 5 to 10 give the data by quarters for the 12 districts into which the United States has been divided for both temperature and precipitation. The quarter December-January-February is given the year of the January and February, for example, the period December 1896 and January and February 1897 is called the winter of 1897.

TABLE 5.—*Temperature departures*

Year	District 1				District 2				District 3				District 4			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
89	1.7	1.9	−0.5	−0.6	−0.8	−0.6	−1.3	−1.9	0.6	1.3	−1.4	−1.9	0.3	0.6	−2.0	−1.9
1890	5.0	−1.0	−.7	−1.1	9.0	−.3	.2	.5	7.3	−2.5	.0	−.7	10.9	−1.2	.5	.1
91	−.5	−1.0	−.9	.1	2.5	−1.8	−.6	−1.7	2.7	−1.5	−1.7	.1	2.9	−1.3	−1.0	−.9
92	3.6	−1.9	1.3	−1.1	1.3	−2.0	.6	−2.2	3.2	−2.6	.9	−1.0	1.7	−2.0	.4	−1.5
93	−3.9	−2.3	.4	−1.1	−3.3	−.5	.1	−1.3	−4.7	−2.4	1.2	−.8	−3.4	−.2	.4	−.8
94	−1.1	1.9	.5	−.5	1.6	1.7	−.4	−.3	.2	2.2	1.3	−.3	1.8	1.8	.2	−.2
95	−1.4	−.4	.8	.0	−3.4	−1.6	.4	−.2	−1.2	−.3	.4	−1.5	−4.3	−.4	.6	−.6
96	.5	−.3	.7	−.2	−.4	1.4	.4	.6	1.7	2.0	.9	−2.5	.9	2.7	.5	−.4
97	.2	.3	−.8	−.4	−.9	.2	.6	.5	1.7	−.5	−.5	1.8	.5	−.4	.0	2.6
98	1.9	1.1	1.3	.9	.9	.6	.9	−.3	2.3	2.4	1.3	.9	1.8	1.4	1.7	−.5
99	−.9	−.3	1.0	−.3	−2.2	−.2	.6	−.1	−2.4	−.1	1.2	1.7	−3.9	.9	1.7	1.6
1900	1.9	−1.5	1.9	2.6	−1.3	−1.0	2.1	3.6	.7	−.6	1.6	3.2	−1.3	−.7	1.9	−3.4
01	−1.3	−.4	2.0	−1.2	−1.9	−2.0	.8	−2.3	−.7	−.1	2.5	−.3	−1.0	−2.0	2.3	−1.8
02	−.3	2.2	−2.0	1.0	−4.0	.2	.3	1.7	−.6	2.3	−1.5	1.6	−4.7	1.2	.0	1.7
03	−.2	3.4	−3.3	−1.2	.4	1.8	−.7	−2.0	.4	3.7	−2.2	−.5	−.7	2.6	−1.6	−1.7
04	−5.9	−.6	−1.0	−3.2	−5.0	−1.1	−.6	−1.3	−7.2	−1.5	−1.6	−.8	−4.7	−1.6	−1.2	−.3
05	−5.6	−.3	−.7	−.9	−6.1	1.4	.0	.4	−3.0	−.5	−.4	−.2	−5.9	.7	.1	−.2
06	2.8	−1.9	1.0	.2	.5	−.9	.7	1.0	3.7	−1.4	1.2	.9	.8	−1.3	.2	.4
07	−3.8	−2.7	−1.3	−1.3	.8	−1.3	−1.1	−.8	−1.7	−3.6	−1.3	−1.9	2.3	−1.4	−1.1	−1.8
08	1.0	.5	1.1	1.3	−1.3	2.8	−.4	−.4	1.3	.8	.5	2.6	−.3	2.9	.2	1.1
09	2.0	−.9	−.3	.4	3.8	−.2	−.4	−.4	2.5	−1.8	.2	−.1	3.8	−1.1	.1	.8
1910	.6	3.1	−.2	−.3	−2.1	1.7	−.9	−.1	−1.6	3.3	.8	−.8	−3.5	1.8	−1.2	−.1
11	−1.4	.1	1.1	−1.2	.1	−.7	1.4	.9	.6	1.9	1.2	−2.1	1.5	.9	.9	.2
12	−1.8	−.3	−1.0	1.3	−2.9	.5	−.5	1.2	−4.0	−2.0	−2.0	1.6	−3.6	−.6	−1.6	.8
13	4.5	1.6	.4	1.8	4.2	1.4	.2	−.3	1.5	−.3	.4	1.1	2.0	.1	−.5	.5
14	−.7	−.5	−.7	.5	.4	−1.1	1.1	−.5	1.2	−.2	.5	1.3	.5	−1.0	2.1	.3
15	2.3	.2	−1.4	1.9	−.2	−1.4	−.4	2.0	.6	.3	−3.0	1.6	−.7	−1.2	−2.2	2.2
16	1.2	−1.4	−.2	−.2	1.1	−.7	−.6	−.3	.2	−2.0	1.3	−.5	.9	−.7	.3	−.2
17	−1.3	−2.8	.6	−3.3	.4	−1.1	.0	−3.7	−4.7	−2.8	−2.0	−3.8	−.7	−2.0	−1.4	−3.6
18	−6.8	1.6	−.6	.1	−5.1	1.6	−.6	−.6	−7.0	1.8	−.3	−.6	−6.6	2.8	.5	−1.2
19	4.1	1.2	.6	.3	2.1	.5	−.3	3.0	5.8	.6	2.8	.3	3.4	−.1	1.5	2.7
1920	−4.6	−1.2	.2	1.8	−2.7	−2.1	−1.1	.6	−5.9	−1.0	−.9	2.8	−2.9	−1.5	−1.7	.6
21	3.1	4.8	1.2	1.3	1.7	2.9	.4	3.0	5.0	5.1	3.8	1.0	3.0	4.2	2.3	2.1
22	−.4	2.3	.4	1.0	1.3	1.5	−.1	1.1	.6	2.8	.4	2.2	1.9	2.6	.2	2.3
23	−2.9	−2.4	−.4	.6	1.3	−.4	.3	−.5	−1.5	−3.0	.2	.3	1.9	−1.5	.1	−.5
24	2.4	−1.0	−.2	−.2	1.5	−1.8	.0	−1.4	1.6	−2.1	−1.9	−.3	1.0	−3.5	−.2	−.4
25	.8	1.4	.9	−2.2	2.3	.7	1.5	.8	−.9	.9	1.0	−2.7	1.8	1.4	1.8	−.1
26	−.8	−3.4	−1.1	−.5	.2	−2.3	.5	.5	.2	−3.9	−1.3	−2.3	−.2	−3.5	−.1	−.1
27	.4	.5	−1.7	2.9	2.7	.9	−1.9	2.5	.4	1.4	−2.7	2.5	2.6	1.5	−2.7	3.4
28	2.8	−1.2	1.0	.4	.7	−1.3	.8	.2	−.1	−1.3	−.5	.2	.0	−2.2	−.7	−.3
29	2.4	1.9	.0	.6	.9	2.7	−.6	.3	.9	2.3	−.8	−1.2	−1.2	2.2	−1.1	−1.2
1930	2.2	.5	2.1	2.2	3.0	.6	.7	.2	1.1	.9	2.0	1.1	2.5	.6	1.3	.1
Base	25.6	44.5	66.7	50.5	43.3	59.1	76.5	62.3	23.0	42.5	66.4	49.5	36.2	55.2	74.7	57.8
Σ (+)	47.4	30.5	20.5	23.2	44.7	25.1	14.6	24.6	47.1	36.0	27.6	28.8	50.7	32.9	21.8	23.5
Σ (−)	45.6	29.7	19.0	21.0	43.6	26.4	12.5	22.6	48.1	38.0	26.0	26.8	49.6	31.4	20.3	23.7
Δ	+1.8	+.8	+1.5	+2.2	+1.1	−1.3	+2.1	+2.0	−1.0	−2.0	−1.6	+2.0	+1.1	+1.5	+1.5	−.2

TABLE 6.—*Temperature departures*

Year	District 5				District 6				District 7				District 8			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
89	−1.9	2.1	−1.1	−3.1	−0.4	−0.3	−1.5	−2.7	0.0	2.6	−0.3	−1.9	−0.5	0.1	−0.8	−2.9
1890	3.6	−2.0	.4	−.5	9.2	−.5	−.4	−.7	−.9	.6	.9	.5	6.8	.1	.0	−1.0
91	3.1	−2.3	−3.1	−.8	1.6	−1.9	−.8	−1.8	.6	−2.1	−2.6	.1	.8	2.9	−.9	.0
92	2.6	−3.8	−.6	−.2	.5	−1.6	−1.1	−.8	1.5	−2.9	−1.1	1.4	.3	−1.4	−1.3	−.1
93	−5.8	−3.8	.5	−.9	−1.0	.5	.0	−.7	−2.3	−2.8	.0	−1.2	−1.7	.5	.3	−.4
94	−2.1	2.6	2.2	−.6	1.5	1.9	−1.4	−.1	−1.5	2.1	.9	1.3	−1.1	1.4	−1.4	1.1
95	−2.1	1.8	−1.1	−1.6	−3.6	−.6	.1	−.5	−2.6	1.2	−2.5	−1.1	−3.9	.5	−1.3	−2.0
96	3.0	1.0	−.2	−5.2	−.3	2.0	1.5	.4	3.8	−.6	.9	−4.6	.9	2.6	1.5	−1.1
97	1.3	−1.6	−.5	3.1	.2	1.3	1.0	1.9	2.3	−.3	−.5	1.3	.5	.0	−.7	.8
98	2.3	.3	.3	−2.2	1.4	.5	.2	−1.8	1.7	−1.8	.3	−2.9	.1	.1	−1.6	−1.6
99	−4.2	−3.1	1.0	3.1	−4.8	1.1	.9	.9	−5.5	−3.7	−.7	2.4	−6.2	.4	−.2	1.2
1900	−.2	1.8	1.9	1.4	−1.4	−.1	−.1	2.8	1.5	3.0	1.7	.3	−1.4	−1.9	−1.0	1.4
01	1.3	1.2	3.7	.5	.3	−1.1	1.2	−.9	2.1	1.7	1.9	1.8	.0	−1.8	1.2	1.5
02	−1.2	2.1	−1.9	.4	−3.7	−.5	1.6	.6	1.7	1.6	−1.2	.1	−1.7	1.7	.1	.4
03	−1.6	1.6	−2.2	−1.4	−1.2	−.5	−2.0	−2.1	−1.3	−1.2	−1.2	−.4	−1.9	−2.4	−2.0	−1.6
04	−4.3	−1.8	−2.7	2.0	−1.0	.1	−1.3	.8	2.3	−.1	−1.6	3.0	1.3	1.6	−1.5	−.3
05	−4.8	1.1	−.8	.5	−5.4	2.0	−.4	.8	−2.7	.9	−.4	.1	−6.1	−.2	−.4	.1
06	2.9	−1.5	−1.1	.2	−2.0	−1.3	−.3	−.6	3.4	−1.8	−1.9	−.7	−1.4	−1.5	−2.1	−3.0
07	.2	−3.5	−1.2	−1.1	2.8	.6	.3	−.8	.9	−1.4	−1.6	1.0	4.9	.3	.4	−.6
08	4.3	.8	−1.4	1.8	−.3	3.1	−.3	−.6	3.9	1.0	−1.6	.1	−1.0	−2.0	−1.7	−1.3
09	1.8	−2.6	.8	1.0	3.2	−.1	1.0	2.3	1.0	−2.5	1.3	1.3	3.7	−.4	1.6	2.0
1910	−4.3	4.6	.1	.0	−3.0	1.2	−.7	.9	−4.8	6.1	.5	1.9	−2.3	2.1	2.5	2.3
11	1.0	2.7	1.0	−3.2	3.4	1.6	.4	.6	−.3	2.3	−.1	−2.5	3.3	1.8	1.4	.2
12	−3.9	−1.5	−1.4	.7	−3.2	−1.1	−1.1	.1	−2.3	−3.7	−1.6	−1.6	−3.5	−2.0	.0	−.6
13	.6	−.7	2.6	1.1	.0	−1.2	.2	−.7	−2.0	−.3	1.4	−.2	−3.3	−.8	.3	−.6
14	3.0	.6	1.8	3.1	.0	−1.5	1.2	−.4	1.4	1.3	1.1	3.2	1.2	−1.2	.9	1.4
15	−.7	−.2	−4.6	2.0	−2.4	−2.3	−.3	1.9	−1.2	−.2	−3.9	1.5	−2.0	−3.9	−1.6	1.3
16	−1.3	−.6	1.1	−.7	1.8	.4	.0	−.4	−3.0	1.1	.2	−1.7	2.4	1.6	.6	−1.0
17	−4.9	−2.6	−1.2	−1.7	1.6	−1.4	−.3	−2.7	−3.8	−4.3	−.2	1.4	.5	−1.9	1.0	.4
18	−6.1	2.8	1.3	−.4	−3.5	1.8	1.2	−1.2	−2.0	1.4	1.9	−.5	−2.3	1.8	2.5	−1.6
19	5.3	.0	2.0	−2.1	.0	−.9	−.8	2.4	3.0	.6	2.8	−3.9	−1.9	−1.4	−1.7	−.7
1920	−2.4	−1.9	−.4	2.0	−.4	−.9	−1.3	−.6	.0	−2.8	−.3	−.2	−.8	−1.3	−1.8	−.2
21	6.6	3.3	3.2	.5	2.2	1.8	.9	2.7	5.4	1.9	1.9	1.7	2.8	1.6	−.4	3.8
22	.0	2.2	1.1	3.6	2.4	1.0	.1	1.3	−2.8	−.4	2.0	1.5	5.0	.0	1.2	1.3
23	.9	−2.3	1.0	.9	3.9	−1.0	−.4	−1.2	1.1	−1.1	.4	−.3	3.4	−1.4	.8	−1.5
24	2.7	−3.0	−2.0	1.3	−.4	−2.8	1.5	.6	1.7	−3.5	−.2	1.4	1.9	−3.5	1.6	1.3
25	−.6	3.2	.8	−2.3	1.2	2.6	1.7	.2	−.2	3.8	1.0	−2.7	.0	3.7	1.4	−1.5
26	3.8	−.4	−.2	−2.6	−.5	−2.8	−.2	.8	6.0	1.4	.8	−.7	3.9	−2.7	−.4	1.5
27	2.3	.9	−2.9	1.6	4.2	2.3	−.2	3.1	1.3	.0	−1.9	1.1	2.7	3.3	−1.2	2.5
28	.9	.6	−1.5	.2	−.9	−1.1	.3	−.2	−.9	1.7	−2.0	−.1	−1.4	2.2	.6	.2
29	−3.6	1.3	.3	−2.1	−1.5	2.1	.4	−1.6	−5.2	.5	2.0	−2.5	−2.6	.8	1.8	−2.0
1930	1.8	1.6	5.8	.7	.3	−1.8	1.2	−.6	.6	.8	2.4	.1	.1	1.0	1.9	1.1
Base	22.5	48.0	71.8	51.1	50.0	65.5	80.7	67.4	25.9	46.9	70.0	49.7	43.7	62.2	79.8	63.0
$\Sigma (+)$	55.3	40.2	32.9	31.7	41.7	27.9	16.9	25.1	47.2	37.6	26.3	28.5	46.5	32.1	23.6	25.8
$\Sigma (-)$	56.0	39.2	32.1	32.7	40.9	27.3	14.9	23.7	45.3	37.5	27.4	29.7	47.0	31.7	24.0	25.6
Δ	−.07	+1.0	+.8	−1.0	+.8	+.6	+2.0	+1.4	+1.9	+.1	−1.1	−1.2	−.5	+.4	−.4	+.2

TABLE 7.—*Temperature departures*

Year	District 9				District 10				District 11				District 12			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
89	−0.7	5.1	3.1	0.6	−1.1	2.4	1.8	−0.4	1.9	3.9	−1.1	1.0	0.6	2.5	0.4	1.0
1890	−3.0	1.4	.1	−.3	1.9	1.7	.4	.1	−4.2	.5	−.5	.0	−2.9	.3	.5	1.1
91	.0	.1	−.9	1.2	−.5	−.9	.2	1.4	.2	.5	.9	1.1	−.5	−.3	1.5	1.2
92	−1.5	1.0	−.5	1.4	−.9	.2	.7	.9	.8	1.2	−.1	.6	−.1	−.6	−1.0	−.3
93	−3.0	−3.4	−3.1	−2.1	.7	−.7	.6	−1.5	−2.7	−1.6	−1.2	−3.2	−1.4	−2.2	−.7	−2.5
94	−.9	−.2	.9	1.1	−1.6	1.0	−1.2	.5	−.9	−1.7	.3	−.5	−1.8	−1.0	−1.2	.8
95	−.6	.7	−.7	−1.1	.0	.9	−.9	−.5	−.8	−.1	−.1	−1.6	−.3	−.4	−.3	−1.1
96	3.3	−3.5	1.6	−1.9	1.1	.5	1.3	.1	1.5	−2.4	1.4	−2.5	1.3	−1.8	1.4	−.9
97	2.5	−.3	−.3	.5	.4	.1	−.2	.2	.9	.0	.7	−1.1	.1	.0	.1	−1.6
98	−.4	−.3	1.3	−2.4	−2.0	.0	1.1	−.5	1.2	−.3	1.0	−.7	−.7	−.9	.7	−.6
99	−2.5	−3.3	−2.4	1.4	−2.6	.0	.0	1.5	−1.0	−2.4	−1.8	1.6	.2	−1.5	−1.1	−.1
1900	2.7	3.2	.4	−1.0	1.8	.9	.7	.5	1.8	1.8	−.2	−.8	.9	.8	.0	−.4
01	3.3	.7	.3	2.2	1.3	−.2	1.2	2.0	1.3	−.8	−1.7	1.8	−.1	−.5	−.4	.3
02	3.1	.0	−1.7	.5	2.0	−.1	.5	.4	.7	−.7	−.6	.3	1.1	−1.7	−.1	−.5
03	−.8	−1.5	.2	.0	−2.4	−.8	.7	1.0	.2	−1.3	−.4	.2	−1.5	−1.2	−.8	.9
04	1.5	.2	−.1	3.1	1.6	2.3	−.3	.7	.1	.2	−.7	2.2	.2	.6	.3	1.5
05	1.7	.9	.5	−1.3	.4	−1.2	−.5	−.2	1.5	2.0	−.1	−1.2	2.0	.8	−.2	−.6
06	.4	−.9	.0	.4	.2	−.6	−.8	−2.0	1.7	.8	.8	.3	1.3	−.8	.3	.1
07	3.2	.1	−3.4	2.1	4.2	.0	−2.2	.0	−.5	.0	−.7	1.2	.7	−.7	−1.3	−.1
08	−.4	−.7	−1.5	−.1	1.0	−3.5	−1.3	−1.9	1.4	−1.3	−.7	−.4	.5	−.2	−.4	−.7
09	1.0	−1.9	−.5	1.4	.8	−2.2	.1	−.3	−1.2	−1.3	−1.5	−.1	−.7	−.9	−1.0	−.5
1910	−4.8	4.8	−.1	1.3	−3.3	3.9	1.3	2.0	−3.0	1.8	−1.8	−.6	−2.1	2.6	−1.0	−.3
11	1.0	−.8	−1.3	−2.9	2.0	1.1	−.9	−1.5	−1.1	−1.6	−.8	−1.3	−3.3	−1.1	−1.2	−.9
12	1.1	−1.6	−2.3	−2 3	−.9	−2.6	−1.4	−2.2	1.8	.0	−.2	−.5	1.2	−1.7	−.9	−.5
13	−2.5	−1.1	−1.1	−.3	−3.8	−1.1	−1.2	−.4	−1.4	−1.0	.9	−.3	−1.3	−.4	.4	1.4
14	2.1	2.2	−.5	.7	−.2	1.5	−.7	1.5	1.8	2.6	−.3	.5	1.2	2.0	−1.5	.6
15	−.1	2.2	−.6	.0	−2.7	−1.7	−.5	.1	.2	3.0	1.3	−.1	−.7	1.1	.6	−.2
16	−1.6	.0	−2.0	−2.9	.4	1.2	−1.0	−2.1	−1.9	−.7	−.7	−2.5	.4	.9	−1.3	−2.8
17	−4.7	−5.2	.7	2.6	−3.3	−4.5	.5	2.0	−2.4	−2.9	.0	1.6	−2.2	−2.5	.9	−1.3
18	3.6	−.2	1.2	1.4	1.9	.1	.5	−.4	2.6	−.6	.5	1.3	1.7	.1	.4	.5
19	1.4	1.4	2.5	−3.2	−2.7	.6	.5	−1.9	.5	.3	−.9	−1.8	−.1	.2	.0	−.2
1920	−.4	−2.8	.0	−1.1	1.8	−1.7	−.6	−1.7	−1.4	−2.2	.1	−.5	.8	−1.1	.2	−1.4
21	3.2	−.1	1.4	.8	1.3	.1	−.5	2.1	1.3	−.7	−.4	.5	−.1	−.8	.6	.9
22	−4.1	−3.3	2.5	1.3	.3	−2.0	1.1	−.2	−2.7	−1.9	.5	.3	−1.2	−1.3	.8	−.1
23	−.4	−1.1	−.3	.9	2.0	−.8	−1.3	−1.8	−1.4	.4	1.5	2.3	.0	.7	−.8	1.9
24	1.1	.5	.2	.5	.3	−1.4	1.3	.3	1.8	.7	.1	−.1	1.8	1.6	.1	−.4
25	1.0	2.8	1.0	−.9	−.8	3.1	−.4	−1.5	.5	1.6	.5	.3	.5	1.0	.8	−.6
26	4.5	3.5	2.2	.4	1.1	1.0	.3	1.4	3.7	4.8	2.3	2.3	1.9	4.7	1.7	2.0
27	1.9	−1.6	.1	1.6	2.1	.4	−.6	1.0	1.1	−.9	1.1	.9	1.1	−.1	.3	.7
28	−.6	2.3	−.3	1.1	−.1	1.5	.0	.4	.1	2.1	.5	.2	1.5	2.7	.1	−.1
29	−5.8	−.9	1.6	−1.2	−2.9	−.8	1.3	.0	−2.9	−1.0	.7	.8	−1.6	−.4	1.5	1.8
1930	−2.8	2.1	1.9	−1.6	1.8	.5	.9	−.7	−1.0	1.2	.2	−.4	2.5	1.5	1.0	.4
Base	27.9	46.3	66.9	47.9	39.2	55.5	75.1	58.1	41.9	49.6	60.9	52.8	49.9	57.2	68.2	61.3
Σ (+)	43.6	35.2	23.7	28.5	32.4	25.0	17.0	20.1	30.6	29.4	15.3	21.3	23.5	24.1	14.6	17.1
Σ (−)	41.6	34.7	23.6	26.6	31.8	26.8	16.5	21.7	30.5	27.4	16.5	20.2	22.6	24.1	15.2	18.7
Δ	+2.0	+.5	+.1	+1.9	+.6	−1.8	+.5	−1.6	+.1	+2.0	−1.2	+1.1	+.9	.0	−.6	−1.6

TABLE 8.—*Precipitation departures*

Year	District 1				District 2				District 3				District 4			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
89	0.22	0.11	1.22	1.42	0.99	1.08	2.05	0.97	0.05	-0.39	0.27	-0.18	-0.79	-0.86	0.38	1.37
1890	-.15	.78	.25	1.13	-1.91	.45	.12	.69	.89	.49	.24	.51	1.57	1.23	.05	1.02
91	.92	-.63	.46	-.39	.72	.31	.73	-.16	.08	-.52	-.07	-.23	1.00	-.33	.98	-.35
92	.21	-.28	.79	-.47	.07	.02	-.55	-.28	.29	.62	.84	-.50	-.11	.70	.49	-.33
93	-.41	.44	-.21	-.58	-.08	.10	.14	1.37	-.03	.39	-.47	-.09	.47	.83	-.93	-.10
94	-.04	-.48	-1.16	.78	.11	-.62	-.10	1.23	.50	.94	-1.28	.46	.08	-.36	-1.18	-1.04
95	-.47	-.32	-.33	.11	.19	1.59	-.67	-.84	-.14	-.79	-.71	.04	-.17	-.96	-.37	-.36
96	-.02	-.04	-.41	.55	.13	-.80	-.42	-.03	.74	.12	.25	.29	-.62	-.42	.83	.62
97	-.87	.45	.85	-.37	.09	.03	-.37	.11	.06	.06	.21	-.53	-.62	1.42	.14	-.57
98	1.00	-.12	.12	1.03	-.98	.24	.24	.78	.36	-.30	-.38	.32	.72	.35	.28	.67
99	-.36	-.35	-.93	-.47	1.00	-.16	.35	.11	-.41	.07	-.46	-.29	-.11	.43	-.53	-.76
1900	.72	-.10	-.75	.42	-.11	.46	-.72	-.19	.64	-.74	.30	.17	-.23	-1.14	.31	.69
01	-1.36	1.96	-.29	-.82	-.30	1.39	1.25	-.55	-.72	-.22	.40	-.34	-1.49	.0	-.09	-.93
02	.89	.36	.03	.01	1.02	-.51	-1.17	1.75	-.30	-.03	.88	.10	.04	-.84	-.35	.32
03	.76	.07	.52	-.56	1.16	.76	.31	-.15	.18	.09	.92	-22	.92	-.02	-.60	-.99
04	-.34	.37	-.28	-.48	-.60	-1.05	-.03	-.42	.09	.23	-.09	-.65	-1.01	.13	-.20	-1.57
05	-.58	-1.11	.53	-.23	.02	.58	.06	-1.26	-.35	-.03	.79	.19	-.13	.05	.38	.20
06	-.38	.53	.47	-.33	.93	.00	1.89	-.14	-.36	-.53	-.07	.49	-.84	-.57	.44	1.03
07	-.10	-.42	-.86	1.78	-1.11	.30	-.18	.88	.17	-.15	-.02	.24	.29	-.05	.01	.27
08	.53	-.08	-.49	-1.25	.83	.01	1.48	.35	.65	.58	.09	-1.12	-.17	.52	-.62	-1.47
09	.91	-.01	-1.05	-.13	-.36	.09	-.71	-1.43	.36	.40	.15	-.22	.32	.42	.31	-.29
1910	.46	-.66	-.70	-.65	-.29	-1.73	.53	-.58	.78	-.26	-.72	-.10	.18	-.91	.15	.10
11	-.53	-.80	.40	.21	-1.26	-1.13	-.26	.25	-.08	-.31	.48	.87	-.23	-.37	-.08	.79
12	-.24	1.08	-.79	-.21	.44	1.16	-.69	-.07	.07	.31	.10	-.25	.24	1.63	.62	-.91
13	.08	.37	-1.42	.70	-.46	.28	-.79	-.05	.09	.87	-.28	-.04	1.47	.09	-.82	.53
14	-.18	.50	.04	-1.18	.05	-1.25	-.93	-.27	-.58	.48	.09	-.89	-.92	-1.08	.16	-.68
15	.98	-1.47	1.36	-1.06	1.20	-.91	.02	-.42	.04	-.99	.73	.10	.51	-1.37	1.00	.41
16	.16	.31	.40	-.47	-.84	-.80	.92	-.75	.10	.23	-.09	.03	1.22	-.84	.46	-.82
17	-.15	-.06	1.14	-.42	-.54	-.06	.20	-.12	-.38	.04	.03	-.35	.15	.65	.33	-.80
18	-.33	-.41	-.22	.54	-.99	.30	-1.50	-.70	.04	.03	-1.00	.33	-.63	-.58	-.77	-.07
19	-.42	.62	-.07	.69	.33	.08	1.04	-1.26	-.43	.53	-.62	.39	-.17	.65	.15	1.58
1920	.07	.46	.45	.63	-.07	.01	.72	.57	-.89	-.14	.35	-.42	-.22	.81	.89	-.12
21	.00	-.30	-.13	.12	-.04	-.16	-1.13	-.31	-.36	.49	-.35	.29	-.06	-.15	.05	1.19
22	-.68	.49	1.42	-1.11	.38	1.05	.73	-.27	-.29	.50	-.09	-.36	-.49	1.12	-.25	-1.09
23	.25	-.26	-.94	-.22	.08	.25	-.42	-.32	-.42	-.40	-.27	-.31	.09	.52	.65	-.51
24	.19	.20	.00	-.49	.05	.76	.38	.71	.12	-.15	.52	-.77	.75	.33	-.67	-.74
25	-.59	-.46	.03	.78	.40	-1.16	-1.60	-.47	-.41	-.88	-.47	.53	-.11	-1.72	-.97	1.85
26	.27	-.91	-.19	.85	.62	-.85	-.22	-.47	-.29	-.42	.41	1.47	-.82	-1.28	.19	1.05
27	-.14	-.93	.91	1.27	-.83	-1.12	.20	-.40	-.46	.19	-.39	.66	1.02	1.95	-.38	.27
28	.27	.20	1.09	-.52	.20	.84	.76	1.09	.04	-.49	1.22	.13	-.70	-.21	1.72	-.07
29	-.23	1.07	.00	-.09	.36	.87	-.46	1.67	.00	.68	-.49	.05	-.34	1.34	-.20	1.25
1930	-.43	-.09	-1.12	-.52	-.59	-.87	-1.15	-.60	.37	-.54	-1.06	-.57	.11	-1.17	-1.96	-.80
Base	3.08	3.18	3.37	3.03	3.34	3.36	4.81	3.08	2.16	2.61	2.90	2.75	3.56	3.99	3.73	2.90
Σ (+)	8.89	10.37	12.48	13.02	11.37	13.01	14.12	12.53	6.71	8.34	9.27	7.66	11.15	15.17	10.97	15.21
Σ (−)	9.00	10.29	12.34	13.02	11.36	13.18	14.07	12.51	6.90	8.28	9.38	8.43	10.98	15.23	10.97	15.37
Δ	-.11	+.08	+.14	.00	+.01	-.17	+.05	+.02	-.19	+.06	-.11	-.77	+.17	-.06	.00	-.16

TABLE 9.—*Precipitation departures*

Year	District 5				District 6				District 7				District 8			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
89	0.20	−0.26	−0.47	−0.20	0.53	−0.85	1.38	0.56	−0.02	0.89	−0.06	−0.26	0.92	−0.62	0.23	0.28
1890	.34	−.41	.00	.17	−1.13	.18	−.11	.56	−.14	−.57	−.62	−.32	−.24	.43	−.51	.22
91	−.03	−.33	.72	−.57	.75	−1.01	−.58	−.85	.06	.63	.72	−.12	.20	.20	.06	−.78
92	.40	1.65	.60	−.68	.05	−.33	.95	−.44	.01	1.26	.09	−.20	.31	.38	−.01	.06
93	−.07	.74	−.75	−.69	−.50	−.24	−.41	−.59	.09	−.62	−.52	−.35	.40	−.94	−.25	−.67
94	.07	−.06	−1.62	−.04	−.15	−.27	1.02	−1.34	−.05	−.05	−.41	−.07	−.03	−.01	.07	−1.00
95	−.34	−.82	.29	−.53	−.57	.19	.65	−1.08	.08	−.44	.50	−.38	.09	−.79	1.34	.55
96	.26	83	−.38	.40	−.09	−1.15	−.62	.08	−.18	−.10	−.27	.18	.14	−1.11	−.71	.37
97	.43	−.34	.00	−1.02	−.83	−.25	−1.03	−1.35	.08	−.34	−.08	−.11	.21	.69	−.02	−1.21
98	.23	.93	.04	.19	.10	−1.56	.78	1.62	.00	.69	−.26	−.07	.14	−.12	1.37	−1.00
99	−.39	.32	.07	−.91	−.30	−1.53	−.24	−1.41	.00	−.13	.30	−.14	−.00	−.19	.98	1.25
1900	.02	−.58	.61	1.20	.45	1.10	1.69	.74	−.01	.34	−.65	.04	.22	1.31	−.18	1.83
01	−.59	−.69	−.33	.05	−.27	−.04	−.14	−.14	−.24	.08	−.07	−.16	−.41	.27	−1.32	−.14
02	−.21	−.01	.86	−.04	−.25	−.19	−1.11	1.05	−.17	.29	.07	−.20	−.50	.94	−.48	.54
03	.13	.32	.54	.40	1.57	−.72	.28	−1.17	−.02	−.07	.02	−.19	.73	−.38	.06	−.50
04	−.30	.25	.55	−.62	−1.46	−.76	.56	−1.36	−.30	−.02	.34	−.48	−.48	−.88	.65	−.08
05	−.14	.30	1.03	.78	.47	.95	.58	.27	−.13	.62	.29	.06	.08	1.75	.12	.18
06	.03	.20	.15	.39	−.05	−.64	.19	.70	−.29	.25	.25	.64	−.14	−.26	1.45	.23
07	.37	−.65	.72	−.59	−.65	1.16	−1.33	1.12	.17	−.24	.24	−.34	−.31	−.63	−.37	.18
08	.01	.68	.07	−.27	.30	.54	−.54	−.37	−.03	.09	.40	.32	−.05	.98	.36	.33
09	.05	.32	.28	.42	−.95	.39	−.21	−.69	−.06	−.20	.38	.46	−.75	−.67	−.53	−.50
1910	.14	−.88	−.77	−.58	.01	−1.13	.29	−.64	.11	−.62	−.38	−.48	−.51	−.91	−1.12	−1.03
11	.08	−.66	−.57	1.02	−1.10	.00	.08	.04	.16	−.74	−.15	.36	.10	−.30	−.58	−.47
12	−.08	.37	.06	−.39	.98	2.41	.35	−.84	.23	.26	.23	.17	.45	−.69	.21	−.80
13	−.18	.03	−.86	.09	1.14	.16	−1.05	2.84	.00	−.44	−.63	.34	.01	−.39	.07	1.09
14	−.13	−.67	.21	.65	−1.09	.17	−.03	.63	.32	−.15	.02	−.21	−.05	.74	.00	−.20
15	.43	.08	1.74	−.01	.52	−.74	.86	.22	.23	.51	1.30	.10	.53	.96	.00	−.35
16	.66	−.05	−.25	−.29	−.21	−.78	1.14	−.79	.08	−.27	.08	−.20	−.26	−.62	.53	−.55
17	−.25	.10	−.90	−.61	−.33	−.33	−.31	−1.21	.08	.14	−.84	−.36	−.37	−1.06	−.43	−1.36
18	−.35	−.15	−.61	.17	−1.33	−.51	−.50	1.74	.29	−.07	−.42	.09	−.57	−.39	−.89	.35
19	.05	.08	−.26	.81	1.19	.60	1.48	1.94	.24	−.41	−.49	.30	.36	1.14	.27	1.14
1920	−.57	.51	−.20	−.24	.60	1.18	.82	−.01	−.05	.08	−.12	.21	.03	−.04	.79	.48
21	−.35	.58	−.24	.29	.19	−.10	−.45	−.78	−.10	−.31	.38	−.35	.17	−.97	.85	−1.44
22	.40	.29	−.94	−.17	−.01	1.72	−.29	−.92	.14	.45	−.09	.00	−.38	1.46	−1.06	−.58
23	−.27	−.34	.05	.19	.90	1.49	.45	.37	−.26	.00	1.00	.70	.40	.27	.04	2.49
24	−.22	−.59	1.25	−.60	.02	−.37	−1.58	−1.93	−.14	−.14	−.77	−.21	.11	.18	.35	−.73
25	.00	−.99	.02	.39	.03	−1.94	−1.01	1.72	−.01	−.45	.02	.28	−.32	.27	−.56	.73
26	−.08	−.94	−.55	1.06	−.35	.90	−.09	−.35	−.05	−.39	−.13	.10	−.28	.58	.02	.38
27	−.15	1.68	−.22	.53	.43	.28	.17	−.98	−.06	.60	.56	.04	.65	−.93	.02	−.28
28	.03	−.75	1.61	−.08	−.07	.47	1.02	−.20	−.05	−.29	.23	.09	−.01	.26	.66	.25
29	.15	.63	−.42	.14	.52	1.67	−.90	1.61	.00	.14	.06	.18	−.12	.17	−.97	.27
1930	.24	−.73	−1.01	−.06	−.15	−.32	−2.00	1.76	−.15	−.24	−.52	.39	−.30	−.02	−.38	.31
Base	1.21	2.76	3.47	2.16	3.71	4.07	4.01	3.22	.60	1.82	2.06	1.12	.85	2.15	2.45	1.99
Σ (+)	4.72	10.89	11.47	9.34	11.65	15.56	14.74	19.57	2.37	7.32	7.48	5.14	6.25	12.98	10.50	13.51
Σ (−)	4.70	10.90	11.35	9.19	11.84	15.76	14.53	19.44	2.51	7.30	7.48	5.20	6.17	12.92	10.37	13.67
Δ	+.02	−.01	+.12	+.15	−.19	−.20	+.21	+.13	−.14	+.02	.00	−.06	+.08	+.06	+.13	−.16

TABLE 10.—*Precipitation departures*

Year	District 9				District 10				District 11				District 12			
	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON	DJF	MAM	JJA	SON
89	−0.43	0.08	−0.43	−0.09	0.26	−0.04	−0.12	0.01	−1.80	−0.39	−0.03	−0.06	−1.31	1.31	0.00	1.74
1890	1.67	.09	−.07	−.56	.39	−.12	.01	.11	1.81	−.25	.44	−2.04	4.49	.48	.00	−1.08
91	.03	.10	.57	−.20	.42	.05	−.51	−.55	.01	.60	.84	1.42	.29	−.03	.08	−.81
92	.23	.39	−.16	−.39	.45	.40	−.49	−.47	.32	.93	.18	1.45	−.47	.70	−.07	.73
93	.28	.31	−.41	.65	−.21	.12	.24	−.24	.11	2.72	.09	1.75	.25	1.24	−.10	.51
94	.36	.12	.08	−.18	−.22	−.07	−.31	−.47	1.64	2.06	.00	1.29	−.02	−.50	.17	−.36
95	.17	−.29	−.31	−.38	.82	−.33	−.10	.25	−.63	1.40	−.46	−2.01	1.94	.09	−.09	−.42
96	.04	.68	.06	.28	−.55	−.49	.19	.33	1.23	.86	−.10	1.10	−.60	1.42	.01	.53
97	.04	−.10	.02	.54	.34	.07	−.17	.20	1.32	.37	.44	.97	.66	−.14	.09	−.07
98	−.28	.02	0	−.18	−.20	.20	.04	−.63	1.89	−1.04	.14	.44	−1.59	−.81	−.02	−.47
99	.16	.07	−.03	.26	−.16	−.41	.17	−.15	1.52	.91	.23	2.25	−1.41	.39	.10	1.31
1900	−.19	.28	−.32	.22	−.60	.04	−.57	.17	.68	.89	1.07	.25	−1.07	−.10	.06	1.24
01	−.09	−.16	−.24	−.07	.04	−.10	−.10	−.33	2.06	1.21	−.04	1.00	.29	−.61	−.11	.46
02	.06	.04	−.07	−.14	−.47	−.28	−.20	.17	1.87	1.16	.10	.31	.10	.29	−.10	.74
03	−.20	−.30	−.09	.09	−.13	.21	.05	−.16	−.31	−.27	.24	.82	−.30	.51	−.05	.42
04	−.17	.38	−.13	−.40	−.64	−.19	.14	.0	.10	.58	−.39	−.49	−.37	1.68	−.02	.84
05	−.29	.24	−.01	−.02	.84	.92	−.36	.87	−1.02	−.29	−.17	−.49	−.45	.49	−.10	−.55
06	−.01	.52	.07	−.18	−.25	.49	−.28	.14	−.42	−1.16	.14	.93	−.26	1.90	.09	−.76
07	.52	.15	.42	−.40	.42	.16	.21	.09	−.45	−.45	−.11	−1.35	1.62	.75	.27	−.77
08	−.11	.07	.35	.10	−.05	−.11	.36	−.21	.05	.08	−.25	−.89	.67	−1.00	−.10	−.32
09	.22	−.31	.15	.46	.51	−.38	.37	.07	.85	−1.47	−.12	1.38	2.51	−.86	−.05	.64
1910	−.01	−.26	−.51	.36	−.01	−.48	−.10	.0	−.92	−.81	−.54	.67	−.25	−.86	−.09	−.41
11	.04	−.21	.04	.14	.38	−.26	.45	.48	−1.61	−1.07	−.68	−1.04	.35	.24	−.09	−.86
12	−.11	.16	.33	.17	−.77	.39	.08	−.18	−.35	−.95	1.18	−.06	−1.51	.95	.06	.17
13	−.24	−.03	.68	.15	−.09	−.36	−.06	.07	−1.00	−.91	.87	.29	−1.09	−.64	.11	.15
14	−.03	−.30	.19	.00	.20	−.16	.59	.02	.11	−.83	−.34	1.33	2.36	−.87	.12	−.61
15	−.48	.47	.13	−.11	.74	.23	−.13	−.28	−2.43	−.14	−.43	.03	2.64	−.33	−.11	−.64
16	.33	−.03	.32	−.16	1.00	−.16	.14	.21	1.62	1.66	.34	−1.75	2.30	−.94	.18	−.31
17	−.01	.33	−.43	−.32	−.16	.08	−.05	−.57	−1.80	.89	−.24	−1.63	−.36	−.71	−.13	−.71
18	.40	−.39	−.01	.01	−.33	−.07	.09	.02	2.03	−.68	.01	−1.13	−1.54	−.09	−.08	.79
19	−.34	−.35	−.55	.13	−.12	.19	.30	.72	.71	.35	−.64	−.51	−.41	−.42	−.12	−.74
1920	−.45	.15	.01	.17	.11	.12	−.29	−.05	−2.63	−.19	.41	1.48	−2.14	0	.12	.58
21	−.06	.15	−.28	−.05	−.52	−.09	.76	−.10	2.13	−.61	.26	1.77	.57	−.33	−.04	−.46
22	.04	−.17	−.04	−.45	.31	.65	−.16	−.18	−2.46	.37	−.44	−1.12	.68	−.59	−.07	.20
23	.02	−.05	.44	.01	−.33	−.04	−.13	.26	.49	−1.17	−.10	−2.03	−1.09	−.60	.09	−.47
24	−.36	−.77	−.12	−.02	−.30	.01	−.40	−.34	.13	−2.09	−.40	1.25	−2.06	−.80	−.05	.40
25	.09	−.08	.44	.02	−.30	−.22	.08	.48	.50	−.75	−.32	−2.00	−.45	.52	.06	−.26
26	−.14	−.43	−.07	.24	−.44	.58	−.22	.13	.27	−1.10	−.21	.48	−.28	−.17	−.05	1.37
27	.02	−.02	−.02	.97	.34	−.18	.25	.28	.53	−.42	−.10	1.34	.52	−.41	.00	.24
28	−.37	−.26	−.09	−.42	−.21	−.12	−.27	.08	−2.21	1.02	−.63	−.95	−1.52	.0	−.09	−.04
29	−.24	−.31	−.18	−.58	−.30	−.10	.30	.02	−3.43	−.42	.19	−3.18	−1.26	−.77	.20	−1.37
1930	.02	−.11	.10	.14	−.28	.06	.08	−.24	−.56	−.51	−.51	−1.25	−.42	−.26	−.12	−.55
Base	1.25	1.27	.78	1.03	.98	.79	1.12	.88	6.73	3.48	1.14	4.62	3.83	1.89	.13	1.41
Σ (+)	4.74	4.80	4.45	5.11	7.57	4.97	4.90	5.18	23.98	18.06	7.17	24.00	22.24	12.96	1.81	13.06
Σ (−)	4.61	4.93	4.57	5.30	7.64	4.76	5.02	5.15	24.03	17.97	7.25	23.98	22.23	12.84	1.85	13.04
Δ	+.13	−.13	−.12	−.19	−.07	+.21	−.12	+.03	−.05	+.09	−.08	+.02	+.01	+.12	−.04	+.02

FOREIGN DATA

The first consideration in selecting foreign stations was to obtain a network that would cover as thoroughly as possible the entire world, the second consideration being length and reliability of the record. In many regions such as Europe it would have been possible to obtain records from a great many more stations than have been used in this study but such a plan would have increased the amount of work and this was not considered necessary for a preliminary survey. Effort was made to select long records, i. e., covering the period 1888–1930; but in many cases, of islands more particularly, it was necessary to include some that had a much shorter record than 43 years in order to have the area represented at all. The shortest record included was 19 years, and that for only two stations, Dutch Harbor and Midway. Forty-six stations have records of 39 years or more, and only five have records less than 25 years. The latter are Dutch Harbor, Midway, Juneau, Nome, and Markovo.

It is regrettable that in the extensive water areas of the world there do not exist more islands on which might be maintained permanent stations. In the South Pacific there are a number of islands, but where a program of meteorological observations is maintained the record is found in most cases to be relatively short. Most of the data have been obtained from Clayton's *World Weather Records* (**98**). Data for earlier years at a few stations were obtained from Exner (**32**).

The figures for the quarterly values were compiled very hurriedly during the intitial stages of the work, in order to get the project under the CWA started, and it was not possible to carefully scrutinize the data until after the correlation work was in large part completed. We have delayed publication, however, until the data could be checked and studied in order to publish records that are as nearly homogeneous as it seems possible to make them.

In this check, 5-year annual means were studied to see if any distinct breaks in the records were evident; and a number were found. Recourse was had then to notes in *World Weather Records*, the *Réseau Mondial*, and at times to individual published annual reports. Hereafter the above-mentioned publications will be referred to as "W. W. R." for *World Weather Records*, and "R. M." for *Réseau Mondial*.

It was found that at a few of the stations some change had taken place either in the application of the correction for reduction to sea level or for gravity and, where it was impossible to ascertain just what had taken place and the date of such change, a fixed correction was made for a part of the record to bring it into harmony with the remainder.

Notes appear below the tabulations of data for each station showing source of the data and what corrections have been made to make the data homogeneous. In the absence of any note it is to be understood that the data were taken from W. W. R. without correction, except for those corrections referred to in W. W. R. (errata) 1929, pages 1–28, and W. W. R. (errata) 1934, pages 575–589.

GROUPING BY MONTHS, QUARTERS, ETC.

Monthly pressure values represent averages of daily values which may be produced in a variety of ways: We may have low pressure at a station the first half of the month and high pressure the second half, or we may have just the opposite; in both cases the average may be the same. Again, low pressure may prevail during the first and third decades, and high pressure during the middle decade of the month. Again, we may have a month characterized by very small fluctuations and yet the averages in all these cases may be exactly the same. It is seen that the distribution of the daily values and the fluctuations in them during the month may be quite different, all of which will have an important bearing on the weather associated with and succeeding them. This would seem to suggest that some index other than monthly averages should be employed in long range studies.

In an attempt to explain the temperature and rainfall distribution in the United States a study was made of the simultaneous monthly departures from normal pressure over North America and available stations in the Pacific. It was found in some cases, especially those of the smaller temperature departures, that it was difficult to satisfactorily explain them from the pressure departures. The marked temperature departures, however, where explainable in most all cases when the pressure departures were considered.

Some of the larger changes in the general circulation, as evidenced by pressure changes near the centers of our permanent and semipermanent HIGHS and LOWS, may take several days—perhaps a week or longer—to begin to operate on the weather of adjacent regions. Again the effects of some particular pressure distribution may persist for several days or perhaps a week after the end of the month; in other words there is a lag so that, if we use a month or a week as a unit, the latter half of the month or week would be less important in its effects on the weather of adjacent areas than the first half. This would seem to explain why some cases, especially of the smaller simultaneous temperature departures over the United States, could not be satisfactorily associated with the pressure departures.

For these and other reasons it is quite generally realized that monthly averages are not satisfactory and that decade or weekly averages would show closer relations, but would be more complicated and more difficult of treatment. On the other hand monthly averages of the different elements are available for long periods, whereas the decade or weekly values are not. For an individual, or even a single institution, to attempt to assemble homogeneous data by 7-day periods for the number of stations required in an investigation of the present kind, would be prohibitive, and moreover the daily values in most cases are not available in published form. Even could the data be so assembled, the labor of comparing the greater number of combinations would multiply the work. To compare temperatures for one district of the United States with a single element like pressure at 60 foreign stations for a single quarter means 60 correlation coefficients, for 4 quarters 240 correlation coefficients, for 12 districts into which the United States was divided 2,880 correlations, and for the 3-time lag intervals of 1, 2, and 3 quarters 8,640 correlation coefficients. If monthly instead of quarterly values were used it would multiply the work 9 times, requiring 77,760 correlation coefficients for a comparison of foreign pressures with United States temperatures alone. It is our conclusion therefore that for purposes of a general survey, especially of a preliminary nature like the present one, quarterly values are the most practical. After the results of the survey are analyzed, it may be found advantageous to use monthly values, possibly even decade groupings, for refining our conclusions.

Table 11 shows the pressure departures from the mean of the series for each quarter at the 63 stations outside the United States proper. In the tables the departures only are given; the base (B) from which the departures are made is indicated at the bottom of the column, followed by the summations of the plus, and of the minus, departures. From these may be obtained if desired the exact value of the base number or $\frac{\Sigma X}{n}$, ΣX being the sum of the original values and n the number of observations. For example, suppose the "base" number is 762.4, the sum of the plus departures is 12, and the sum of the minus departures is 3; the difference between the plus and minus departure is +9, showing that the base 762.4 was lower than the exact base by $\frac{9}{n}$. If n was 40 it would mean that the actual base number was 762.4−0.0225 or 762.3775. It will be noted that the departures have no decimal point. To get the original X or quarterly pressure reading, the departure should be added to the base number without regard to the decimal point. For example, if the base number is 762.4 and the departure is +3, the pressure reading would be 762.7. In cases where 1 of the 3 months of the quarter was missing, the mean for the missing month was substituted. Where 2 months of the quarter were missing the quarterly value was left blank.

In one case, namely that of St. Helena, it was found that the annual values became progressively higher. It was, therefore, decided to apply a method used by C. E. P. Brooks (74) for correcting for secular change. Accordingly, the correlation coefficient was worked out for each of the four quarters against time. Then by substituting x in the regression equation, $r\left(\frac{\sigma y}{\sigma x}\right)x$, a correction was obtained to represent the secular change from year to year. In the case of the winter quarter $r\left(\frac{\sigma y}{\sigma x}\right)$ equals 0.001353, in which $r=0.57$, $\sigma x=0.026$, $\sigma y=10.95$ and $x=1$. The mean 27.902757 was used for the middle year. For the year preceding the middle year, .001353 was added; for the second year before the middle year, twice .001353 was added, etc. For years succeeding the middle year the corrections were subtracted.

TABLE 11

ADEN, ARABIA [Lat. 12°46′ N.; Long. 45°03′ E.]

Year	Pressure departures foreign stations DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	+03	0	+08	+19
89	+21	+15	−28	−01
1890	−16	−26	−03	+13
91	−7	+13	+28	−04
92	−4	−23	−34	−17
93	−29	−11	−09	+19
94	−23	+7	−03	−09
95	+07	−1	−12	−09
96	+02	−13	+03	−04
97	+08	+12	−19	+06
98	0	−17	−37	−29
99	−01	−3	+42	+44
1900	−07	+23	+25	+02
01	+08	−4	+04	+12
02	+32	−22	−25	−21
03	+32	+23	−15	0
04	−10	−22	+13	+29
05	+25	+20	+10	−01
06	−05	+37	0	+20
07	+13	+28	+18	+08
08	+36	+33	+10	+06
09	+07	0	+04	+07
1910	−09	+14	−07	−14
11	0	+04	+25	+08
12	+16	+35	+01	+31
13	+14	−01	+12	+45
14	+33	+35	−10	−02
15	+20	−18	−14	−42
16	−09	−34	−33	−48
17	−42	−31	−54	−32
18	+04	−33	+17	+04
19	0	+02	−16	−03
1920	−12	−02	+09	−26
21	−11	−20	−26	−04
22	−22	+08	−04	+01
23	−18	0	+27	+14
24	−03	−03	+06	+11
25	+09	−10	+15	+07
26	+02	+16	+44	−29
27	−11	−05	+07	−05
28	−09	0	+01	−14
29	−26	−10	+04	−10
1930	−32	−03	+09	+15
Base	29.904	29.765	29.574	29.782
Σ (+)	292	325	342	321
Σ (−)	306	312	349	324
Δ	−14	+13	−7	−3

ALEXANDRIA, EGYPT[1] [Lat. 31°12′ N.; long. 29°53′ E.]

Year	Pressure departures foreign stations DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	−01	+1	+3	+2
89	+02	0	−4	+6
1890	+01	−11	−8	+3
91	−13	−7	+6	+4
92	+02	−4	+1	−4
93	−05	+8	+5	+2
94	−07	0	+2	−2
95	−07	+2	+6	+4
96	0	+1	+7	+3
97	0	−3	−3	+5
98	+12	−6	−3	−9
99	−03	+2	+5	+1
1900	−14	0	+11	+11
01	+04	−9	−3	−5
02	+04	−5	−2	−9
03	+19	+4	−4	+4
04	−03	−4	−1	−5
05	+10	+2	+4	0
06	+02	+7	+2	+6
07	0	−2	+5	+6
08	+12	+5	+5	+6
09	−02	−6	−1	−6
1910	−03	−1	−4	+4
11	+02	−8	+4	+2
12	−01	+13	−6	+5
13	+13	+3	+7	−1
14	+05	+12	−1	−9
15	+01	+1	−2	+2
16	+10	−12	−9	+3
17	−12	+3	−4	−1
18	+13	−4	+6	−6
19	−12	+6	+8	+2
1920	+03	+1	0	0
21	+06	−4	−6	+3
22	−10	+15	−7	−7
23	−03	−1	+1	−3
24	−14	+1	−11	−4
25	+13	−3	−2	−11
26	+02	−7	−1	−1
27	0	+2	−8	−3
28	−03	0	−9	−5
29	−13	−1	−2	−4
1930	−08	−3	−5	+6
Base	760.6	758.2	755.5	759.2
Σ (+)	136	89	88	90
Σ (−)	134	101	106	95
Δ	+2	−12	−18	−5

ALLAHABAD, INDIA [Lat. 25°28′ N.; long. 81°54′ E.]

Year	Pressure departures foreign stations DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inchess*
88	+25	−16	−7	+40
89	+22	+37	+18	−30
1890	−31	−19	+10	+18
91	+09	+28	−8	−1
92	−12	−71	+1	−31
93	−02	+05	+27	−14
94	−03	−32	−3	−17
95	+04	−13	+21	+9
96	−07	−26	+4	+7
97	−02	0	−6	−5
98	−24	−13	−18	−12
99	−32	−13	+8	+20
1900	−20	+27	−6	+10
01	+18	+14	−35	−9
02	+18	−27	+24	+54
03	+23	+24	−4	−33
04	+01	−32	−14	+19
05	+37	+44	+11	+6
06	+15	−04	+23	−3
07	−13	+33	−13	−11
08	−05	−02	−4	+14
09	+04	+10	+22	−25
1910	−26	−09	+31	−41
'11	−30	−23	−3	−5
12	+04	+28	−11	+21
13	+19	−21	+34	+21
14	+31	+38	−16	+31
15	+17	+18	+2	−45
16	−25	−21	+1	−33
17	−15	+41	0	−41
18	−03	−03	+25	+34
19	+56	+55	+7	+26
1920	+32	+26	+19	+2
21	−23	−51	−16	+33
22	+03	−01	−19	+9
23	−09	−03	−41	+17
24	+15	−01	−33	+1
25	−27	−22	+10	+24
26	+23	+50	−18	−24
27	−21	−28	+7	+1
28	+08	−16	−10	−18
29	−20	−20	−29	−4
1930	−14	−07	+19	+18
Base	29.713	29.438	29.209	29.537
Σ (+)	384	478	324	435
Σ (−)	364	494	314	402
Δ	+20	−16	+10	+33

ANTANANARIVO, MADAGASCAR [Lat. 18°55′ S.; Long. 47°32′ E.]

Year	Pressure departures foreign stations DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	+7	+5	+2	−1
1890	+1	−1	−7	−2
91	+2	+1	+1	+2
92	−5	−1	−6	−2
93	−3	0	0	−2
94	−1	−1	+1	−4
95	−1	+1	0	--------
96	+4	--------	+5	−1
97	+1	+3	−3	−2
98	−3	−7	−2	−4
99	−6	0	+8	+3
1900	+7	+6	+2	+4
01	+11	+2	+2	+7
02	+6	−1	−7	0
03	−3	−7	−5	+1
04	−1	−1	+4	+5
05	0	+4	−1	−3
06	+2	+3	−5	+3
07	+6	−7	−5	−4
08	−1	−2	+1	−2
09	−4	−8	+1	+1
1910	−5	+6	−1	+4
11	−2	+1	+4	+3
12	+2	+4	−1	0
13	−1	0	+1	+1
14	+6	+3	+4	+3
15	+9	+5	0	+2
16	−1	−6	−4	−1
17	−7	−2	−11	−1
18	−8	−2	+5	+5
19	+10	+6	+6	0
1920	+1	+2	+4	−1
21	0	+1	−3	0
22	−13	+7	+6	+2
23	+9	−8	+6	+4
24	−10	+2	−1	−1
25	0	+1	−1	−8
26	+6	+3	−2	−5
27	−9	−3	+1	+4
28	0	−1	0	+3
29	−2	+2	−1	−2
1930	−3	+4	−5	0
Base	647.2	648.7	651.4	649.8
Σ (+)	90	72	64	57
Σ (−)	89	53	71	41
Δ	+1	+19	−7	+16

[1] Annual values for 1888-1896 (757.4 mm.) are lower by about 1.0 mm. than for the period 1897-1930 (758.4). Accordingly, 1.0 mm. have been added to the period 1888-1896.

TABLE 11.—Continued

Pressure departures foreign stations

APIA, SAMOA [2]

[Lat. 13°48′ S.; long. 171°46′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
1890	−4	+2	+6	−10
91	−3	+1	+1	+5
92	+1	−1	+3	−4
93	+6	+11	+11	+7
94	+5	+5	0	0
95	+7	+9	−6	+1
96	+2	−3	−2	+2
97	+1	0	+3	0
98	−1	0	−4	−4
99	+8	0	−3	−1
1900	−6	−4	−2	+2
01	−5	0	+1	+6
02	0	−8	−5	−3
03	−4	−6	−1	−3
04	+9	+1	+2	−4
05	−5	−3	−6	−3
06	−4	−1	−1	−4
07	−1	0	−3	−1
08	+1	−1	+5	+4
09	+5	+4	+8	+3
1910	+7	+3	+3	+9
11	+5	+1	−3	−4
12	−10	0	−2	0
13	+3	−2	+2	+4
14	+4	−3	−13	0
15	−4	+2	+13	+9
16	+4	+6	+8	+4
17	+11	+8	+11	+8
18	+4	−1	−4	+3
19	−12	−3	−3	−8
1920	−13	0	−8	−4
21	+8	+1	+4	+1
22	+3	+3	−2	−1
23	+2	−5	−6	−3
24	0	+2	+4	+7
25	−1	−2	−5	+2
26	−10	0	+1	−2
27	+7	+1	0	−3
28	−2	−1	−3	−3
29	−1	+2	+1	−6
1930	−7	−1	−4	−1
Base	756.2	757.4	758.8	758.1
Σ (+)	103	62	91	77
Σ (−)	93	45	82	72
Δ	+10	+17	+9	+5

AREQUIPA, PERU [3]

[Lat. 16°22′ S.; long. 71°33′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
92	−20	−3	+6	−13
93	−10	+3	+4	+5
94	+8	+4	0	+3
95	0	+8	+1	−2
96	−5	−8	−8	−14
97	−2	−3	−8	−9
98	−16	−17	−11	−16
99	−7	−12	−7	−3
1900	−6	−1	+4	−2
01	+6	+4	−3	+6
02	+2	−10	−21	−5
03	+1	−9	−1	+1
04	−14	−16	−8	−18
05	+4	+11	−2	+5
06	+15	+22	+2	+3
07	+4	+2	−5	−2
08	+2	+2	+11	+2
09	+4	−2	+9	+6
1910	−2	+5	−1	0
11	−3	+4	−5	−4
12	−4	+20	+5	+4
13	+7	+3	+6	+1
14	+21	+17	+4	+11
15	+7	+13	+7	+6
16	+14	+6	+5	+5
17	+3	+4	+16	+7
18	−7	−15	−16	−3
19	−1	+13	+10	0
1920	+4	+5	+10	+1
21	−4	−1	+2	+16
22	−7	−4	−10	−8
23	−18	−20	+3	−6
24	+8	−1	+16	+16
25	−1	−8	+1	+6
Base	22.475	22.489	22.500	22.488
Σ (+)	110	146	122	104
Σ (−)	127	130	106	105
Δ	−17	+16	+16	−1

BATAVIA, NEDERLANDS (EAST INDIES)

[Lat. 6°11′ S.; long. 106°50′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	+46	+20	+39	+23
89	+76	+48	−15	−51
1890	−64	−49	+02	+17
91	+38	+30	+53	+27
92	−03	−49	−35	−56
93	−25	−13	−42	−12
94	−04	−06	−05	−05
95	+01	+08	−18	+13
96	+03	+02	+38	+46
97	+16	+24	+12	+09
98	−67	−49	−20	−59
99	−31	+03	+17	+69
1900	+29	+61	−25	+02
01	+49	+04	−11	+29
02	+50	+22	+16	+68
03	+67	−19	−23	−19
04	−82	−39	+15	+28
05	+64	+74	+33	+41
06	−02	+25	−24	−27
07	−24	+23	−10	0
08	−23	−16	+05	−26
09	−62	−44	−28	−36
1910	−93	−37	−70	−50
11	−07	−18	+29	+30
12	+34	+46	−06	−14
13	+17	−41	+25	+63
14	+109	+54	+49	+46
15	+50	+75	−27	−42
16	−22	−26	−53	−98
17	−78	−50	−46	−57
18	−16	+33	+57	+54
19	+70	+18	+25	+10
1920	+22	−01	−14	−48
21	−69	−22	−28	+19
22	−39	−12	−30	−29
23	−01	−34	+04	+18
24	−09	−26	+09	−30
25	−39	−06	+21	+47
26	+81	+43	+24	−32
27	−32	−44	+12	+10
28	−01	−36	−18	−11
29	−56	+10	+38	−19
1930	+27	+13	+30	+59
Base	756.74	756.53	757.01	757.05
Σ (+)	849	636	553	728
Σ (−)	849	637	548	721
Δ	0	−1	+5	+7

BERMUDA (PROSPECT) [4]

[Lat. 32°17′ N.; long. 64°46′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	+11	+12	−33	+20
89	−11	−83	+77	+18
1890	+71	+44	+31	+9
91	+25	−32	−30	−32
92	−13	+25	+46	+5
93	−35	+27	−8	+5
94	+74	+33	+55	+32
95	−26	+45	+3	+24
96	−59	+16	+34	+70
97	−26	+45	−1	+42
98	−10	−14	−2	+32
99	+63	−2	−10	+3
1900	−7	+4	−5	+43
01	−129	−92	−22	−80
02	−79	−29	−54	−16
03	0	−28	−44	−14
04	−17	+1	+25	−21
05	−7	+5	−40	−29
06	−18	+11	−2	−48
07	+36	−44	−31	+2
08	−52	−10	−10	−28
09	+9	−30	−74	+1
1910	−7	+14	+32	−82
11	+51	+44	−22	+8
12	−36	+93	−14	+7
13	+79	+86	+5	+9
14	−63	+27	+28	+21
15	−9	−115	−63	−62
16	+32	−89	−43	+18
17	−32	−50	+33	−28
18	−66	+11	−61	−36
19	−68	−23	−10	−28
1920	−4	−58	+40	−5
21	−24	+69	−14	−3
22	+5	+44	+81	−38
23	+34	−12	−11	−61
24	+21	−112	−26	+6

BERMUDA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
25	+65	−29	+6	+8
26	−44	−30	+8	+7
27	+33	+27	+6	+14
28	+37	+1	+5	+61
29	+66	+123	+77	+88
1930	+135	+76	+52	+62
Base	29,949	29,925	29,976	29,900
Σ (+)	847	883	644	615
Σ (−)	842	882	630	611
Δ	+5	+1	+14	+4

BOUZAREAH, ALGERIA

[Lat. 36°48′ N.; long. 3°02′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
94	−2	−13	−6	−11
95	−48	−16	−9	−4
96	−4	−5	−8	−15
97	−12	+4	0	+15
98	+17	−16	+3	−15
99	+12	+10	+5	+15
1900	−24	0	−2	0
01	+7	−1	+1	−8
02	−11	+5	−2	−7
03	+34	+8	+1	+9
04	−29	0	+5	+5
05	+25	+4	−2	−8
06	+5	+3	+2	+3
07	−6	+4	+5	−8
08	+10	+4	+5	+9
09	−6	−6	+5	−5
1910	+3	−4	−3	+7
11	+5	−7	+8	+3
12	−1	+17	−4	+7
13	+18	+9	+1	+10
14	+2	+17	−2	−7
15	−13	−8	−2	−10
16	+16	−22	−9	−2
17	−42	−6	+3	+16
18	+13	−8	+3	−6
19	−12	+9	+10	−2
1920	+23	+11	−2	−4
21	+10	+3	0	+2
22	−4	+15	−1	0
23	+3	−3	+7	+1
24	−17	−4	−5	+5
25	+34	−10	−5	−11
26	+9	+3	+2	−6
27	+3	+11	−4	−8
28	0	−17	+2	+2
29	−8	+3	+5	0
1930	−6	−10	−5	+14
Base	733.6	731.1	732.3	732.4
Σ (+)	249	140	73	123
Σ (−)	245	156	71	137
Δ	+4	−16	+2	−14

BULAWAYO, RHODESIA [5]

[Lat. 20°09′ S.; long. 28°40′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
97	--------	+37	+2	+11
98	+14	−13	+18	−29
99	−7	−6	−16	+21
1900	+36	+23	−13	+8
01	+1	+9	0	−18
02	+2	−16	−11	−2
03	+31	−38	−10	+11
04	−13	−8	+15	+15
05	+17	+23	−9	−5
06	+14	+16	+2	+18
07	0	−19	+27	0
08	+15	+5	+6	−26
09	−19	−7	+6	+9
1910	0	−20	−17	+20
11	−13	+13	+23	+26
12	+11	+5	+19	+9
13	−4	+5	0	−8
14	+14	+7	−1	+7
15	−17	+13	−20	−4
16	+1	−22	−20	−18
17	−24	−36	−67	−28
18	−53	−11	+9	−4
19	+16	+24	+7	+4
1920	−9	−1	+8	−10
21	−9	−12	−15	+4
22	−12	+9	−15	−6
23	−11	−23	−6	+4
24	+25	+4	+4	−6
25	−21	−31	+6	+6
26	+3	+22	+27	−14
27	−6	+8	+20	+21

BULAWAYO, RHODESIA—Con.

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
28	+12	+22	+19	−8
29	−13	+3	−2	−15
1930	+18	+14	−6	+9
Base	29.604	29.697	29.789	29.675
Σ (+)	230	262	218	203
Σ (−)	231	263	228	201
Δ	−1	−1	−10	+2

CAPETOWN, SOUTH AFRICA

[Lat. 33°56′ S.; long. 18°29′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	+23	−20	−21	+4
89	+17	−4	+32	−10
1890	−21	−10	0	+13
91	−27	−18	+9	+2
92	−6	−13	−17	−8
93	−37	0	−4	−19
94	−21	+7	−8	−27
95	−15	−18	+6	−12
96	−13	−7	+17	−3
97	+16	−20	+47	+15
98	−3	−13	−4	−18
99	+3	+18	−43	+17
1900	+8	−8	−24	−13
01	−12	+10	−1	+18
02	+13	−52	−28	+11
03	+40	+1	+25	+13
04	−17	−5	0	+7
05	+52	+3	−8	−23
06	+25	+21	+5	−12
07	−31	−10	+51	+7
08	+30	+18	+32	+6
09	−7	−9	−11	+7
1910	−10	−13	−44	+19
11	−4	+21	+67	−15
12	+9	0	+30	+6
13	−15	−37	−13	−7
14	+39	+2	−5	−3
15	−13	+5	−12	−6
16	+3	−9	−42	−13
17	−43	−10	−26	+16
18	−15	+4	+16	−21
19	+30	+31	−1	+24
1920	+1	+14	−37	−13
21	−36	+13	−30	+20
22	−9	+13	−27	+1
23	+17	−16	−21	−20
24	+5	+21	+8	+5
25	−13	−23	−21	+5
26	+30	+32	+42	−9
27	−12	+13	+17	−13
28	+21	+40	+21	+22
29	−1	−4	+15	+6
1930	+8	+28	+28	+10
Base	29.938	30.014	30.133	30.046
Σ (+)	390	315	468	263
Σ (−)	381	319	448	265
Δ	+9	−4	+20	−2

COLON, PANAMA

[Lat. 9°23′ N.; long. 79°23′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
08	+10	+7	+18	+10
09	−5	−9	+13	+1
1910	+4	+15	+7	+5
11	+2	+10	−11	−9
12	−19	+10	+3	+1
13	−2	+13	+6	−2
14	+13	+2	−14	+1
15	−7	−31	−23	−9
16	+5	−2	+5	+6
17	+33	+15	+20	+26
18	+5	−10	−28	−1
19	−15	−11	−12	−10
1920	−2	−9	−2	−2
21	−10	+10	−2	+14
22	−20	0	+8	+4
23	+10	−10	−12	−6
24	0	0	+18	+14
25	0	−10	−2	−6
26	−10	+13	+1	−17
27	+10	0	+1	−9
28	+10	+17	+2	+14
29	−14	−2	+26	−25
1930	0	−15	−8	−10
Base	29.840	29.830	29.812	29.806
Σ (+)	102	112	128	96
Σ (−)	104	109	114	106
Δ	−2	+3	+14	−10

[2] Values for 1916–20 are higher than other years by 0.7 mm. Accordingly, 0.7 mm. has been subtracted from values for 1916–20.

[3] Record for 1892–95 obtained from Annals of the Astronomical Observatory of Harvard College, vol. XLIX, pt. I (1907), p. 74, and same corrected by applying correction of +0.005 to bring into harmony with record of 1896–1925.

[4] Mean of annual means, 1888–1904, is 29.907 inches, and 1905–30, is 29.937 inches. Accordingly, 0.030 inch has been added to the values for 1888–1904.

[5] Note on p. 5, W. W. R., vol. 90, states that −0.006 should be applied to values in W. W. R., vol. 79, for the period 1897–1923. Also correction for index error of +0.014, applied in vol. 79 should have been 0.025, thereby necessitating a correction of 0.011. The combination of the 2 corrections (−0.006 and +0.011) gives a net correction of +0.005 which has been applied in obtaining the quarterly values above.

TABLE 11—Continued

Pressure departures foreign stations

CUYABA, BRAZIL[6]

[Lat. 15°36′ S.; long. 56°06′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
01	+03	+07	−12	+02
02	−02	−07	−06	+01
03	+04	−05	−07	+06
04	−09	−08	−01	−02
05	+06	−05	−04	−02
06	−05	−02	−04	−04
07	−09	0	0	−02
08	+01	−01	+07	−01
09	0	+01	−03	−07
1910	−05	−05	−13	−04
11	−03	0	+03	+04
12	+13	+08	+01	+07
13	−05	−03	−06	+01
14	+04	+05	−10	0
15	+04	−10	−02	0
16	−01	−06	+02	−12
17	−05	+07	+07	+01
18	−01	−06	−01	−03
19	−05	−06	+03	−03
1920	−01	0	+05	+03
21	+02	−01	+06	+06
22	0	+06	0	+01
23	+01	+03	+01	+01
24	+03	0	+07	+06
25	+03	+01	+03	+04
26	+01	+05	0	−04
27	+01	+06	+07	−01
28	−01	−01	+04	+02
29	−06	+07	+02	−02
1930	+01	+05	−06	+04
Base	742.4	744.0	746.0	743.1
Σ (+)	47	61	58	49
Σ (−)	58	66	75	47
Δ	−11	−5	−17	+2

DARWIN, AUSTRALIA

[Lat. 12°28′ S.; long. 130°51′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	−2	+1	0	0
89	+4	+1	−4	−7
1890	−7	−4	−4	−5
91	−3	+1	+1	+1
92	+1	−3	−3	−6
93	−4	−1	−4	−5
94	−5	−2	−2	−3
95	−2	0	−2	−1
96	−2	0	+1	+2
97	+2	+3	−1	−3
98	−5	−6	−2	−4
99	0	0	+2	+3
1900	+4	+5	−2	0
01	+2	+1	+1	+2
02	+2	+4	+3	+5
03	+6	−2	0	−2
04	−2	−2	+2	0
05	+4	+5	+2	+1
06	+3	+2	−1	−4
07	−1	+2	−1	0
08	0	−1	+1	−1
09	+1	−2	−2	−2
1910	−3	−1	−3	0
11	−2	+1	+3	+2
12	+5	+5	0	0
13	+2	+2	+3	+4
14	+6	+1	+5	+6
15	+6	+6	−1	−3
16	−3	0	−4	−4
17	−2	−2	−4	−4
18	−3	+1	+2	+3
19	+5	+1	+2	+2
1920	+1	+1	−4	−1
21	−2	−1	−2	0
22	−3	−1	−1	−1
23	−2	−3	+2	+2
24	+2	0	+1	−2
25	−4	−4	+1	+3
26	+4	+3	+1	−1
27	−4	−1	0	+2
28	+2	0	+1	−1
29	−6	+1	+3	0
1930	−2	+3	+2	+4
Base	29.72	29.80	29.90	29.84
Σ (+)	62	50	39	42
Σ (−)	69	36	47	60
Δ	−7	+14	−8	−18

DAWSON, CANADA

[Lat. 64°03′ N.; long. 139°25′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
01	---	----	----	+1
02	−5	+13	+13	+11
03	+3	+7	+4	−1
04	+9	+1	0	+2
05	0	−4	+3	−2
06	−7	+4	−4	−2
07	+24	+10	−4	−6
08	−25	−7	+3	+1
09	+8	+1	−6	+11
1910	+2	−3	+4	+9
11	+10	−2	+14	+15
12	−3	+6	−2	−9
13	+2	0	−2	−8
14	−13	+5	−9	−10
15	−9	−8	+2	−16
16	+11	−7	−11	−6
17	+7	+3	−5	−8
18	+9	−3	−3	−9
19	−24	−4	+2	+15
1920	+11	+1	−4	−6
21	−17	+2	−3	+2
22	+7	0	+2	−2
23	+12	+1	+5	−9
24	−11	−1	+3	−4
25	+13	−5	+5	+7
26	−18	−2	+6	+13
27	−9	−2	+3	+5
28	+7	−5	+1	−5
29	−1	−4	−5	0
1930	+17	−6	−1	+4
Base	29.83	29.73	29.73	29.67
Σ (+)	152	54	70	96
Σ (−)	142	63	59	103
Δ	+10	−9	+11	−7

DUTCH HARBOR, ALASKA

[Lat. 53°55′ N; long. 166°30′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
12	−11	−10	+4	−14
13	+4	−5	+4	+13
14	−11	+26	−6	+7
15	+3	−17	+12	+11
16	+36	+7	−4	+12
17	+4	+6	+3	+8
18	+7	+23	+2	−10
19	−26	−12	+13	+13
1920	+14	+24	−11	+1
21	−1	+8	−5	−7
22	+13	−8	+7	+4
23	+8	−6	−4	−21
24	−4	−6	0	−2
25	+5	−11	−3	−13
26	−27	−25	0	--------
27	−16	+15	−17	+6
28	−14	−7	−10	−9
29	+5	−4	−8	−18
1930	+19	+3	+8	+13
Base	29.57	29.77	29.91	29.66
Σ (+)	118	112	66	91
Σ (−)	110	111	68	94
Δ	+8	+1	−2	−3

EDMONTON, CANADA

[Lat. 53°33′ N; long. 113°30′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
1890	−1	−5	−5	−3
91	−9	−5	−5	−3
92	−10	+4	−3	−4
93	+4	−6	−7	−3
94	−9	−7	−3	−7
95	+1	−6	+2	+1
96	−9	−4	+4	+12
97	−2	+1	−1	+2
98	−6	+2	−2	−3
99	−2	−1	−3	−3
1900	−1	−2	−6	−1
01	−2	−3	0	+1
02	0	−6	−2	−5
03	−2	−1	+5	−2
04	+1	+1	+1	+2
05	+9	0	0	0

EDMONTON, CANADA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
06	−5	+8	−1	+1
07	+10	+4	−5	+3
08	−5	−2	+1	+3
09	−3	+3	+1	+1
1910	+5	+3	+2	+5
11	+5	−2	+6	+8
12	+4	+3	+2	+1
13	−3	+4	+2	−3
14	0	+10	−2	−5
15	0	+4	+4	−6
16	+5	−1	−2	0
17	+1	+1	0	+6
18	+3	−3	+1	+3
19	−5	−2	−1	+4
1920	+13	−1	+4	−5
21	−10	+1	−2	−2
22	+6	−1	+1	+2
23	+3	−1	+2	+4
24	0	+4	−1	−4
25	+2	+1	+1	+6
26	−3	+4	+4	+4
27	−1	+1	+3	−2
28	+8	−2	0	+2
29	+4	−5	−4	+7
1930	+3	−3	−1	+2
Base	29.60	29.59	29.62	29.60
Σ (+)	87	59	46	80
Σ (−)	88	69	56	61
Δ	−1	−10	−10	+19

FREETOWN, SIERRA LEONE[7]

[Lat. 8°29′ N.; long. 13°09′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
94	−17	−13	−05	+18
95	+46	+34	+19	+21
96	+26	+14	+02	−29
97	−21	−35	−19	−25
98	−27	−24	−04	−27
99	−19	−30	−41	+07
1900	+1	+05	−13	−05
01	+13	+43	−21	−05
02	+04	+12	−07	0
03	0	−11	+03	+07
04	−02	+21	+22	+12
05	+39	+42	+18	+41
06	+27	+33	+13	+07
07	+02	+20	0	−05
08	−12	−10	+10	−49
09	−39	+15	+03	−18
1910	−17	−27	−34	−21
11	−24	−28	−01	−18
12	--------	--------	--------	−06
13	−20	−40	−05	0
14	+34	+24	+26	0
15	−09	−14	−11	−14
16	−15	−24	−16	−11
17	−16	−06	−36	+19
18	+23	−05	+11	+21
19	−01	+39	+37	+15
1920	0	+03	+15	+12
21	−01	−32	−18	−08
22	−09	+07	+14	−11
23	−12	−18	+02	−10
24	−06	−19	−02	+23
25	+29	−10	−02	+19
26	+19	+02	−03	−24
27	−13	−02	+05	−19
28	−04	−02	+03	+41
29	+03	−13	+11	+19
1930	+19	+45	+29	+32
Base	29.641	29.642	29.701	29.668
Σ (+)	285	359	243	314
Σ (−)	284	363	238	305
Δ	+1	−4	+5	+9

GEORGETOWN, DEMARARA

[Lat. 6°50′ N.; long. 58°12′ W.]

Year	DJF	MAM	JJA	SON
	Mb.	*Mb.*	*Mb.*	*Mb.*
89	−1	−14	−9	−1
1890	−22	−6	−3	−10
91	−12	−10	−11	−12
92	−15	−14	−17	−12
93	−12	−7	−7	−11
94	−11	−5	−3	0
95	−8	0	−5	−12
96	+4	−17	0	−11

GEORGETOWN, DEMARARA—Con.

Year	DJF	MAM	JJA	SON
	Mb.	*Mb.*	*Mb.*	*Mb.*
97	+6	−9	−6	+1
98	−10	−7	+1	0
99	+3	+1	−11	+5
1900	+2	0	+3	−4
01	+4	−4	−17	−8
02	−10	−6	−9	+3
03	+3	−3	−5	+4
04	−11	0	0	+3
05	−3	−9	−9	−6
06	+2	+6	−2	−2
07	−10	−10	+2	+13
08	+1	+3	+7	−1
09	+11	−3	+2	−6
1910	−8	−6	−7	+4
11	−5	+1	+7	+5
12	+10	+7	−2	+5
13	−5	−5	+4	+4
14	+16	+22	+12	+7
15	+6	+2	+9	+12
16	+11	+2	+5	+3
17	+14	+16	+15	+13
18	+5	+4	+8	+14
19	+11	+9	+16	+9
1920	+8	+21	+15	+16
21	+13	+9	+13	+15
22	+14	+16	+14	+5
23	+12	+13	+14	+3
24	+3	−3	0	+3
25	+5	−5	−3	−1
26	+5	+7	−6	−11
27	−12	−7	−5	−15
28	−14	−3	−3	−7
29	−8	−3	−1	−9
1930	−6	+1	−3	−2
Base	1012.6	1012.8	1013.2	1011.6
Σ (+)	169	140	147	147
Σ (−)	183	156	144	141
Δ	−14	−16	+3	+6

GJESVAR, NORWAY[8]

[Lat. 71°06′ N.; long. 25°22′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	--------	+07	−03	−10
89	−05	+22	−02	+27
1890	+10	+03	−30	+22
91	+04	−04	+12	+19
92	+03	+05	−08	−07
93	+39	−27	+02	−44
94	−49	+11	−02	+21
95	+28	0	+04	−15
96	−18	+03	+19	−01
97	+37	+33	+05	−07
98	0	+39	−13	+11
99	−16	−05	+16	−53
1900	+78	−10	−01	+04
01	−13	+05	+17	+02
02	−02	+34	+08	+16
03	−59	−11	−10	+09
04	+24	+08	−01	−01
05	−51	+04	+12	−01
06	−36	−33	−02	+23
07	−37	−18	−10	+08
08	+02	+22	+04	+21
09	−06	+44	−30	+06
1910	−50	0	+15	−13
11	+03	−13	+04	−13
12	+28	+01	+13	+08
13	+07	−31	+13	−02
14	−44	−41	+16	−06
15	+13	−35	−04	+62
16	−03	+36	−02	−12
17	+25	−10	+11	−40
18	−29	+26	+16	−15
19	+41	+03	−18	−04
1920	−28	−28	−11	+34
21	+04	−33	−29	+09
22	+15	−19	+01	−12
23	−15	+20	−41	−29
24	+21	+02	−01	−05
25	−44	+06	+14	−19
26	+30	−02	+15	+06
27	+16	−20	+16	+02
28	+13	+23	−22	+01
29	+87	−11	−20	−07
1930	−11	+13	+13	−15
Base	752.0	757.2	758.2	754.0
Σ (+)	528	370	246	311
Σ (−)	516	351	260	331
Δ	+12	+19	−14	−20

[6] Values seem about 0.4 too low prior to 1911, but due to uncertainty in early record no correction has been attempted.

[7] Mean of annual values for 1894–1912 is 29.6449 inches, and for 1913–30 is 29.6614 inches. Accordingly, a correction of +0.016 has been applied for the period 1894–1912. Record prior to 1894 not considered reliable.

[8] Record ceased with 1926, after which Mehavn-Stetnes was used.

TABLE 11—Continued

Pressure departures foreign stations

HONOLULU, HAWAII [9]
[Lat. 21°19′ N.; long. 157°52′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
92	−21	−13	+20	−10
93	−47	+34	+43	+48
94	+31	+36	+44	+21
95	−6	+45	−12	−20
96	−21	+8	+11	−17
97	+49	+51	+1	−8
98	−13	+4	−7	+2
99	−13	−9	−7	+21
1900	−7	−15	−26	−14
01	−42	−16	−21	+2
02	−4	−8	−28	−9
03	+12	−6	+2	+20
04	−6	−33	−10	−16
05	−13	+25	−10	+8
06	+15	+1	−4	−16
07	−42	−22	−32	−7
08	+42	+2	+27	+16
09	+54	+22	+36	+37
1910	+17	+42	+20	+12
11	−26	−42	−15	+5
12	+14	+33	−3	+18
13	+18	+19	−5	+6
14	+29	−40	−26	0
15	+6	−16	−18	−2
16	−47	+6	+33	+31
17	−6	+14	+48	+20
18	−41	−61	−39	−10
19	+78	+12	−2	−18
1920	−32	−18	−11	+17
21	+15	−15	0	+12
22	+9	+14	+6	+8
23	−13	−35	+2	−11
24	+27	−9	+31	−59
25	+5	−10	−3	−9
26	−10	+16	−17	−10
27	+15	−19	+12	−1
28	−21	−8	+4	+20
29	−6	+4	−6	−42
1930	−59	+5	−25	−40
Base	30.016	30.053	30.023	30.001
Σ (+)	457	393	340	324
Σ (−)	475	395	327	319
Δ	−18	−2	+13	+5

IRKUTSK, SIBERIA
[Lat. 52°16′ N.; long. 104°19′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	−21	−19	+2	−3
89	+8	−1	−7	+5
1890	−21	−16	+2	−3
91	−22	+6	+10	−8
92	−5	+8	+6	+15
93	+23	+2	+2	+4
94	−16	−9	−6	+10
95	+7	−2	+10	+3
96	+9	+18	0	−6
97	+9	+6	+2	−1
98	+10	+9	+12	−4
99	−6	+6	+17	+29
1900	+11	+9	+10	−2
01	+11	0	+7	−7
02	+2	−13	+8	−6
03	−7	−1	−2	+3
04	−13	+5	+2	+5
05	−12	+7	+2	−5
06	−6	−3	−8	+14
07	−5	0	+5	−2
08	+4	+1	−4	−7
09	−20	+13	+11	−1
1910	+3	−3	−5	+5
11	−5	−10	+4	−8
12	−3	0	−11	+19
13	+3	0	−4	−2
14	−21	+3	−8	−3
15	−9	+12	−1	−7
16	+18	+3	0	+8
17	+20	+9	−12	0
18	+21	−5	+4	−8
19	−1	−8	−9	−10
1920	+14	+2	+5	−16
21	0	−4	0	+15
22	−10	−7	−9	−3
23	+10	−18	+2	−5
24	−7	+6	+1	−11
25	−3	−3	−6	−4
26	+1	0	−4	+4
27	+11	+3	−4	−14
28	0	−13	+1	+4
29	+21	+4	−12	−5
1930	0	−12	+4	+14
Base	727.5	721.9	715.9	723.9
Σ (+)	216	132	129	157
Σ (−)	213	147	112	151
Δ	+3	−15	+17	+6

IVIGTUT, GREENLAND
[Lat. 61°12′ N.; long. 48°10′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	+70	+59	−2	+17
89	+13	−15	−13	+7
1890	−42	−21	−8	−5
91	−7	+38	+7	−28
92	+66	+24	+5	+18
93	+11	−18	+10	+44
94	−42	−4	−28	+5
95	+65	−24	+20	+4
96	+26	−14	−1	+31
97	+5	−22	+17	−2
98	+13	+7	−7	−9
99	−22	+43	−15	0
1900	+68	+16	−3	−21
01	+9	+12	−33	−3
02	+58	+14	+25	−21
03	−54	−22	+27	+13
04	−24	−28	−11	−12
05	−4	−37	−9	+1
06	−10	+18	−5	0
07	+15	−15	+31	−2
08	+6	−20	−14	−34
09	−10	+28	−17	+20
1910	+18	+21	+21	+42
11	−14	−31	+16	−24
12	−9	−31	+22	−6
13	−67	−37	−14	−3
14	−35	−13	−17	−27
15	+12	+21	+23	+13
16	−14	+37	−5	−15
17	+15	+52	+20	+9
18	+52	−33	+16	−15
19	+23	+16	+3	+15
1920	−23	−11	−15	−28
21	−3	−30	+1	−17
22	−29	+8	−20	+6
23	−28	−32	−9	+17
24	+3	+61	−2	−2
25	−30	+15	−22	+6
26	−29	−19	−8	+19
27	------	------	------	------
28	------	------	------	−23
29	+2	−29	------	−13
1930	−46	+13	+4	+28
Base	748.8	756.2	757.4	753.3
Σ (+)	550	503	268	315
Σ (−)	542	506	278	310
Δ	+8	−3	−10	+5

JASK, PERSIA
[Lat. 25°45′ N.; long. 57°45′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
93	−15	−3	−7	+7
94	−10	+45	+22	−1
95	+11	−8	+20	+14
96	−13	−4	+14	+30
97	+23	+6	+14	+13
98	+7	+47	+42	+30
99	+51	+5	+30	+31
1900	−47	0	−1	+27
01	+40	+10	+6	+17
02	+33	−37	−13	−1
03	+29	+17	+35	−9
04	−5	−24	+7	−10
05	−2	+15	+13	+4
06	−3	+56	+17	−10
07	−22	+17	+1	+1
08	+7	+23	+7	+6
09	−3	+8	+3	−36
1910	−49	+1	−11	−39
11	−16	−18	+7	−9
12	−12	+24	−16	+18
13	+2	−24	−3	+11
14	+16	+16	−25	−13
15	+31	−15	+7	−32
16	−1	+2	+9	−30
17	−34	−17	−12	−30
18	+20	−27	+16	+12
19	+12	+2	−5	+2
1920	−2	−7	−5	−26
21	−36	−33	−28	−14
22	−28	+6	−81	−17
23	−41	+9	+6	+28
24	+2	−16	−29	−6
25	+29	−30	−5	+28
26	+23	+45	−23	−8
27	+19	−14	+3	+17
28	+2	−36	−1	−42
29	−15	−19	−22	+9
1930	+2	−11	+6	+15
Base	30.046	29.810	29.500	29.866
Σ (+)	359	354	285	320
Σ (−)	354	343	287	333
Δ	+5	+11	−2	−13

JUNEAU, ALASKA
[Lat. 58°18′ N.; long. 134°24′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
09	−5	+3	−7	−4
1910	+3	−2	+4	0
11	+1	+4	+5	+10
12	−4	+5	+3	−7
13	+3	0	−3	−12
14	−12	+7	−2	−9
15	−3	−3	+4	−10
16	+5	−5	−3	+8
17	+9	+3	+3	−1
18	−1	+3	0	−2
19	−14	−2	+5	+16
1920	+24	−1	0	−4
21	−19	+7	−2	−2
22	+13	−1	+6	−1
23	+9	+1	−1	+2
24	−12	+5	+1	−6
25	−2	−3	0	+9
26	−17	−2	−5	+5
27	−9	−3	+2	−2
28	+11	−9	+3	+1
29	+15	0	−6	+16
1930	+7	+2	+3	+3
Base	29.85	29.91	30.00	29.82
Σ (+)	100	40	39	70
Σ (−)	98	31	29	60
Δ	+2	+9	+10	+10

LAGOS, NIGERIA [10]
[Lat. 6°27′ N.; long. 3°24′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
91	------	------	+21	−4
92	−20	−10	+14	−7
93	−19	−6	−18	−16
94	−25	−1	+12	+1
95	−14	−8	+7	−16
96	−9	−6	+38	−14
97	0	+5	+12	+12
98	−8	−6	+13	+13
99	+28	+23	−1	+13
1900	−6	+6	+3	−2
01	−5	−5	−15	+33
02	+21	+3	−30	+30
03	+60	+54	−18	−6
04	+5	−28	+20	+3
05	+20	−34	+23	+19
06	+28	+19	−4	+5
07	−23	−17	+6	−9
08	−8	−14	−13	−65
09	−29	−17	−19	−26
1910	−20	−37	−24	−17
11	+9	+10	+34	+15
12	−1	−7	+2	−10
13	−19	−18	−4	−3
14	+18	+13	+32	+10
15	+7	−2	+21	+23
16	+11	+5	+5	+1
17	−8	+24	−8	−5
18	+11	−1	+4	−4
19	+11	+31	+17	+17
1920	+14	+19	−9	+8
21	+13	−26	−33	−11
22	−12	+3	+1	−12
23	+5	0	+10	−2
24	+7	−8	−13	+22
25	+22	−9	−40	+7
26	−22	+20	−10	−26
27	−24	−12	+10	+31
28	−11	+8	−1	−9
29	−1	−4	−30	+10
1930	+12	+24	−20	+4
Base	29.798	29.796	29.889	29.840
Σ (+)	302	267	305	277
Σ (−)	284	276	310	264
Δ	+18	−9	−5	+13

MADEIRA (FUNCHAL) [11]
[Lat. 32°37′ N.; long. 16°54′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	−24	0	+8	+2
89	+07	+14	+6	+10
1890	+4	−1	+8	+19
91	−8	−1	−3	−5
92	−14	−14	+6	−2
93	−12	−25	−10	−4
94	+11	+3	+5	−13
95	−39	−2	+5	−11
96	−11	+14	+5	−2

MADEIRA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
97	+15	+12	+2	+1
98	+5	−2	+2	−2
99	−6	−2	+4	+3
1900	−11	+3	+4	+16
01	−2	−6	+2	+35
02	−16	−1	+1	+3
03	+1	+4	−5	+5
04	+9	−4	−1	−16
05	+15	+6	−2	−6
06	+11	−12	−5	−2
07	+12	+2	−1	−9
08	+7	+13	−1	−10
09	−2	−10	+2	−9
1910	+10	+3	−2	−5
11	+4	0	+2	0
12	−20	+10	+4	+5
13	+2	+1	+1	0
14	+7	+24	+4	−7
15	+23	+2	−3	−3
16	+19	−11	−1	+10
17	−42	−4	+5	+20
18	−20	−6	−4	+11
19	+5	+10	+1	−9
1920	+15	+5	−3	−1
21	+6	+12	−2	−5
22	+22	+31	+4	−6
23	+27	+2	+6	+4
24	−4	−19	+6	+7
25	+22	−10	−8	−17
26	−22	+3	−10	−11
27	+1	+5	−6	−14
28	+6	−14	−17	+8
29	−14	−20	−6	+3
1930	−9	−5	−4	0
Base	29.654	29.634	29.642	29.632
Σ (+)	266	179	93	162
Σ (−)	276	169	94	169
Δ	−10	+10	−1	−7

MADRAS, INDIA
[Lat. 13°04′ N.; long. 80°15′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	+17	+9	+27	+28
89	+31	+31	−9	−33
1890	−25	−29	+21	+2
91	+9	+18	+17	+18
92	−6	−43	−13	−12
93	+8	0	+13	+2
94	+7	−16	−12	−4
95	+12	+5	+11	+19
96	+9	−4	+18	+27
97	−1	+6	−5	−3
98	−13	−8	0	−13
99	−8	−1	+16	+38
1900	+19	+30	0	+17
01	+5	+19	+2	−12
02	+35	−2	+4	+35
03	+16	+11	−15	−27
04	−5	−14	+10	+32
05	+26	+17	+14	+19
06	−14	+11	−1	+12
07	−20	+14	−2	−5
08	−6	−5	+7	−7
09	−14	−10	+9	−14
1910	−36	−14	−12	−32
11	+16	−11	+15	+15
12	+7	+23	−17	−1
13	+17	−17	−5	+20
14	+43	+27	−5	+27
15	+2	+21	−3	−44
16	+2	−5	−18	−55
17	−11	+3	−18	−48
18	−24	−10	+21	+13
19	+13	+21	−5	−7
1920	−10	−5	+8	−17
21	−20	−34	−17	+31
22	−3	−8	−13	−14
23	−9	−8	−11	−3
24	+1	−9	−16	−20
25	−16	−12	+6	+27
26	+28	+36	−3	−13
27	−21	−28	+4	+10
28	+13	−16	−14	−10
29	−40	−2	−13	−11
1930	−11	−10	+3	−2
Base	29.947	29.797	29.688	29.820
Σ (+)	336	302	226	392
Σ (−)	319	321	227	407
Δ	+17	−19	−1	−15

[9] Record prior to 1892 not considered reliable.
[10] Mean of annual means, 1892-1920, is 29.832 inches, and for 1924-30, 29.803 inches. Accordingly, 0.29 inch has been added to record for 1924-30.
[11] Mean of annual means for 1889-1902 is 762.104 mm.; for 1903-17, 763.195 mm., and for 1918-30, 764.040 mm. Accordingly, a correction of +1.8 mm. has been applied to the period 1889-1902, and +0.8 to 1903-17.

TABLE 11—Continued

MALDEN ISLAND (S. PACIFIC) [Lat. 4°01′ S.; long. 155°01′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
1890	—	+14	+35	+5
91	+6	+22	+23	+34
92	+24	+13	−6	−2
93	+9	+29	+21	+13
94	+9	−6	+3	—
95	−1	+4	−5	−3
96	−20	−7	−2	−12
97	−28	+1	−1	+3
98	+11	—	+14	−2
99	+18	−10	—	—
1900	—	—	—	—
01	−15	−14	+23	+49
02	+24	−13	−28	−18
03	−33	−9	—	+35
04	—	−2	+2	−17
05	−31	+2	−15	−3
06	−6	+24	−19	−26
07	+9	+8	−15	+19
08	−21	−13	+2	+9
09	−1	−4	+2	−13
1910	−20	−23	+7	+12
11	+1	−5	−14	−13
12	—	—	—	−2
13	+30	+13	+7	—
14	−7	−11	−31	−30
15	−38	−23	−16	−11
16	+13	+6	+14	+28
17	+58	+30	+36	+41
18	+29	+2	−2	—
19	—	—	—	—
1920	—	—	—	—
21	—	—	—	—
22	−7	−7	−9	−12
23	+3	—	−20	−42
24	−25	−21	—	—
25	—	—	—	−45
Base	29.839	29.853	29.865	29.873
Σ (+)	244	168	189	248
Σ (−)	253	168	183	251
Δ	−9	0	+6	−3

MANILA, P. I.[12] [Lat. 14°35′ N.; long. 120°59′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	+8	+6	−2	+11
89	+8	+10	+9	−1
1890	−10	−1	+8	−3
91	+5	+7	−1	+4
92	+3	−1	+6	−6
93	+1	0	+6	−1
94	+1	−2	+4	−3
95	+1	−1	+1	+1
96	+7	−2	−2	+7
97	+9	+2	+5	0
98	−6	−10	−3	−7
99	−8	−2	−2	+3
1900	+4	+8	−1	−1
01	+6	+4	+1	−1
02	+3	+2	−4	+11
03	+13	+3	+2	−3
04	−12	−6	−6	+4
05	+10	+8	−1	+7
06	0	0	+1	−10
07	−2	+2	−7	+1
08	−3	−3	+1	−6
09	−8	−4	+3	−9
1910	−9	−7	+3	−2
11	−6	−1	−5	+9
12	+8	+9	−1	−5
13	+5	−3	−1	+7
14	+15	+5	−2	+12
15	+8	+9	+1	−9
16	−18	−4	0	−8
17	−10	−7	0	−5
18	−7	−1	−2	+5
19	+11	+2	−3	+3
1920	+3	−1	−9	−1
21	−5	−1	−4	+4
22	−2	−2	−6	−2
23	−6	−2	−4	−4
24	+4	−2	+1	+1
25	−13	−1	−4	+8
26	+14	+8	+5	−1
27	0	−6	−1	+6
28	+3	−5	−8	−4
29	−2	+2	+1	0
1930	+6	+3	−1	+13
Base	757.7	756.2	754.3	755.3
Σ (+)	156	90	58	117
Σ (−)	127	75	80	92
Δ	+29	+15	−22	+25

MARKOVO, SIBERIA[13] [Lat. 64°45′ N.; long. 170°50′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
95	+13	+6	+13	−3
96	+41	+12	−1	+47
97	−21	+42	+7	+14
98	+7	−14	+9	+25
99	+8	−16	−2	−18
1900	−4	+3	−21	−39
01	+10	+27	−11	−13
02	−27	−11	−8	−45
03	−13	−12	+13	−1
04	+8	−18	0	−3
05	−24	−2	+2	+12
06	+31	−9	+7	+7
07	+2	0	0	+29
08	−38	+24	+3	+3
09	−41	+26	−9	−7
1910	−7	+5	−11	−10
11	−6	−27	*+9	*−3
12	*−20	*−28	*−2	*−26
13	*−5	*−9	+9	*−3
14	−10	−15	*−12	−4
15	−18	+21	+11	−17
16	−8	+34	−10	−12
17	+51	−7	−5	+23
18	+46	−22	+4	+25
19	+15	−11	*+16	*+26
Base	760.0	760.1	755.0	757.1
Σ (+)	232	200	103	211
Σ (−)	242	201	92	204
Δ	−10	−1	+11	+7

MEXICO CITY, MEXICO[14] [Lat. 19°26′ N.; long. 99°08′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	−5	−1	−1	+3
1890	+6	+2	+1	−3
91	−4	−5	+3	+1
92	−3	−3	−2	−2
93	−6	−1	−7	−4
94	+1	−1	+1	0
95	−5	−2	0	−5
96	−6	0	0	−4
97	−3	0	−1	+3
98	−2	−5	−6	−9
99	−7	−5	−8	−6
1900	−10	−9	−7	−3
01	−2	−5	−10	−2
02	−7	−10	−9	−7
03	−4	−1	+1	+6
04	+4	0	+3	+2
05	+7	−1	−5	0
06	+3	+6	0	+1
07	+9	+5	+7	+2
08	+7	+5	+5	+2
09	+8	+1	+2	+8
1910	+5	+7	+2	+1
11	+10	+6	+5	+3
12	−5	+6	+5	+2
13	+2	+3	+3	+1
14	+4	+6	+8	+2
15	+4	−2	+4	+7
16	+8	+2	−4	−1
17	+2	−1	+15	+16
18	+5	+8	−3	−8
19	—	—	—	—
1920	—	—	—	—
21	+3	+1	+2	+2
22	+3	−2	+6	−1
23	+7	0	0	−3
24	0	−6	+1	+1
25	−1	−3	0	−6
26	−9	+1	−2	−5
27	+4	−1	+1	−4
28	+2	−4	−3	0
29	−7	−4	−1	−6
1930	−1	−3	+3	−2
Base	585.04	584.47	585.12	585.16
Σ (+)	104	59	78	63
Σ (−)	87	75	69	81
Δ	+17	−16	+9	−18

MIDWAY ISLANDS (N. PACIFIC) [Lat. 28°13′ N.; long. 177°22′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
12	−16	+100	−13	+5
13	+12	−10	−8	−24
14	+64	+62	+21	+4
15	+152	−15	−41	−7
16	−87	−20	−9	−22
17	−130	−66	+95	+72
18	−48	+27	−11	+23
19	+118	+2	+11	−13
1920	−37	−27	0	+41
21	+5	−39	+25	−7
22	+36	+24	−30	+18
23	−14	−37	−42	+4
24	+37	−17	+39	+30
25	−53	−24	−16	+9
26	−66	−7	+7	−14
27	−20	+27	+24	−62
28	+58	−40	+13	+40
29	+19	+55	−12	−24
1930	−28	+1	−56	−71
Base	29.999	30.097	30.070	30.028
Σ (+)	501	298	235	246
Σ (−)	499	302	238	244
Δ	+2	−4	−3	+2

MONTEVIDEO, URUGUAY [Lat. 34° 52′ S.; Long. 56° 13′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	0	−2	0	−6
89	+3	−2	+3	+8
1890	−5	+8	+7	0
91	−7	+8	−6	+2
92	−3	+13	+24	−10
93	+6	+7	+4	+25
94	−5	+15	+16	+2
95	+7	+2	+1	+4
96	+7	+14	+12	−7
97	+6	−5	+20	+16
98	−10	−10	+2	+10
99	+18	−8	−24	+2
1900	−2	−1	−5	−6
01	−25	−1	−12	−2
02	−2	−8	−7	−2
03	+4	0	0	−2
04	−1	+1	−11	−4
05	+6	0	−10	−4
06	+16	−3	−1	−3
07	+6	+8	+4	+4
08	−3	+7	+18	+2
09	+5	+8	+20	0
1910	−3	+13	−5	+11
11	+11	+10	+6	+7
12	−7	+6	+3	+6
13	+3	−8	−8	+1
14	+8	−3	−26	−12
15	+6	−11	−7	−1
16	+3	0	+11	−6
17	−1	+19	+14	+11
18	−1	0	−13	−7
19	+4	−9	−1	−11
1920	+3	−6	+9	−5
21	−10	−7	−3	+20
22	−15	−2	−11	−6
23	−3	−13	−22	−7
24	−1	−5	+7	+6
25	−6	−20	−2	−12
26	−2	+1	−12	−19
27	−6	−5	−12	−5
28	+6	+1	+15	+7
29	−13	+2	−14	−11
1930	−14	+7	+9	+12
Base	756.6	759.1	761.1	759.5
Σ (+)	128	150	205	156
Σ (−)	145	129	212	148
Δ	−17	+21	−7	+8

MOOSE FACTORY, CANADA [Lat. 51°16′ N.; long. 80°56′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
91	−7	+7	+1	—
92	−5	+6	+3	+2
93	0	+8	−3	−5
94	+7	+2	−1	−6
95	−6	+1	−12	−15
96	−12	−11	−12	+5
97	+7	+6	0	+6
98	+4	0	+1	0
99	−8	−1	+2	+5
1900	−7	+4	+1	+5
01	−5	+4	+1	+2
02	−1	+3	−2	−4
03	−5	+10	+4	−3
04	+4	+1	−2	+2
05	+7	−8	+3	0
06	+6	+2	+1	+11
07	+17	0	−5	+1
08	−3	+2	+5	−6
09	0	−6	+1	+7
1910	0	−5	−2	−1
11	+7	−2	−2	0
12	−1	0	+1	−2
13	−5	+4	+4	+4
14	+4	+8	+7	+7
15	+15	+8	+13	0
16	+11	−9	−6	−1
17	−8	+7	+2	+7
18	−1	+3	+7	+7
19	−3	+8	+2	−3
1920	+6	−10	+7	+4
21	+5	+6	0	−3
22	+1	—	+4	+3
23	+6	+1	+4	+4
24	+4	−8	−6	−4
25	+4	0	−4	−3
26	−12	−2	−3	+5
27	+3	+6	0	−5
28	−8	−12	−1	−8
29	−7	−11	−9	0
1930	−6	−15	−8	−9
Base	29.97	29.97	29.85	29.90
Σ (+)	118	107	74	87
Σ (−)	110	100	78	78
Δ	+8	+7	−4	+9

NOME, ALASKA [Lat. 64°30′ N.; long. 165°24′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
08	−216	+09	+73	+39
09	+15	+40	−47	+127
1910	+16	−26	−05	+46
11	+43	−59	+81	+05
12	−98	−173	−66	−164
13	−09	−52	+19	−53
14	−122	+88	−56	−24
15	−116	−60	+110	−54
16	+204	+40	−36	−55
17	+154	+63	−21	+125
18	+176	+71	+61	+21
19	−184	−42	+61	+118
1920	+150	+114	−84	−40
21	−100	+40	−33	−31
22	+20	+23	+14	0
23	+119	+72	+67	−166
24	−18	+04	−12	−11
25	+135	−140	−35	−81
26	−132	−90	+56	+59
27	−90	+131	−69	+164
28	−98	−13	−58	−70
29	−65	−31	−28	−52
1930	+190	−10	−03	+107
Base	29.807	29.859	29.850	29.708
Σ (+)	1222	695	542	811
Σ (−)	1248	696	553	801
Δ	−26	−1	−11	+10

ORENBURG, RUSSIA[15] [Lat. 51°45′ N.; long. 55°06′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	−7	−24	−2	−29
89	+35	+16	−3	+28
1890	+23	+12	−3	−3
91	+34	+6	+7	−16
92	−19	+13	−1	+13
93	+16	−17	−3	−17
94	−15	+18	−14	−13
95	+20	−19	+3	−10
96	−24	+13	−2	+18
97	+22	+17	+11	−19
98	+26	+45	+3	−9
99	−50	−12	+4	−5
1900	+68	−13	−9	+11
01	−21	+7	+4	+8
02	−23	−3	+2	−20
03	−69	+25	+17	−20
04	+14	+39	+1	+17
05	−30	+9	−10	+3
06	−5	−19	−12	+14
07	−4	−1	+15	+18
08	−17	+16	+6	−10
09	+5	+20	−4	+32
1910	+18	−6	−7	+17
11	−12	−6	+11	−11
12	+11	−8	+7	+23
13	−23	−14	+8	−25
14	−77	−29	−9	−4
15	+30	−13	−20	+7
16	−11	+25	−3	+22
17	−18	0	+1	+12
18	+9	−16	−5	+25
19	+35	−16	−5	+2

(Column heading for all stations: Pressure departures foreign stations.)

[12] Values for 1888–1920 are given in W.W.R. as station pressures, and those for 1921–30 as sea-level pressures. A correction of −1.35 mm. has been applied to the period 1921–30.
[13] Values marked "*" are based on interpolated monthly values from nearest available stations.
[14] Mexico City values for 1889–1920 and Tacubaya values with correction of +3.3 mm. to correct difference of elevation (50 m.), 1921–30.
[15] Data for 1888–1915 and 1921–30 taken from W. W. R. and those for 1916–20 from R. M.

TABLE 11—Continued

OERENBURG, RUSSIA—Continued

Year	Pressure departures foreign stations: DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
1920	+13	+21	+5	−16
21	−4	+16	−13	−19
22	−12	−28	−7	−12
23	+9	−15	−11	−3
24	+21	+17	+25	+2
25	−24	−15	−6	−36
26	0	−22	−13	0
27	−2	−6	+5	−15
28	−19	−4	−4	+15
29	+43	−16	+15	+20
1930	+35	−17	−1	−1
Base	757.9	754.7	748.8	755.5
Σ (+)	487	335	150	307
Σ (−)	486	339	167	313
Δ	+1	−4	−17	−6

PERTH, AUSTRALIA [16]

[Lat. 31°57′ S.; long. 115°51′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	+6	+10	+13	+6
89	+12	+11	−7	−13
1890	−8	−3	−4	−14
91	−4	−3	+21	+10
92	+8	+2	−3	0
93	−10	+2	+2	−11
94	+3	−13	+6	0
95	0	+8	−6	+5
96	−3	+15	0	+11
97	+9	+7	+5	+1
98	−9	−26	−11	−9
99	−1	−2	+4	−1
1900	+9	+9	−22	0
01	+3	−1	+7	+10
02	−2	+5	+21	+10
03	+11	+4	+2	−17
04	−4	0	−6	+2
05	+12	−14	+15	+5
06	0	−1	−1	−11
07	−4	+4	−19	+6
08	+6	+4	+11	+6
09	+3	−6	+10	−4
1910	+1	−9	−10	+2
11	+2	+4	+9	+8
12	+5	+3	+2	−7
13	+5	+8	−3	+4
14	+9	+11	+21	+6
15	−4	+15	−23	−12
16	−12	−4	−12	−10
17	−6	−4	−22	−18
18	−17	−8	+5	−2
19	+9	+7	+4	+14
1920	+5	0	−22	−1
21	−4	−15	+5	+1
22	−11	−2	+7	−1
23	−4	−13	−6	+3
24	+5	+5	+6	−10
25	−6	−2	+17	+14
26	+6	−4	−10	−7
27	−1	−4	−12	+5
28	+4	−2	−5	−7
29	−7	−5	+8	+3
1930	+4	−1	−16	+5
Base	759.8	762.9	764.0	762.6
Σ (+)	137	134	201	137
Σ (−)	117	142	220	155
Δ	+20	−8	−19	−18

PONTA DELGADA, AZORES [17]

[Lat. 37°44′ N.; long. 25°40′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	−38	−12	−4	−34
89	+30	+1	+5	+19
1890	+18	+19	+18	+22
91	−2	+3	−16	−1
92	+1	−19	+5	−4
93	−21	−30	−17	−5
94	+21	−1	+3	−26
95	−14	+4	−3	−37
96	−11	+34	+8	−11
97	+10	+10	−8	−8
98	+10	−9	−20	−22
99	−17	−21	+4	+16
1900	−15	0	−4	+19
01	−24	−22	+8	+2
02	−22	0	−19	−16
03	−7	+16	−7	+3
04	+20	+24	−13	−5
05	+15	+4	−2	+8
06	+13	−2	−4	+8

PONTA DELGADA, AZORES—Con.

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
07	−53	−20	+1	+9
08	+39	+21	+5	+14
09	+17	−22	+18	−8
1910	+14	+16	+7	−10
11	+7	+10	−2	0
12	−55	+18	+4	+10
13	−4	+24	+14	−3
14	−4	+27	+14	−5
15	+17	+7	−12	−8
16	+15	−14	−9	+6
17	−41	−29	+8	+32
18	+18	+1	+2	+12
19	−16	+5	+17	−8
1920	+44	+10	+4	−2
21	−1	+20	0	−17
22	+29	+20	+18	+26
23	+19	−3	+9	+12
24	+8	−48	+11	+7
25	+27	+7	+14	−18
26	−44	−6	−10	−5
27	+18	+1	−2	−12
28	+12	−30	−53	+16
29	−25	−16	+1	+16
1930	+10	−1	−2	−1
Base	765.9	765.6	764.4	765.2
Σ (+)	432	302	198	257
Σ (−)	414	305	207	266
Δ	+18	−3	−9	−9

PORT AU PRINCE, HAITI

[Lat. 18°34′ N.; long. 72°22′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	+4	+2	−6	−5
89	−6	−12	−2	−2
1890	−4	+6	+3	+3
91	0	−5	−5	−3
92	−3	+3	+2	+1
93	−4	+3	−6	−3
94	+1	+2	+6	+2
95	−3	+4	+3	−3
96	−5	+2	+3	−2
97	−1	−4	+1	−7
98	−3	−1	−2	−2
99	+3	+3	−3	−4
1900	−4	−1	−3	+3
01	−2	+2	−7	−3
02	−4	−4	−4	+4
03	0	−5	−2	+3
04	0	−2	+7	+1
05	+6	+1	−2	0
06	−1	+2	−5	−5
07	+7	+4	+3	+3
08	−2	+5	+3	−2
09	−2	−2	+1	−4
1910	+5	+2	+1	+1
11	+3	+1	+2	+3
12	−6	+6	+4	−1
13	+3	+7	+6	+6
14	0	+5	+4	+3
15	−10	−9	−9	−2
16	+2	−1	−7	−3
17	+11	+2	+1	+2
18	−3	−3	−3	−1
19	−6	−3	+1	−1
1920	−2	−3	+2	+3
21	0	+2	0	+6
22	0	+8	+3	0
23	+8	+2	+3	0
24	+4	−6	−3	−4
25	+5	−5	0	+3
26	−1	+1	−4	−7
27	+2	+2	−1	−9
28	+1	0	−2	−1
29	−3	+4	−2	−3
1930	0	−2	−2	+1
Base	758.7	758.0	758.2	756.6
Σ (+)	65	81	59	48
Σ (−)	75	68	80	77
Δ	−10	+13	−21	−29

PORT MORESBY, BRITISH NEW GUINEA

[Lat. 9°29′ S; long. 147°09′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
91	−3	+14	−15	+34
92	−9	------	−22	−56
93	−29	−7	−50	−45
94	−43	−24	−41	−28

PORT MORESBY, BRITISH NEW GUINEA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
95	−7	+1	−37	−2
96	------	------	------	------
97	------	------	------	------
98	------	------	------	------
99	------	------	------	------
1900	------	------	------	------
01	------	------	------	------
02	------	------	+35	+71
03	+60	0	−10	−13
04	−7	−26	+32	+1
05	+36	+50	+37	+27
06	+20	+7	+5	−20
07	−48	+1	0	+12
08	+6	−37	0	−17
09	−5	+2	−20	−14
1910	−34	−1	−32	−29
11	−24	+28	+16	+46
12	+56	+47	+13	−8
13	+10	−53	−2	+24
14	+30	+6	+43	+57
15	+38	+34	−9	−43
16	−19	−26	−53	−40
17	−26	−10	−16	------
18	−57	−18	+21	+13
19	+53	+17	+41	+21
1920	+44	+21	+9	+13
21	−2	+1	+6	−2
22	−7	−4	−10	−20
23	−13	−29	+44	+12
24	+6	−7	+2	−22
25	−11	−16	+3	+21
26	+26	+29	−2	−31
27	−14	−21	−25	+20
28	−2	+3	+18	−17
29	−19	+40	−15	−1
1930	+8	−7	+23	+43
Base	29.781	29.821	29.870	29.860
Σ (+)	393	301	348	415
Σ (−)	379	286	359	408
Δ	+14	+15	−11	+7

PUNTA ARENAS, CHILE

[Lat. 53°10′ S.; long. 70°54′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	+23	+37	+29	+3
1890	−13	+28	−23	+23
91	−45	+2	+20	+4
92	−29	−8	+28	−2
93	+26	0	−9	+57
94	−24	+29	−11	+5
95	+1	−60	−31	+10
96	−18	+1	------	−33
97	+4	−13	+19	−1
98	+46	+4	+39	+6
99	−13	−41	+2	−18
1900	−36	+31	+32	−12
01	+19	+4	−10	−3
02	−19	−11	−10	−12
03	−4	−27	−22	−21
04	+10	+12	−6	−36
05	+31	+26	−37	−33
06	+9	−23	+11	0
07	−5	+1	+39	+7
08	+14	−13	−8	−30
09	+13	−8	−23	+26
1910	−30	+31	−41	−2
11	+24	+21	+8	+23
12	−9	+18	+15	−24
13	+3	−42	−8	−11
14	+13	+22	+3	+4
15	+18	−31	−42	−4
16	+12	−23	+10	−53
17	+10	+21	+3	+19
18	0	−39	+22	−3
19	+21	+10	−14	−18
1920	−6	−11	−27	−12
21	−17	+7	−20	+43
22	−5	+24	−12	+19
23	+30	−16	+37	−29
24	+37	−5	−14	+51
25	−8	−19	+6	+2
26	+3	+37	+41	−9
27	−5	−20	0	+9
28	+13	+21	+6	+8
29	+6	−9	−13	−29
1930	+7	+23	+12	+10
Base	747.1	748.2	749.8	749.6
Σ (+)	347	410	382	358
Σ (−)	332	419	381	366
Δ	+15	−9	+1	−8

QUIXERAMOBIM, BRAZIL [18]

[Lat. 5°16′ S.; long. 39°15′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
97	+3	−3	+2	0
98	−3	−6	−1	−4
99	−1	0	−6	+3
1900	−3	+1	−4	−2
01	0	−2	−6	−1
02	0	+5	−5	+3
03	+7	−3	+3	+4
04	−5	−4	+5	+2
05	+5	+4	+2	−4
06	−1	0	−2	−4
07	−6	−6	−5	−3
08	−2	−3	+3	−4
09	−4	−4	0	−5
1910	−5	−3	−4	−2
11	+1	+3	+3	+4
12	+5	+8	+2	+3
13	+2	+1	+3	+2
14	+11	+8	+7	+7
15	0	−7	−7	−3
16	−4	−3	−3	−5
17	−2	0	−1	−4
18	−3	−6	−1	−2
19	0	−2	+1	0
1920	−1	+1	−2	0
21	+3	+1	+3	+2
22	−2	+6	+4	0
23	+6	+8	+10	0
24	+2	−1	+3	+5
25	+5	+2	0	+4
26	+6	+7	0	−1
27	+2	+2	0	−5
28	−1	+2	0	+2
29	−2	+2	+1	−1
1930	+2	+3	+4	+10
Base	740.9	741.4	743.1	741.6
Σ (+)	60	64	56	51
Σ (−)	45	53	47	50
Δ	+15	+11	+9	+1

RANGOON, INDIA

[Lat. 16°47′ N.; long. 96°13′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
89	+28	+33	+18	−26
1890	−26	−15	+24	+12
91	+29	+12	−12	−01
92	−07	−38	+05	−32
93	−08	−12	+10	0
94	−01	−23	−05	+11
95	−12	−08	+01	+10
96	−04	−08	−01	−08
97	+02	+01	−02	−04
98	+10	−21	−17	−14
99	−17	−14	+04	+30
1900	−01	+24	−11	+01
01	+06	+02	−22	−10
02	+24	−09	−08	+32
03	+23	+07	+04	−07
04	−04	−06	−17	+03
05	+14	+26	+01	+17
06	−14	+03	+18	+04
07	−10	+05	−04	−14
08	−09	−13	+05	−15
09	−29	−08	+09	−40
1910	−33	−16	+14	−35
11	−03	0	+03	+15
12	+04	+27	−05	+08
13	+19	−10	+12	+27
14	+52	+36	−13	+22
15	+12	+32	+15	−28
16	−06	+01	+06	−28
17	−11	−10	+05	−25
18	−03	−01	+17	+17
19	+18	+12	+05	+15
1920	+10	0	−13	−15
21	−23	−06	−03	+24
22	−13	0	−15	−07
23	−14	+03	−23	+03
24	−02	−04	−06	+01
25	−09	−02	+04	+29
26	+33	+22	−04	−24
27	−14	−22	+07	+20
28	0	−12	−14	+16
29	−29	+11	−09	+06
1930	−03	0	+12	+27
Base	29.940	29.821	29.717	29.848
Σ (+)	284	257	199	350
Σ (−)	305	258	204	333
Δ	−21	−1	−5	+17

[16] Data for 1888–1909 from Exner, with corrections of −0.8 mm. so as to agree with later readings; 1910–15 from R. M., and 1926–30 from the Meteorological Magazine.

[17] Data for 1888–93 from Exner were brought into harmony with W. W. R., 1894–1930, by use of following corrections: DJF +0.84 mm.; MAM 0.81 mm.; JJA, +0.70 mm., and SON, +0.81 mm.

[18] Values for early part look low as judged from study of annual means; 1897–1909 is 741.5 mm. and 1910–30 is 741.85 mm. No correction has been made.

324540—41——3

TABLE 11—Continued

Year	Pressure departures foreign stations DJF	MAM	JJA	SON

RIO DE JANEIRO, BRAZIL

[Lat. 22°54′ S.; long. 43°10′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	+7	+5	−1	−4
1890	−8	+4	+7	−1
91	+3	−4	−4	−9
92	−7	−3	+6	−9
93	+3	−3	−1	+8
94	−4	+2	+6	+2
95	+4	+4	+2	+8
96	+4	+5	+6	+2
97	+1	−8	+10	+15
98	0	−6	−6	+9
99	+1	−6	−17	0
1900	−7	+2	+3	−1
01	−2	+4	−5	+4
02	0	−7	−19	−11
03	−2	−7	+4	−3
04	0	−2	+1	−3
05	+2	−1	−4	0
06	−1	+3	−3	−9
07	−4	−5	−9	−6
08	−1	+1	+2	−1
09	−10	−9	+11	−7
1910	+3	−2	−8	−3
11	−8	−3	−3	−9
12	−9	+8	+1	+11
13	+7	0	+2	−2
14	+11	+13	−7	−10
15	+12	−10	−4	+4
16	+2	−1	−1	−8
17	+10	+1	+11	+5
18	+4	−3	−3	+2
19	+4	+5	+6	−1
1920	−11	0	−2	+5
21	+1	+1	+5	+4
22	−1	+4	+2	+3
23	−2	−3	−1	−1
24	+6	−2	+16	+12
25	+8	−1	+2	+3
26	−2	+1	+1	−6
27	−3	+2	+3	+4
28	0	−5	−1	+7
29	−17	+5	+1	−2
1930	−7	+6	−10	+4
Base	753.4	756.0	759.1	755.7
Σ (+)	93	76	108	112
Σ (−)	106	91	109	106
Δ	−13	−15	−1	+6

ST. HELENA (S. ATLANTIC) [19]

[Lat. 15°57′ S.; long. 5°40′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
92	--------	+6	+34	−9
93	−24	−6	+7	−2
94	−23	−8	+14	+3
95	−9	−4	+23	−9
96	−5	−13	+45	−17
97	0	−6	+14	+11
98	−8	−20	+3	−10
99	−33	−11	−16	−1
1900	+1	+4	−7	+3
01	+22	+13	−20	+11
02	+25	+10	−29	+4
03	−1	+9	−19	+2
04	+10	−5	+16	−2
05	−6	−6	−48	−6
06	+19	+13	−8	+2
07	+12	+19	−14	+11
08	+67	+30	−59	−24
09	−29	−10	−27	−21
1910	−16	−32	−22	−11
11	+5	+13	+47	+29
12	−3	+21	+22	+25
13	+1	−27	+25	+15
14	+4	+22	+36	−5
15	−20	+8	−26	+18
16	−8	−17	−50	+12
17	+14	−22	−14	−7
18	−5	+13	+13	−4
19	−2	+9	+29	−17
1920	−7	+17	+20	+18
21	+47	+12	+6	+48
22	+25	+6	+26	−20
23	+16	+19	−49	+12
24	+17	−5	−10	−10
25	--------	--------	--------	+3
26	−10	−2	+2	−16
27	−22	+5	+20	−19
28	0	−6	+28	−1
29	−38	−15	+11	−14

ST. HELENA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
1930	−22	−7	+5	−4
Base	27.903	27.914	27.976	27.941
Σ (+)	285	249	446	227
Σ (−)	291	222	418	229
Δ	−6	+27	+28	−2

ST. VINCENT (CAPE VERDE ISLANDS) [20]

[Lat. 16°54′ N.; long. 25°04′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
94	−2	+4	−1	+1
95	−7	+5	+2	−2
96	−6	−2	+8	−5
97	+10	0	−2	+2
98	−8	−8	−3	−2
99	+2	+3	+3	+4
1900	−2	+4	+5	+8
01	0	+1	−5	+5
02	0	0	+4	+6
03	+6	+2	+4	+5
04	+1	+2	+9	+3
05	+6	+7	+5	+3
06	−5	−2	−7	−2
07	−9	−1	+9	+4
08	+3	0	+4	−3
09	+3	+1	0	+4
1910	−2	−2	−2	+1
11	+2	+4	+11	+5
12	+5	+6	+3	+6
13	+5	+4	+2	+6
14	+7	+5	+8	+2
15	−1	−5	−6	−2
16	−1	−2	−5	−3
17	+1	−3	−7	−2
18	−6	−3	−1	+2
19	+3	+1	+3	+2
1920	+6	+8	+8	+3
21	+3	+2	−2	−2
22	−6	−1	−4	−7
23	+3	−2	−1	−3
24	−9	−7	−11	−3
25	+2	−12	−9	−6
26	−9	−4	−14	−12
27	0	−13	0	−13
28	+1	0	−4	−1
29	−8	−1	−4	−2
1930	−2	+3	+1	+2
Base	762.3	761.8	761.4	760.9
Σ (+)	69	62	89	74
Σ (−)	83	68	88	70
Δ	−14	−6	+1	+4

SANTIAGO, CHILE

[Lat. 33°27′ S.; long. 70°42′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	−5	0	+4	−3
1890	−1	+5	+1	−2
91	−1	−1	−4	+7
92	+3	+5	+6	0
93	+2	+3	+10	+4
94	+5	+5	+3	+4
95	+4	+7	−2	−1
96	0	+1	−5	−3
97	+1	−5	+4	+3
98	−2	−9	−11	−7
99	−8	−11	−21	−8
1900	−13	−16	−17	−10
01	−1	+3	−3	+1
02	−7	−16	−14	−11
03	−3	−2	+3	0
04	+1	−3	−9	−1
05	+2	−2	−9	−1
06	+5	+1	+8	−1
07	+4	+3	−4	+2
08	+6	+1	+4	+3
09	+4	+1	+8	+4
1910	+5	+9	−1	−3
11	−9	+9	+3	−2
12	−2	+2	+5	+2
13	+3	+6	0	−2
14	+6	+4	−9	+3
15	−1	+2	+2	−2
16	−2	+5	+15	+2
17	+6	+4	+7	+4
18	+1	+1	−4	+2
19	−3	−7	−2	−3

SANTIAGO, CHILE—Continued

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
1920	−3	−3	+3	−3
21	+1	−2	+13	+2
22	−3	+3	+1	+2
23	+3	+1	−3	−2
24	+5	+5	+9	+3
25	+1	0	−2	0
26	0	+3	−3	+1
27	+5	+2	+4	+4
28	+7	+3	+3	+2
29	−2	+3	0	−1
1930	−3	+1	−9	+1
Base	714.6	716.0	717.6	716.7
Σ (+)	80	98	116	56
Σ (−)	69	77	132	66
Δ	+11	+21	−16	−10

SOUTH ORKNEYS (LAURIE ISLAND)

[Lat. 60°44′ S.; long. 44°39′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
03	−06	−18	−31	−08
04	−18	+10	+13	+51
05	−08	−04	−25	−35
06	+12	−31	+14	−12
07	−27	−28	+30	+02
08	+01	−04	−08	−03
09	+03	−16	−14	+08
1910	+03	+19	−08	−15
11	+09	+59	−15	+05
12	+36	−48	0	−36
13	−07	−13	+19	−21
14	+13	−12	−04	−34
15	−19	+01	−01	+33
16	−03	+18	+41	+09
17	−22	+21	0	+26
18	−18	+18	+12	+33
19	+05	+34	−18	−37
1920	+05	+12	+14	+08
21	+01	+33	−07	+03
22	+03	−33	−13	+03
23	+33	−10	+15	+27
24	−21	+11	+06	−03
25	−16	−25	−01	−26
26	+75	+24	+20	+05
27	−05	−26	−20	+08
28	−30	+19	+18	+01
29	+13	+13	−26	−17
1930	−11	−29	−14	+05
Base	743.4	743.0	745.9	743.3
Σ (+)	212	292	202	227
Σ (−)	211	297	205	247
Δ	+1	−5	−3	−20

SOUTHWEST POINT, CANADA

[Lat. 49°23′ N.; long. 63°43′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
88	0	+7	−4	+1
89	−2	−1	+3	+2
1890	+6	−1	+2	−5
91	−1	+3	+2	+3
92	+8	−8	+1	−5
93	−13	0	−3	−1
94	+7	+8	−2	−3
95	−3	−4	0	−1
96	+4	+3	−2	+6
97	+2	+2	+1	−3
98	+6	+7	+1	+1
99	−11	+5	0	+3
1900	−2	−9	−5	+5
01	−22	+5	−2	−8
02	−3	−1	−5	+1
03	−11	+13	+5	−2
04	−3	+5	+2	−8
05	−2	−8	−1	−6
06	+12	0	0	0
07	+9	+2	−2	0
08	−5	−5	+4	−5
09	0	−4	−3	+5
1910	+2	+6	−1	−7
11	−1	+1	+2	−4
12	−8	−2	−4	−1
13	−7	+2	−3	+7
14	−4	+1	−2	−1
15	+14	−11	+6	−2

SOUTHWEST POINT, CANADA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inchse*	*Inches*	*Inches*
16	0	−3	+4	+2
17	−13	+1	+8	+3
18	+1	+3	+5	+3
19	0	+13	+7	+7
1920	+3	−4	+3	+2
21	+5	+14	0	−4
22	+3	+3	+6	−7
23	+4	−3	−6	+9
24	+3	−5	−3	+4
25	+8	+7	−2	−6
26	−17	−11	−1	+3
27	+6	+5	+5	0
28	−3	−6	+2	−3
29	−2	−2	−2	0
1930	+10	−10	+2	+5
Base	29.84	29.86	29.84	29.89
Σ (+)	113	116	71	72
Σ (−)	133	98	53	82
Δ	−20	+18	+18	−10

STYKKISHOLM, ICELAND

[Lat. 65°05′ N.; long. 22°46′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	+15	−2	−10	+2
1890	−38	−25	−14	−25
91	+14	+40	+20	−38
92	+30	+42	+15	+4
93	+48	−15	+6	+25
94	−75	−27	−24	+9
95	+90	−11	−1	−8
96	+9	−33	−2	+33
97	+8	−42	+5	+22
98	−34	−9	−18	−26
99	−5	+44	−6	−20
1900	+39	+38	+7	−20
01	+25	−5	−23	+7
02	+56	+18	+40	−9
03	−51	−46	+18	+16
04	−23	−47	+11	−9
05	+22	−5	−9	+15
06	−46	+15	−1	−17
07	+9	−22	+16	−12
08	−5	+2	+1	−23
09	−17	+35	−11	+10
1910	−43	−10	+21	+50
11	−2	−1	+17	+9
12	−6	−19	+21	+10
13	−45	−62	+4	−15
14	−17	−20	−5	0
15	−24	+25	+26	+45
16	−3	+41	+11	−3
17	+100	+45	+22	−15
18	+69	+2	0	−17
19	+45	+23	+4	--------
1920	−18	−44	−9	−45
21	+4	−45	+8	+8
22	−64	+20	−31	+38
23	−22	+11	−18	−18
24	+18	+46	−13	−18
25	−66	−3	−22	+29
26	+7	+4	−15	+47
27	+13	−10	−2	+25
28	−15	+13	0	−14
29	+67	+33	+6	−44
1930	−44	+11	−31	+8
Base	748.7	756.9	758.0	753.5
Σ (+)	688	508	279	412
Σ (−)	663	503	265	396
Δ	+25	+5	+14	+16

SYDNEY, AUSTRALIA

[Lat. 33°52′S.; long. 151°13′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
89	+15	+55	−15	+11
1890	+2	+60	−65	−95
91	+36	+20	−32	+41
92	−14	−27	−03	−40
93	−62	−56	0	−62
94	−06	+13	−56	+46
95	+54	+82	−29	−21
96	−14	−16	−71	+97
97	+07	−18	+77	−33
98	+26	+08	+56	−80
99	+57	−14	+44	+31

[19] A study of the annual values indicates a progressive change to higher values. Accordingly, it was decided to use C. E. P. Brooks' method to correct for secular change, except that the change was first applied to the annual instead of to the quarterly values. The results are the same and are described on p. 20.

[20] Values for 1894–1916 are taken from Exner and 1917–30 from publications of Observatory Infanto de San Luis. Study of annual means seems to indicate that 1921–30 values, mean 761.15, are a little low, probably about 0.6 mm. compared to 1894–1920, mean 761.72 mm. On account of uncertainty, corrections have not been applied in obtaining quarterly values.

TABLE 11—Continued

Pressure departures foreign stations

SIDNEY, AUSTRALIA—Con.

Year	DJF	MAM	JJA	SON
	Inches	Inches	Inches	Inches
1900	+53	−12	−114	+19
01	+26	+20	+11	+68
02	−40	+45	+101	+15
03	−05	−17	+22	+26
04	−46	+72	+27	+05
05	+18	+24	+37	−69
06	+36	+18	+37	−15
07	+38	+03	−11	+17
08	+39	−34	+55	+61
09	+02	−41	−34	−03
1910	+01	+46	−22	+47
11	−37	−47	+35	+09
12	−14	+15	+33	−55
13	+11	−25	+37	−25
14	+54	−07	+129	+191
15	−15	+10	−77	−101
16	−21	−07	−40	−34
17	−28	−82	−57	−36
18	+07	+31	+07	+27
19	+33	+50	+58	+26
1920	+22	+35	−82	+54
21	+49	+13	+36	+17
22	−64	−25	−44	−27
23	−74	−51	−84	−17
24	−32	−44	+78	−69
25	−34	−14	+39	+10
26	−28	−56	−20	−16
27	−07	−65	−67	+83
28	+10	+06	−10	−108
29	−53	−49	+07	−19
1930	−16	+87	+03	+34
Base	29.921	30.062	30.070	29.981
Σ (+)	596	713	929	935
Σ (−)	610	707	933	925
Δ	−14	+6	−4	+10

TASHKENT, SIBERIA

[Lat. 41°20′ N.; long. 69°18′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	Mm.	Mm.	Mm.
88	−10	−6	+4	+5
89	−3	+3	−2	+8
1890	+17	+3	−6	−5
91	+9	+11	+4	−4
92	−11	−1	0	+8
93	−8	−4	−2	−6
94	0	0	−3	+6
95	+3	−16	+4	+1
96	−22	−7	+6	+9
97	+4	−1	−1	−4
98	+9	+8	+2	+6
99	−10	+2	+1	+1
1900	+14	0	+8	+5
01	+5	+7	+7	0
02	+10	−1	−1	−1
03	−9	+14	+1	−5
04	+12	−3	+7	−1
05	−3	+7	+8	−7
06	−8	0	−6	−2
07	−11	−3	+6	+9
08	−7	+12	+8	−4
09	0	+2	+6	−6
1910	−8	−2	−1	−1
11	−3	−9	+7	+9
12	+2	+3	−3	+3
13	−3	+3	−2	−3
14	+4	+2	−12	−16
15	+17	−9	−5	−8
16	+30	−8	+5	+7
17	−16	−10		
18	+8	−2	−3	+7
19	+10	−5	−6	−1
1920	−1	+9	+2	−8
21	+13	+9	−1	−2
22	−21	+5	−4	−11
23	−12	−2	−12	+4
24	−5	+4	−7	0
25	+15	0	−12	−6
26	−4	−4	−2	+9
27	0	−2	−5	−6
28	−6	+6	+3	+1
29	−1	+2	−5	+3
1930	+12	−2	−6	−1
Base	724.7	720.5	714.6	723.1
Σ (+)	194	112	89	101
Σ (−)	182	97	107	108
Δ	+12	+15	−18	−7

TOKYO, JAPAN [11]

[Lat. 35°41′ N.; long. 139°45′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	Mm.	Mm.	Mm.
88	−7	−4	−4	−2
89	−5	+6	−3	−3
1890	+7	0	−5	−5
91	−10	−4	+2	0
92	+6	−6	+4	−3
93	−13	−7	+6	+7
94	−1	+6	−1	+9
95	−5	+7	−3	+1
96	−11	+18	+4	−8
97	+10	+3	0	0
98	0	+1	+3	+3
99	−1	+1	−1	0
1900	+7	−5	+6	+8
01	+28	+6	−1	−8
02	+4	−4	−3	+7
03	−1	+15	−1	+3
04	+6	+7	+3	−14
05	−9	+17	0	+12
06	−2	−7	−11	−23
07	−6	−6	−4	+7
08	+4	+6	+3	−6
09	0	+1	+5	−4
1910	−10	0	−9	+1
11	+12	0	+3	+1
12	+6	−7	−6	+1
13	+11	−7	−16	+5
14	+5	0	−6	+10
15	−4	−8	−7	+9
16	0	0	−3	+18
17	−17	−12	+7	0
18	−13	+6	+6	+3
19	+7	−8	+5	−6
1920	−3	+2	+3	+2
21	+1	−6	+29	−4
22	+1	−9	−13	−10
23	−12	+14	+1	−14
24	0	−1	+12	−3
25	+4	+1	+10	−2
26	−3	−10	+4	−6
27	−5	+5	−2	−7
28	+1	−1	−1	+10
29	−3	+6	+3	+2
1930	+17	+11	−2	+2
Base	760.5	759.1	755.4	760.1
Σ (+)	137	139	119	121
Σ (−)	141	112	102	128
Δ	−4	+27	+17	−7

UPERNIVIK, GREENLAND

[Lat. 72°47′ N.; long. 56°07′ W.]

Year	DJF	MAM	JJA	SON
	Mm.	Mm.	Mm.	Mm.
89	−6	−7	−15	+8
1890	−36	−3	−8	+7
91	−12	+27	+6	+1
92	+37	+36	−1	+3
93	+22	−28	+10	+14
94	−21	+2	−23	+25
95	+43	−19	−16	−7
96	+24	+2	−6	+24
97	+11	−25	+23	−3
98	+51	−2	−19	−9
99	0	+15	−11	−11
1900	+46	+14	+1	−22
01	+14	+10	−38	−26
02	+38	+12	+23	−21
03	−44	−24	+31	+17
04	−18	−28	+2	−8
05	−2	−24	−7	−2
06	−7	+10	−1	−21
07	−3	+5	+34	−20
08	−7	−22	+6	−15
09	−3	+45	−12	+25
1910	+27	+13	+30	+48
11	−8	−33	+22	−18
12	+7	−29	+23	+3
13	−59	−30	−18	−12
14	−17	−7	−9	−23
15	+22	+24	+21	+37
16	+5	+33	−8	−5
17	−8	+40	+15	+1
18	+47	−30	+8	+17
19	+45	+23	−6	+10
1920	−9	0	−21	−19
21	+14	−23	−7	−2
22	−15	+18	−18	+11

UPERNIVIK, GREENLAND—Con.

Year	DJF	MAM	JJA	SON
	Mm.	Mm.	Mm.	Mm.
23	−9	−19	−6	−9
24	0	+50	+8	−6
25	−10	+3	−22	+3
26	−19	−6	0	+15
27				+28
28	−49	−7	+7	−19
29	−35	−19	+3	−29
1930	−50	−5	−1	+22
Base	754.8	760.7	758.7	756.2
Σ (+)	453	382	273	319
Σ (−)	447	390	273	307
Δ	+6	−8	0	+12

UST-ZYLMA, RUSSIA [12]

[Lat. 65°27′ N.; long. 52°10′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	Mm.	Mm.	Mm.
95				−24
96	−8	+40	+14	
97			+03	−29
98	+32	+77	+10	+02
99	−33	−20	+04	+16
1900	+95	−15	−16	+09
01	−43	−05	+23	−03
02	−10	+13	+02	−24
03	−54	+08	+01	−03
04				02
05	−64	+37	−02	−09
06	−13	−18	−14	+26
07	+19	−15	+03	+54
08	−10	+07	−05	−20
09	−9	+39	−32	+14
1910	+14	0	+01	+29
11	−5	−23	+05	−22
12	+8	0	+17	+46
13	+18	−24	+21	−17
14	−89	−15	+02	0
15	+36	−15	−10	+07
16	−20	+38	−03	+14
17	−2	−08	+29	−12
18	−5	−04	−13	+15
19	+35	−04	−07	−05
1920	+20	+04	+14	+10
21	−48	−01	−07	−13
22	+21	−12	−06	−08
23	−28	−04	−26	−01
24	+27	−11	−05	−02
25	−29	+12	+17	−58
26	+20	−12	−12	−09
27	+22	−22	+16	−25
28	−4	+11	−22	+17
29	+62	−38	−08	+18
1930	+22	−06	+05	−09
Base	756.9	758.0	755.8	755.9
Σ (+)	460	286	187	279
Σ (−)	465	272	188	293
Δ	−5	+14	−1	−14

VALENCIA, IRELAND

[Lat. 51°56′ N.; long. 10°15′ W.]

Year	DJF	MAM	JJA	SON
	Inches	Inches	Inches	Inches
89	+14	−07	0	+06
1890	+10	−12	−01	+11
91	+26	−03	−06	−17
92	−5	+09	+01	−04
93	−1	+17	+01	+06
94	−2	−05	−03	+02
95	+5	−02	−05	−02
96	+19	+21	+07	−02
97	−2	−14	−06	+13
98	+10	−01	+09	−08
99	+12	+04	+11	+06
1900	−15	+07	−03	−01
01	+7	−04	+08	+02
02	−3	+02	−03	+06
03	+3	−10	−05	−10
04	−25	0	0	+12
05	+20	−08	−03	0
06	+4	+09	+05	+12
07	+28	0	−03	−08
08	+8	0	+08	0
09	+12	−14	+06	+02

VALENCIA, IRELAND—Con.

Year	DJF	MAM	JJA	SON
	Inches	Inches	Inches	Inches
1910	−22	+05	−10	+05
11	+12	+04	+05	−07
12	−32	−02	−16	+08
13	−15	−13	+13	−13
14	+2	0	0	+04
15	−39	+13	0	+02
16	−11	−06	+01	−14
17	0	+01	−07	+07
18	+16	+07	+05	−07
19	−19	+02	+15	+10
1920	0	0	+03	−04
21	+12	+10	+09	+10
22	−05	0	−02	+13
23	−09	−03	+06	−11
24	+08	−14	−09	−10
25	−12	+02	+05	0
26	−23	−01	+01	−10
27	+13	−03	−13	−03
28	−07	−14	−05	−09
29	+11	+12	0	−09
1930	−17	−06	−08	−10
Base	29.90	29.94	29.99	29.94
Σ (+)	252	125	119	137
Σ (−)	264	142	108	159
Δ	−12	−17	+11	−22

VIENNA, AUSTRIA

[Lat. 48°15′ N.; long. 16°22′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	Mm.	Mm.	Mm.
89	−04	−21	−07	+03
1890	+42	−19	−02	0
91	+42	−17	−02	+02
92	−21	+07	+02	+06
93	−20	+30	−01	−12
94	−55	0	+02	+05
95	−44	−01	+05	+11
96	+28	+03	−05	−16
97	−09	−20	+01	+35
98	+29	−19	+09	+02
99	+06	+07	+09	+18
1900	−34	−02	+05	−12
01	+13	−04	+02	−01
02	−23	−02	−02	+17
03	+31	−03	−05	−06
04	−23	+07	+11	+06
05	+22	0	−01	−29
06	+41	−02	+04	+07
07	+30	+04	+03	+07
08	−02	+03	+01	+34
09	+15	0	−09	−14
1910	−33	+02	−15	−13
11	+12	0	−02	−02
12	−13	+06	−13	+04
13	+31	+10	−01	+02
14	+05	+09	−05	−08
15	−52	0	−01	−11
16	−12	−22	−10	−06
17	−34	−07	+07	+01
18	+26	+09	0	+04
19	−29	−02	+09	−15
1920	+07	+16	+04	+33
21	+15	+25	+01	+28
22	−08	−03	−02	−09
23	−19	+03	+10	−18
24	−21	+01	−05	+14
25	+38	−05	−06	−15
26	−11	0	−03	−10
27	+05	−01	−06	−03
28	+15	−09	+12	−12
29	+17	+24	+12	−05
1930	+08	−20	−04	−16
Base	745.5	742.4	743.6	745.2
Σ (+)	478	166	109	239
Σ (−)	467	179	107	233
Δ	+11	−13	+2	+6

WELLINGTON, NEW ZEALAND

[Lat. 41°16′ S.; long. 174°46′ E.]

Year	DJF	MAM	JJA	SON
	Inches	Inches	Inches	Inches
89	+62	+78	+06	+84
1890	−15	+96	+59	−65
91	−47	−44	+75	+45
92	+08	+118	+37	+93

[11] Values for 1921–30 are taken from R. M., with correction applied. W. W. R. values for that period do not correspond with previous values in W. W. R. In addition, the R. M. station pressure, beginning with Jan. 1, 1922, are for an elevation of 5.8 m., instead of 21.3 m. as before that date. The correction for change of station elevation is 1.9 mb. or 1.4 mm., and this amount has been subtracted from 1922–30.

[12] Mean of annual means for 1896–1915 is 756.6 mm. and for 1921–30 is 752.1 mm. Accordingly, 4.5 mm. has been added for the period 1921–30. Elevation of station was changed from 27 m. to 68 m. Values for 1916–20 taken from R. M. (station) with correction of 4.5 mm. to accommodate change of elevation. Data missing in W. W. R. have been interpolated from surrounding stations.

TABLE 11.—Continued

WELLINGTON, NEW ZEALAND—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
93	−85	+05	+51	+34
94	+07	−46	−124	+75
95	+111	−31	−164	−80
96	+03	−35	−88	+18
97	+73	−102	+33	−157
98	+11	−09	+10	−120
99	−18	−14	+111	−17
1900	+45	+55	−10	−80
01	−15	−07	−10	+128
02	−173	−108	+117	−81
03	+03	+39	+24	+208
04	+60	+27	−40	−109
05	−19	+51	+03	−156
06	−32	−64	+37	+79
07	+75	+08	+04	−31
08	+150	−40	+24	+115
09	+11	+29	+19	+39
1910	+22	+32	−57	+136
11	+30	+67	+08	−62
12	−126	−24	+18	−140
13	−11	−59	−07	−04
14	−24	−11	+24	+138
15	−45	+51	+65	−56
16	+43	+30	+47	+82
17	+07	−01	−102	+143
18	+34	−32	−176	−17
19	−29	+72	−07	−35
1920	+35	−74	+71	+65
21	+49	+18	−01	+20
22	+49	−120	+104	+41
23	−144	−35	−78	+45
24	+16	+28	+106	+27
25	−69	+45	−31	−93
26	−101	−05	+17	−72
27	+20	−83	−98	+55
28	+151	+05	−30	−148
29	−31	−20	−93	+02
1930	−100	+90	+26	−147
Base	29.925	30.018	29.973	29.905
Δ (+)	1075	944	1096	1672
Σ (−)	1084	964	1116	1670
Δ	−9	−20	−20	+2

WINNIPEG, CANADA

[Lat. 49°53′ N.; long. 97°07′ W.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
89	−3	+1	−2	+3
1890	0	0	−1	−2
91	+2	+3	+2	−1
92	−6	+7	+2	+1
93	0	−2	−6	−7
94	−2	−4	+1	−8
95	−1	−3	0	−4
96	−9	−6	+1	+5
97	−3	0	−3	+2
98	−6	0	−2	−7
99	−9	−1	−3	−1
1900	−3	+2	−2	+5
01	+1	+10	+2	+5
02	−2	−4	−3	−6
03	+8	+1	+5	−1
04	+1	+3	0	+3
05	+9	−4	+1	−2
06	−2	+3	−1	+1
07	+10	+1	−5	+3
08	−6	−3	+1	−1
09	0	−1	+2	+3
1910	+3	−2	+2	+2
11	+6	−4	+1	+4
12	+1	0	+5	−4
13	−9	+3	+3	+2

WINNIPEG, CANADA—Continued

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
1914	+2	+7	+2	−2
15	+3	+6	+5	−6
16	+4	−3	−1	−2
17	−4	+6	−3	+7
18	+4	−6	+1	+3
19	−5	+3	+2	+3
1920	+8	−5	+4	+5
21	−8	+2	0	−4
22	+1	−1	+1	+2
23	+1	0	+2	+2
24	+2	0	−1	−1
25	0	+1	−1	+1
26	−6	+1	+2	0
27	0	0	+5	−1
28	0	−1	−1	+1
29	+2	−6	0	+4
1930	0	−3	+1	−3
Base	29.22	29.16	29.09	29.14
Σ (+)	68	60	53	67
Σ (−)	84	59	35	63
Δ	−16	+1	+18	+4

YAKUTSK, SIBERIA

[Lat. 62°01′ N.; long. 129°43′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
89	+6	+3	−11	+12
1890	−34	−16	−6	------
91	−12	−24	+7	+19
92	+6	−4	−10	−5
93	+28	+11	−4	+10
94	−5	−2	−14	+20
95	+6	−1	+17	−5
96	+15	+18	+17	+13
97	+3	+25	+5	−7
98	−20	−4	+1	+1
99	0	−4	+12	−8
1900	+27	+13	+4	------
01	+11	+3	+13	−9
02	+1	+7	+8	+5
03	−22	+1	+5	+4
04	−5	−12	−8	−14
05	−29	+20	+12	−15
06	+34	−6	+4	+8
07	−9	−2	+9	+13
08	------	------	------	------
09	------	------	------	------
1910	------	------	------	------
11	------	------	+14	−1
12	−9	−6	−6	−5
13	+10	−16	−7	−2
14	−17	−13	−3	+1
15	−15	+22	+4	−11
16	−14	+16	−15	−6
17	+34	+4	−2	−4
18	+14	−15	−8	−7
19	+7	------	−4	0
1920	+18	+3	0	−3
21	−26	−6	−8	+7
22	+18	+6	−10	−7
23	+2	−18	−11	+6
24	−35	+3	−11	−15
25	+7	+2	−7	+1
26	−9	−10	+3	+11
27	+5	+17	−9	+5
28	−12	−4	+4	−32
29	+12	−16	−9	+4
1930	+8	−2	+7	+17
Base	759.1	751.1	746.0	752.8
Σ (+)	272	174	146	157
Σ (−)	273	181	163	156
Δ	−1	−7	−17	+1

YENISSEYSK, SIBERIA

[Lat. 58°27′ N.; long. 92°10′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
1890	−22	−25	+06	+6
91	−26	−26	−01	−8
92	+08	+15	------	−15
93	+42	−7	−03	−6
94	−29	−14	−05	+2
95	+12	+3	+11	0
96	+2	+27	−04	−18
97	+11	+20	−12	−13
98	+3	+14	+04	−20
99	−31	−8	+14	−4
1900	+21	+7	−03	−4
01	−13	------	−04	−10
02	−3	−5	+12	−9
03	−26	+4	−4	+3
04	−18	+11	−4	−1
05	−24	+22	+1	0
06	+05	−8	−11	+25
07	−03	−8	+5	+14
08	+06	+31	−5	−11
09	−16	+19	+1	+6
1910	+11	−1	+2	+12
11	+1	−17	+14	−21
12	−14	−2	−11	+34
13	−14	−10	−1	−6
14	−56	−2	−13	+3
15	+5	+15	+4	−6
16	−18	+27	−1	+15
17	+30	+11	−14	+7
18	+38	−10	+13	−10
19	+22	−5	−13	−15
1920	+24	−4	+13	−14
21	−16	+1	+5	+22
22	+13	0	−7	+7
23	+15	−23	+4	+16
24	+14	+11	−34	−21
25	−13	−1	+3	−13
26	−04	+2	+3	+11
27	+29	+5	+8	−16
28	+5	−20	+6	+16
29	+38	−21	+12	+4
1930	+2	−19	−1	+22
Base	762.1	755.9	748.9	756.6
Σ (+)	357	245	141	225
Σ (−)	346	236	154	241
Δ	+11	+9	−13	−16

ZANZIBAR, EAST AFRICA

[Lat. 6°10′ S.; long. 39°11′ E.]

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
92	−8	−12	−33	−10
93	−13	−2	+12	−9
94	+26	+5	−11	+9
95	−1	−2	+9	+10
96	−8	−10	+10	−2
97	+16	+41	+13	+4
98	+6	−30	−11	−25
99	−10	0	+22	+23
1900	+9	+17	+2	+4
01	+12	−8	+9	+24
02	+31	−9	−34	0
03	+10	−21	−31	−2
04	−21	−12	+13	+17
05	−16	+11	−26	−41
06	−19	+15	−7	+19
07	+13	−9	+9	+4
08	+9	+3	+2	−5
09	−17	0	−6	+3
1910	−25	−8	−15	+15
11	−1	+7	+30	+22
12	+7	+12	−1	0
13	+12	−14	+14	+14

ZANZIBAR, EAST AFRICA—Con.

Year	DJF	MAM	JJA	SON
	Inches	*Inches*	*Inches*	*Inches*
14	+28	+18	−7	+1
15	+24	+15	−10	0
16	+27	−13	−23	−11
17	−23	−15	−11	−6
18	+1	+2	+26	−39
19	+29	+20	+14	+1
1920	+7	+8	+21	+5
21	−6	−2	−12	+9
22	−19	+18	+3	−7
23	−6	−28	+3	+2
24	+2	−3	−7	+7
25	−35	−7	−9	−10
26	+10	+9	−13	−29
27	−17	−3	+14	+11
28	+1	−8	+7	+6
29	−16	+8	−3	−22
1930	−6	+12	+10	+15
Base	29.845	29.876	30.010	29.942
Σ (+)	280	221	243	225
Σ (−)	267	216	270	218
Δ	+13	+5	−27	+7

ZI-KA-WEI, CHINA [23]

[Lat. 31°11′ N.; ong. 121°25′ E.]

Year	DJF	MAM	JJA	SON
	Mm.	*Mm.*	*Mm.*	*Mm.*
88	−19	−16	−31	+15
89	+28	+3	−9	−5
1890	−69	−2	+38	−11
91	−118	+3	+20	−77
92	−16	+13	+67	−36
93	+80	−25	+31	+47
94	−22	−43	+1	+75
95	−63	−49	−2	+36
96	−9	+50	+31	−99
97	+28	+5	−1	−3
98	−45	+40	−18	−56
99	−29	+47	−47	+166
1900	−15	−44	+70	+6
01	+50	+32	+7	−20
02	+24	−4	+20	−17
03	+9	−39	+47	+10
04	−20	−16	+19	+30
05	−82	+66	+17	+65
06	−116	+24	−77	+95
07	−23	−14	−1	−42
08	+70	+76	−13	−12
09	−54	+42	+60	−70
1910	−38	+47	−77	−20
11	+95	−5	−9	−39
12	+25	+11	−52	+92
13	+119	+6	−1	+53
14	+6	−30	−36	−26
15	−85	+14	−47	−14
16	−100	+46	−23	+75
17	+64	+1	+20	+20
18	+102	−4	+44	+7
19	−37	−83	−13	−33
1920	+82	+68	−59	−80
21	−21	−31	−11	+90
22	−51	−25	−65	−48
23	+43	−3	−4	−107
24	−27	+30	+53	+32
25	+108	+60	−36	−17
26	+123	−15	+80	−13
27	+15	+31	+6	−63
28	−4	−50	−39	−28
29	+12	+17	−31	+70
1930	−22	−37	−46	−36
Base	768.55	761.23	753.34	762.99
Σ (+)	1083	732	631	984
Σ (−)	1085	535	748	972
Δ	−2	+197	−117	+12

[23] Annual means in W. W. R. for 1888–1904 give average of 761.73 mm.; for 1905–20, 761.53 mm., a difference of 0.20 mm. Therefore, a correction of −0.20 mm. has been applied to the period 1888–1904. Annual means for 1905–20 give average of 761.53 mm., for 1921–30, 762.56 mm., a difference of 1.03 mm. Therefore, a correction of −1.03 mm. has been applied to the period 1921–30.

5. THE RESULTS

THE TIME INTERVALS

It is quiet certain that for general purposes of this kind and with stations so far apart, the use of a period less than a month in length would have been inadvisable; in fact, the month would be somewhat too small to bring out the larger relations. After the preliminary survey points out the regions which seem to suggest associations, it will then be desirable to break down the quarterly values of pressure at foreign stations into smaller periods in order to throw further light on the association. For example, if winter temperatures (December–January–February) in district No. 1 seem to show a relation with June–July–August pressures of the previous year at Wellington, it may well be that using November–December–January at Wellington would show a better relation. Again it might be advisable to use October–November–December–January–February or November–December–January–February–March at Wellington. Again, for districts in the United States, it may be that instead of using the usual quarters we would want to use some other combination of months. For example, we might want to use the growing season for some particular crop, which might include the months of May to September; or it might be that instead of March–April–May we should for some reason prefer to use April–May–June. From a climatic point of view, as regards seasonal rainfall, for example, in California, it would be preferable to combine the months from December to April.

The time interval used was the quarter. Correlations were worked out with foreign pressures one quarter before, two quarters before and three quarters before the season in the United States. This gives a maximum time interval of three quarters of a year. Perhaps it would have been advisable to provide for greater time lags between the foreign pressure departures and the United States condition of temperature or precipitation, for example, four quarters or five quarters before, but to do so would have multiplied the work and further delayed the completion of the project.

The foreign pressure data after being marshalled into quarterly values were compared by means of correlation coefficients with temperature departures in district No. 1 (comprising New England, northern New Jersey, and parts of New York and Pennsylvania). For example, winter temperatures (December-January-February) in district No. 1 were correlated with pressure at the 63 stations for the first quarter before (September-October-November of the preceding year), with the second quarter before (June-July-August of the preceding year) and with the third quarter before (March-April-May of the preceding year). Similar correlations were worked out for spring, summer and fall temperatures in district No. 1, making a total of 756 coefficients. The same procedure was carried out in the other 11 districts.

Similarly, correlation coefficients were worked out between pressures at the 63 foreign stations and precipitation in the 12 districts of the United States.

Tables 12–23 give the 63 foreign stations arranged in alphabetical order, with the correlation coefficients for temperature for the 12 districts by quarters and with the three time lags; and tables 24 to 35 give similarly the correlation coefficients for precipitation.

METHOD OF PORTRAYAL

It is impossible from tabulations of this sort to get a picture of the geographic distribution of the coefficients so that it is considered most important also to have charts to show the geographical distribution of the correlation coefficients. The coefficients were therefore entered on world charts and it was found that the plus coefficients and minus coefficients arranged themselves into groups. The result was quite encouraging, especially since lines of equal coefficients could be drawn for 0.10, 0.20, 0.30, and in a few cases 0.40 and even 0.50.

RESULTS

The present study has produced no outstandingly large correlation coefficients. However, 60 or more equalled or exceeded ± 0.50 in each of the correlation groups between foreign pressures and United States temperatures, and between foreign pressures and United States precipitation; and a total of 18 equalled or exceeded ± 0.60.

The distribution of the correlation coefficients between foreign pressures and subsequent temperature conditions in the United States are shown on charts 4 to 147, and between foreign pressures and precipitation in the United States on charts 148 to 291.

WINTER TEMPERATURES IN THE UNITED STATES

Relation to foreign pressures one quarter before, that is, in the preceding September, October, and November.—Moderate negative correlation coefficients are found from the Aleutian Islands, southward and southeastward over the Pacific Ocean, as far southeastward as off the coast of Central America for northern districts of the United States. For southern districts negative correlations are in evidence over the Aleutian Islands and thence southwestward over Midway Islands to Papua. For district 12, coefficients are much the same as for northern districts. In addition to the negative correlations above referred to, there is quite a definite positive correlation between the winter temperatures in northern districts with precedent September, October, and November pressures over the East Indies, whereas for the southern districts marked positive correlations are lacking or correlations are slightly negative.

Relation with foreign pressures two quarters before, that is, in the preceding June, July, and August.—A fairly consistent negative correlation is in evidence, especially for northern districts, from the Aleutian Islands southward to Samoa. Also, there is evidence of a negative correlation in South America between latitudes 20° and 40°. For northern districts there is quite a consistent positive correlation over eastern and, more particularly, northeastern Africa. For southern districts, areas of negative correlations appear farther to the westward, extending from Kamchatka southward to Papua and Australia. The negative correlations found in central South America in connection with the northern districts are replaced by positive correlations over the northern portion of South America. The positive correlations found in connection with northern districts over eastern Africa are replaced by negative correlations over western Africa, except for district 11.

Relation to foreign pressures three quarters before, that is, in March, April, and May.—Positive correlation coefficients are found for districts 1, 3, 5, and 7 from Kamchatka southward and southwestward to Australia and the East Indies. Also, positive correlations are found for districts 1, 2, 3, 4, 5, 6, 7, and 8 in the region extending from eastern Africa eastward and northeastward over India, the East Indies and Australia. It is noticed also that negative correlations are found for districts 1, 2, 3, and 4 over northeastern Canada and western Greenland; and for districts 5, 6, 7, 8, 9, 10, 11, and 12 over northern Russia and northern Siberia.

SPRING TEMPERATURES IN THE UNITED STATES

Relation to foreign pressures one quarter before, that is, in December, January, and February.—Positive correlations are found for districts 1 to 6 over northern Africa and the Mediterranean.

In districts 9, 11, and 12, positive correlations are shown from southern Africa over the Indian Ocean, Australia, and the East Indies. It is further noted that negative correlation coefficients are shown for districts 9, 11, and 12 over Alaska and Kamchatka. Also that for districts 4, 6, and 8, negative correlation coefficients appear over the region of Australia and the East Indies; also that for districts 9, 11, and 12 areas of negative coefficients appear in the region of Apia and Malden Islands.

Relation to foreign pressures, two quarters before, that is, in September, October, and November.—Districts 6 and 8 show negative correlation coefficients over Australia and the Indian Ocean, while districts 9, 11, and 12 show positive correlation coefficients over the same area.

Relation to foreign pressures three quarters before, that is, June, July, and August.—Districts 1, 2, 3, 4, 5, 7, 9, and 11 show negative correlations over the region of Alaska and Kamchatka. Districts 1, 2, 4, 5, 6, 8, and 10 show positive correlations over an area extending from Korea and Japan east-southeastward to Midway; for districts 5, 6, and 8 another area of positive correlations is shown over northwestern South America; and in districts 6 and 8 positive correlations over South America between latitudes 20° and 40° south.

SUMMER TEMPERATURES IN THE UNITED STATES

Relation to foreign pressures two quarters before, that is, December, January, and February.—Districts 1, 2, 3, 4, 5, 9, 10, and 12 have negative correlations with pressures over Canada. Districts 1, 11, and 12 show positive correlations over northern Siberia and northern Russia. Districts 3, 5, 6, and 8 show negative correlations over Australia and the East Indies.

Relation to foreign pressures three quarters before, that is, September, October, and November.—Districts 1, 2, 3, 4, 5, and 6 show negative correlations over eastern Alaska, while districts 7, 10, 11, and 12 show negative correlation coefficients over western Alaska. In addition, for districts 5, 7, 8, 10, and 12, negative correlation coefficients are shown over northeastern Siberia. Districts 4, 5, and 7 show positive correlations over eastern and southern Europe and northwestern Africa.

FALL TEMPERATURES IN THE UNITED STATES

Relation to foreign pressures one quarter before, that is, June, July, and August.—Districts 1, 3, and 5 show positive correlations over eastern Canada, while districts 4 and 12 show positive correlation coefficients over central Canada. Districts 2, 4, and 7 show negative correlations over Japan, while for districts 8, 9, and 10 negative correlation coefficients are found over Kamchatka and western Alaska.

Relation to foreign pressures two quarters before, that is, March, April, and May.—Districts 1, 3, 4, and 5 show negative correlations in the region of New Zealand. Districts 4, 5, 6, and 8 show positive correlations in southeastern Africa and the region of Madagascar and Zanzibar. Districts 7, 9, 11, and 12 show negative correlations in the region extending from extreme northern Russia eastward over northern Siberia.

Relation to foreign pressures three quarters before, that is, December, January, and February.—Districts 1 and 3 show positive correlations over eastern Africa and in the region of the East Indies and eastern Australia. Districts 1, 2, 3, 4, 5, 6, and 7 show negative correlations over northern Alaska. Of these districts 3, 4, 5, and 6 also show negative correlations with Kamchatka. Districts 2 and 6 show negative correlations over northwestern South America and thence westward to Malden Islands.

WINTER PRECIPITATION IN THE UNITED STATES

Relation to foreign pressures, one quarter before, that is, in September, October, and November.—For districts 2, 6, and 8, negative correlations are found from New Zealand to Mexico. Positive correlations are found for districts 7 and 9 over western Alaska, at Samoa, and in western South America. For districts 2, 6, and 8, positive correlations appear in the East Indies, Australia, and the east portion of the Indian Ocean. For district 9, negative correlations are found over southern Africa, the Indian Ocean, India, Australia, and the East Indies.

Relation to foreign pressures two quarters before, that is, in June, July, and August.—For districts 2, 6, and 8, negative correlation coefficients are found over Honolulu, Apia, western and southern South America, northeast India, Indo China, and Manila. For districts 2, 6, and 8, positive correlations appear in southern Africa, Australia, and the western Indian Ocean. For district 7, large negative correlations are found over the North Pacific Ocean (Honolulu, Midway, Apia, and the Malden Island).

Relation to foreign pressures three quarters before, that is, in March, April, and May.—Districts 1, 2, 6, 8, 10, and 11 show positive correlations in Alaska. For districts 5, 6, and 8, positive correlations are found over northern Australia, the Indian Ocean, and East Africa. Positive correlations are found for districts 9 and 12 at Rangoon and Manila. For districts 6 and 8, negative correlations appear at Honolulu, Malden Island, Apia, and over western and south-central South America. For districts 6 and 10, negative correlations are found over Russia and Siberia.

SPRING PRECIPITATION IN THE UNITED STATES

Relation to foreign pressures one quarter before, that is, in December, January, and February.—Districts 2, 6, 7, 8, and 10 show positive correlations at Manila and Port Moresby. Districts 3, 5, 6, and 8 show negative correlations over western Alaska and Kamchatka. Districts 9, 11, and 12 show positive correlations over northeastern Siberia and portions of Alaska. District 8 shows marked positive correlations at Honolulu, Midway, and over Australia, the East Indies, India, the Indian Ocean, and Africa. District 10 shows marked positive correlations over China, the East Indies, the Philippines, and Australia.

Relation to foreign pressures two quarters before, that is, in September, October, and November.—Districts 7, 8, and 10 show positive correlations over Indo-China, the Philippines, and the East Indies. Districts 8 and 10 show negative correlations at Honolulu and Malden Island. Districts 11 and 12 show negative correlations over Mexico, the West Indies, the Azores, and Madeira.

Relation to foreign pressures three quarters before, that is, June, July, and August.—Districts 7 and 8 show negative correlations at Honolulu and in central South America.

Districts 1, 3, 4, and 5 show positive correlations over Greenland and Labrador. Districts 7 and 8 show positive correlations over Europe, northeastern Africa, the Indian Ocean and Australia. Districts 5, 7, and 9 show positive correlations with northeastern Siberia.

SUMMER PRECIPITATION IN THE UNITED STATES

Relation to foreign pressures one quarter before, that is, in March, April, and May.—Districts 3, 5, 6, and 8 show positive correlations with northwestern Siberia and northeastern Russia. Districts 3 and 5 show negative correlations with Samoa, Malden Island, Mexico, Bermuda, Midway, and Dutch Harbor. Districts 3 and 5 show positive correlations with Indo-China, Manila, the East Indies, and western Australia. Districts 1, 3, and 5 show positive correlations with Yenesseysk and Yakoutsk. Districts 9, 11, and 12 show negative correlations with South Orkneys and Cape Town.

Relation to foreign pressures two quarters before, that is, in December, January, and February.—Districts 3, 4, 5, 6, and 8 show positive correlations with Australia and Port Moresby. Districts 3, 5, and 8 show positive correlations with central and southern Africa. Districts 3, 7, and 9 show negative correlations with northwestern Alaska and northeastern Siberia.

Relation to foreign pressures three quarters before, that is, September, October, and November.—Districts 2, 5, 8, and 12 show negative correlations with Apia, Malden Island, and Wellington. Districts 1, 3, 4, and 5 show positive correlations with the Philippines, Australia, the East Indies, the Indian Ocean, and Madagascar. Districts 2 and 8 show negative correlations with southern Europe, the Azores, and Madeira. Districts 1, 5, and 6 show positive correlations with western Alaska. Districts 1 and 2 show negative correlations with South America. District 12 shows widespread negative correlations with Australia, New Zealand, Samoa, Malden Island, and Santiago.

FALL PRECIPITATION IN THE UNITED STATES

Relation to foreign pressures one quarter before, that is, in June, July, and August.—Districts 6, 8, and 10 show negative correlations with Midway, Honolulu, and Mexico. Districts 8 and 10 show negative correlations with Malden Island and Samoa. Districts 1, 3, and 10 show positive correlations with southern Africa. Districts 5, 6, 7, and 8 show positive correlations with northern Africa. Districts 7, 8, and 9 show positive correlations with the Indian Ocean. Districts 5, 6, 7, 8, and 10 show positive correlations with northern Australia.

Relation to foreign pressures two quarters before, that is, in March, April, and May.—Districts 3, 4, and 7 show negative correlations with Alaska. Districts 6 and 8 show negative correlations with northeastern Siberia. Districts 8 and 9 show positive correlations with northern Siberia. Districts 7, 8, and 12 show negative correlations with southern South America. Districts 6, 7, 8, and 10 show negative correlations with Samoa. Districts 5 and 7 show positive correlations with southern Africa and northeastern South America.

Relation to foreign pressures three quarters before, that is, in December, January, and February.—Districts 5, 6, 7, and 8 show positive correlations with southern Europe. Districts 1 and 2 show negative correlations with northeastern South America and St. Vincent. Districts 1, 2, 5, 11, and 12 show negative correlations with southern Alaska. Districts 5 and 7 show positive correlations with South Orkneys, Cape Town, Madagascar, Darwin, and Port Moresby. Districts 11 and 12 show negative correlations with southern Alaska, southern Canada, Bermuda, Mexico, and the West Indies.

6. WALKER'S OSCILLATIONS

Previous investigations that might profitably be used in correlation studies are those relating to the "oscillations" of Walker (**99**), the monsoon rainfall of India, the summer rainfall of Australia (**43**), the summer rainfall of South Africa (**43**), and the Nile flood:

A few "seesaws" or oppositions have attracted attention; particularly in the North Atlantic, the pressure opposition between the Azores and Iceland, and in the Pacific between Honolulu and interior Alaska. In his studies of world conditions Walker found what he has called "oscillations" (probably suggested by the work of Lockyer); the ones to which he has called special attention are the North Atlantic, the North Pacific, and the southern oscillations. In explanation of what oscillations are, he uses the winter North Atlantic oscillation as an illustration: He says that it is generally regarded as expressing the tendency for pressure to be low near Iceland when it is high near the Azores and over southwest Europe; and this distribution is, of course, associated with high temperature in northwest Europe and low temperature off the Labrador coast. If we may consider the situation in another way, a consideration of the pressures in the region of Horta and Stykkisholm give a representation in a north-south direction only and no indication of the east-west distribution. Further, pressures at both stations have to be considered. It would provide a much more satisfactory and significant index if more stations could be brought into consideration. Walker therefore arrived at a combination of factors to represent the winter oscillation, which is more pronounced than in other seasons, by a series of approximations which led to an expression involving Vienna pressure, Bodo temperature, Stornoway temperature, Bermuda pressure, Stykkisholm pressure, Ivigtut pressure, Godthaab temperature, and half the sum of Hatteras and Washington pressures.

The North Pacific winter oscillation is represented by a relation involving Honolulu pressure, Qu'Appelle and Calgary and Prince Albert temperature, Sitka, Fort Simpson or Juneau pressure, Dawson pressure, Nome pressure, and Dutch Harbor temperature.

The southern winter oscillation includes Santiago pressure, Honolulu pressure, Indian rain, Nile flood, Manila pressure, Batavia pressure, Cairo pressure, Madras temperature, Darwin pressure, and Chile rain.

The southern summer oscillation involves Samoa pressure, Darwin pressure, Manila pressure, Batavia pressure, southwest Canada temperatures, Samoa temperatures, northeast Australia rain, Charleston, S. C., pressure, New Zealand temperature, Java rain, Hawaiian rain, South African rain, northwest Indian pressure, Capetown pressure, Batavia temperature, Brisbane temperature, Mauritius temperature, and South American rain.

Relation with temperature and precipitation in the United States.—These oscillation indices are more stable and reliable than data from any single station or pairs of stations. Owing to the fact that most of the stations employed are outside the United States, it seemed desirable to associate the 3 oscillations with the 12 districts of the United States, both as concerned temperature and rainfall. This has been done, using time intervals of 1, 2, 3, and 4 quarters following the oscillations.

The data for the oscillations are given in table 36.

In presenting the results it is thought that tables 37 and 38 will suffice without charts to show the results of associations with the oscillations.

TABLE 12.—*Correlation coefficients between foreign pressures and United States temperatures, district 1*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.07	0.32	0.26	0.46	0.03	-0.01	-0.07	-0.41	0.07	0.18	0.28	0.41
Alexandria	-.03	.01	-.02	.11	-.12	-.22	-.10	-.19	.27	.28	.56	.22
Allahabad	.21	.11	.31	.14	.26	.06	-.22	-.10	-.20	.19	.12	.21
Antananarivo	-.00	.17	.12	-.13	.19	-.02	.12	-.08	-.22	.18	.29	.31
Apia	.08	-.31	-.16	.08	.33	.04	.25	.16	.12	-.16	-.26	-.36
Arequipa	.14	-.08	.04	-.18	.13	.02	.06	-.12	.06	.10	.19	.05
Batavia	.22	.34	.51	.10	.17	.10	-.23	-.15	-.21	.04	.30	.17
Bermuda	.16	-.15	.07	-.01	.05	-.08	.09	-.09	.22	-.17	.10	.04
Bouzareah	-.09	.01	.25	.40	-.07	.03	-.21	-.16	.06	-.04	.17	.24
Bulawayo	.06	.39	.24	.03	-.07	.11	.35	-.06	.13	.24	.30	.22
Capetown	-.17	.14	-.08	.09	.24	-.05	.31	-.24	-.15	-.22	-.03	.23
Colon	-.26	-.30	-.18	-.20	.22	.16	.06	.07	.19	-.22	-.27	-.46
Cuyaba	.04	-.24	-.11	.15	.32	.04	.42	-.08	-.13	.04	-.05	.25
Darwin	.25	.17	.46	.06	.16	-.06	-.17	-.23	-.21	.08	.41	.34
Dawson	-.30	-.06	-.10	-.37	.09	-.05	-.47	-.21	-.25	-.05	-.04	-.44
Dutch Harbor	-.03	-.37	.27	.11	-.23	-.24	-.04	.21	-.10	-.22	.17	-.00
Edmonton	-.10	.01	.02	-.24	-.09	.05	-.06	-.29	-.13	-.00	.09	-.12
Freetown	-.16	.02	-.06	-.02	.12	.09	-.01	-.14	-.09	.25	-.05	.07
Georgetown	-.04	-.13	-.11	-.07	.19	.16	.08	.07	.06	.29	.26	.24
Gjesvar	.06	.28	.18	-.33	-.03	-.01	-.02	.35	-.06	-.03	-.07	.12
Honolulu	.02	-.24	-.05	.35	.22	-.10	.04	-.08	.08	-.18	-.04	.27
Irkutsk	.06	-.01	.14	.12	-.12	.06	.06	.25	.07	.06	-.08	.04
Ivigtut	-.15	.05	-.24	-.11	-.00	.05	.23	.28	.08	-.05	-.02	.09
Jask	.18	-.08	.01	.26	.22	-.36	.20	-.22	.19	.02	.13	.15
Juneau	-.42	.00	.04	-.16	-.23	-.26	.02	.24	-.11	.04	.02	-.06
Lagos	-.07	.05	-.33	.22	-.04	-.41	-.10	-.43	-.23	-.09	.06	.03
Madeira	-.14	-.01	.26	.18	.12	.16	-.27	-.26	.27	.05	.29	.20
Madras	.11	-.16	.26	.32	.18	-.20	-.32	-.30	-.18	-.00	.19	.12
Malden Island	.01	-.06	-.13	-.13	.06	.06	.18	.19	.13	-.05	.01	-.07
Manila	.17	.07	.41	.31	.19	-.22	-.29	-.23	-.26	-.18	.25	.35
Markovo	-.16	-.23	.46	-.35	-.21	-.60	.09	.38	.21	-.08	.20	-.27
Mexico City	-.26	-.17	.15	-.08	.03	-.04	-.12	-.13	-.15	-.23	-.10	-.22
Midway Islands	-.18	-.43	.49	.33	.49	.42	-.42	-.11	-.13	-.48	.20	.42
Montevideo	-.00	-.20	-.20	-.27	.23	.18	.10	-.16	.28	-.15	-.28	-.09
Moose Factory	-.02	.10	-.36	-.05	-.01	-.06	-.14	-.30	-.07	.35	.04	-.01
Nome	-.39	-.18	.14	-.16	.05	-.40	-.16	.08	-.03	-.06	.27	-.44
Orenburg	.14	.18	-.24	-.19	-.04	.26	-.07	.13	-.04	.07	-.47	.30
Perth	.19	.19	-.01	.33	.27	.19	-.00	-.04	-.06	-.08	.47	.12
Ponta Delgada	-.05	-.05	.19	.08	-.27	.03	-.25	-.09	-.02	.01	.34	.11
Port au Prince	-.07	-.02	.00	-.13	.19	.09	.33	-.01	-.16	-.05	.02	-.39
Port Moresby	.26	.16	.22	.04	.16	.14	-.15	-.22	-.27	.10	.05	.32
Punta Arenas	-.03	.03	-.01	-.17	.34	-.15	.07	-.09	-.01	-.04	-.24	-.31
Quixeramobin	-.05	-.22	.08	.21	.13	-.11	-.03	-.24	-.12	-.01	.16	.28
Rangoon	.08	.00	.36	.29	-.00	-.34	-.34	-.30	-.20	-.04	.27	.25
Rio de Janeiro	.18	-.24	.04	.15	.27	.04	.29	-.09	.34	-.16	.05	-.15
St. Helena	.11	-.05	.18	-.05	.04	.14	-.21	-.02	-.07	.02	.24	.03
St. Vincent	.06	.14	.18	.19	.28	.17	.08	-.24	-.11	-.02	.16	.11
Santiago	.07	-.20	.02	-.08	.04	.07	.02	-.04	.08	-.09	-.35	-.28
South Orkneys	-.17	.23	-.28	-.01	.10	-.03	.40	.20	-.03	-.05	-.29	.43
Southwest Point	.06	-.04	-.13	-.24	-.03	-.10	.06	.06	.00	-.02	-.13	.13
Stykkisholm	-.13	-.13	-.09	-.28	-.12	.09	.48	.16	-.11	-.05	-.02	-.26
Sydney	.13	.04	.16	.09	.22	.11	-.19	.32	-.18	-.05	.03	.27
Tashkent	.26	.09	-.03	-.02	-.24	.16	-.38	-.00	.04	.03	.23	.19
Tokyo	.23	-.17	.19	.10	.02	.27	-.16	.22	.30	-.25	-.11	.13
Upernivik	.01	-.05	-.22	-.02	-.12	.02	.17	.33	.17	-.07	-.02	.17
Ust Zylma	-.01	-.08	-.02	-.27	-.14	.05	-.10	.35	.27	.20	.01	.25
Valencia	-.10	-.18	-.06	-.13	.13	-.08	.24	.08	-.21	.14	.02	-.24
Vienna	.21	-.43	-.08	-.06	.27	-.06	.06	-.14	.08	-.18	-.00	.04
Wellington	-.18	.02	-.20	-.07	-.08	-.08	.04	.29	-.13	.25	-.28	-.12
Winnipeg	-.11	.05	-.28	-.17	.08	-.00	.12	-.54	-.05	.49	-.23	-.15
Yakutsk	.06	.04	-.04	-.23	.00	.13	.03	.45	-.01	-.01	.03	-.07
Yenisseysk	.11	-.06	.03	-.22	.01	-.03	.11	.35	.04	-.08	.15	.10
Zanzibar	-.19	.24	.19	.24	.05	.21	.01	-.16	-.22	-.03	.25	.42
Zi-ka-Wei	-.04	.19	-.18	.01	-.10	.14	.08	.04	.20	-.16	.10	-.01

TABLE 13.—*Correlation coefficients between foreign pressures and United States temperatures, district 2*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.01	0.11	0.21	0.06	−0.12	−0.12	0.04	0.03	0.27	0.18	0.11	0.06
Alexandria	.19	−.20	.15	.12	−.08	−.17	−.06	.11	.02	.09	.09	.08
Allahabad	.12	.10	.16	−.23	−.09	.05	−.11	−.14	.08	.11	−.05	−.06
Antanarivo	−.37	.16	.34	−.28	−.07	.00	.17	.23	−.01	.28	.43	.29
Apia	.11	−.06	−.07	.21	.11	.12	−.29	−.22	.10	−.23	−.29	−.27
Arequipa	.03	.11	.23	−.29	−.03	−.10	−.06	.06	−.10	−.10	.22	−.36
Batavia	−.11	.10	.33	−.28	−.15	−.20	.14	.17	.17	.11	.30	.07
Bermuda	.21	.25	.12	.17	.21	.00	.08	−.04	.07	.03	.05	.11
Bouzareah	.01	−.20	.20	.34	.07	.09	−.23	−.03	.18	−.09	.22	.04
Bulawayo	−.19	.17	.24	−.08	−.02	.20	.24	.23	.16	.19	.43	.12
Capetown	−.12	.19	.05	.03	.19	.22	.00	.17	−.03	−.05	.17	.13
Colon	−.02	.05	−.04	−.26	.34	.29	.15	.10	.11	−.46	−.26	−.65
Cuyaba	.02	.26	.17	.06	.16	.23	.08	.14	.22	.21	−.16	.13
Darwin	−.13	−.06	.25	−.28	−.12	−.15	.09	.15	.17	.14	.38	.12
Dawson	−.23	−.03	−.25	.19	−.04	−.09	−.11	−.01	−.21	.25	−.15	−.56
Dutch Harbor	−.53	−.22	−.14	.17	−.22	−.23	−.29	−.05	−.17	.06	−.19	−.30
Edmonton	−.33	.04	.00	−.17	.01	.06	.07	−.19	−.12	.06	−.02	.00
Freetown	−.04	.11	−.04	.04	.14	.04	−.01	.12	.00	.26	.18	.26
Georgetown	−.08	−.01	−.01	.05	.19	.06	.00	.09	−.06	.28	.17	.13
Gjesvar	.25	−.02	.02	.05	−.01	−.10	.03	.07	.27	−.11	−.19	.24
Honolulu	−.11	−.08	.12	.27	.14	−.03	−.08	−.05	−.16	−.32	−.04	.27
Irkutsk	−.05	−.25	−.15	−.20	.02	.12	−.08	−.04	.07	−.06	−.06	.02
Ivigtut	.07	−.04	−.23	−.18	−.10	.35	.07	.11	−.03	.03	−.16	.10
Jask	.06	−.38	−.02	−.17	.34	−.17	.01	.04	.45	−.19	−.11	−.07
Juneau	−.19	−.23	−.05	−.02	−.20	−.18	.21	−.16	−.22	−.16	−.17	−.36
Lagos	−.23	−.15	−.24	.05	−.19	−.29	.15	.22	.25	.08	−.09	.05
Madeira	.13	.12	.22	.21	.10	−.05	−.18	−.16	−.06	.17	.40	.30
Madras	−.09	−.04	.17	−.32	−.09	−.05	.10	.06	.16	−.01	.00	−.03
Malden Island	−.12	−.03	.10	−.04	.07	−.10	−.03	−.05	−.04	−.40	−.22	−.20
Manila	−.04	.24	.36	−.14	−.13	−.26	.14	.08	.19	−.21	.17	.10
Markovo	−.14	−.01	.14	−.16	.09	−.06	−.09	.09	−.12	.08	−.04	−.25
Mexico City	−.11	.08	.32	.11	.15	.09	−.26	−.24	−.34	−.10	.06	−.01
Midway Islands	−.29	−.58	.49	.03	.56	.36	−.19	.02	−.12	.37	.23	.53
Montevideo	.05	−.09	−.21	−.21	.31	.31	−.17	.08	.20	−.18	−.39	.04
Moose Factory	.10	.01	−.27	−.10	−.12	−.23	.04	−.25	−.08	.04	.00	.14
Nome	−.51	−.11	−.18	−.15	.02	−.35	−.39	.07	−.25	.07	−.20	−.44
Orenburg	.08	−.06	−.22	−.12	.23	.29	−.23	.08	−.12	−.36	−.30	.27
Perth	−.15	.07	.11	−.13	−.15	−.20	.10	.17	.20	−.03	.07	.04
Ponta Delgada	.24	.02	.09	.19	.00	−.34	−.04	−.08	−.02	−.03	.37	.07
Port au Prince	−.10	−.06	−.02	.04	.12	.11	−.01	−.08	−.03	.05	.11	−.21
Port Moresby	−.04	.03	.20	−.10	−.07	.00	.04	.06	.05	.26	.31	.30
Punta Arenas	.09	.10	.05	−.14	.18	−.05	.16	−.05	−.08	−.13	.03	−.16
Quixeramobin	−.02	.11	.35	.02	−.12	−.14	.31	.27	.14	−.10	.22	.07
Rangoon	.02	.24	.35	−.29	−.17	−.20	.07	.13	.18	.03	.19	−.09
Rio de Janeiro	.12	−.06	.23	−.08	.25	−.02	.11	.10	.36	−.09	.15	−.14
St. Helena	.05	−.10	.24	.08	.22	.21	−.12	.05	−.01	.23	.23	−.02
St. Vincent	−.23	−.11	−.12	.14	.13	.14	.13	.02	.10	.11	.00	.04
Santiago	.23	.21	.10	.02	.19	.20	−.23	−.32	−.17	−.13	−.38	−.40
South Orkneys	−.26	.15	−.20	−.05	.34	.27	.12	.13	−.19	−.35	−.02	.16
Southwest Point	.13	−.08	−.36	.13	−.06	−.04	−.17	−.08	−.02	−.08	.01	.37
Stykkisholm	−.04	−.14	.03	−.20	−.09	.23	.14	−.03	−.13	.03	−.06	−.14
Sydney	−.15	.00	.07	−.06	−.19	.08	−.04	.12	.09	−.06	.13	.15
Tashkent	.04	−.33	.18	−.08	.13	.34	−.08	.09	−.02	−.14	−.09	.33
Tokyo	.00	−.19	−.08	−.04	.10	.18	−.07	.41	.15	−.10	−.14	.17
Upernivik	.03	−.01	−.20	−.09	−.20	.27	−.04	.11	−.03	.01	−.12	.24
Ust Zylma	.09	−.27	−.16	−.08	.25	.03	.03	−.10	−.02	−.26	−.13	.36
Valencia	−.03	−.15	−.07	.13	.03	−.17	.12	−.10	−.09	.09	.24	−.23
Vienna	.14	−.30	−.06	.18	.35	.13	−.19	.06	.16	−.05	.05	−.05
Wellington	−.11	.17	−.15	.05	−.20	−.01	.22	−.11	−.04	.08	−.11	−.10
Winnipeg	−.15	−.01	−.30	−.16	.09	−.22	.21	−.38	.02	.13	.22	−.15
Yakutsk	.12	−.26	−.06	−.04	−.25	.21	.00	.12	−.15	−.01	.27	−.01
Yenisseysk	.22	.09	−.17	.03	.11	.17	−.06	−.16	−.29	.13	−.04	.11
Zanzibar	−.31	.07	.32	−.18	.01	.18	.14	.01	.21	.05	.47	.15
Zi-ka-Wei	.02	−.17	.17	.04	−.01	.07	−.11	.13	.21	−.23	−.27	−.14

TABLE 14.—*Correlation coefficients between foreign pressures and United States temperatures, district 3*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.15	0.32	0.13	0.15	−0.12	−0.11	0.01	−0.07	0.09	0.13	0.32	0.28
Alexandria	.11	.15	−.02	.25	−.10	−.05	−.08	.09	.22	.01	.36	.05
Allahabad	.30	.20	.11	.10	.18	.11	−.25	−.16	−.18	.03	.10	.19
Antananarivo	.10	.29	.44	−.15	.04	−.07	.11	−.03	−.08	.26	−.10	.05
Apia	.08	−.20	−.13	.10	.16	.00	.08	.14	.15	−.18	−.44	−.22
Arequipa	−.02	−.20	−.05	−.12	.24	.06	−.06	−.16	−.16	−.20	−.03	−.18
Batavia	.28	.31	.42	.07	.16	−.09	−.12	−.19	−.14	.07	.18	.17
Bermuda	.03	.01	.11	−.19	−.04	−.18	.24	−.09	−.02	−.19	.06	−.03
Bouzareah	−.20	−.30	.18	.30	.12	.20	−.08	.21	.16	−.20	.43	.10
Bulawayo	.01	.30	.25	.01	.08	.08	.04	.02	−.13	.09	.43	.35
Capetown	−.23	.12	−.14	−.01	.28	−.11	.13	.01	−.16	−.23	.10	.34
Colon	−.21	−.29	−.19	−.27	.34	.19	.22	−.33	.06	−.11	−.11	−.19
Cuyaba	.08	−.07	.00	−.17	.18	−.09	.01	−.12	.01	−.06	−.01	.24
Darwin	.09	.01	.26	−.17	.07	−.10	−.21	−.16	−.14	.14	.27	.31
Dawson	−.28	−.04	−.04	−.22	.18	−.09	−.22	−.20	−.37	−.16	−.09	−.36
Dutch Harbor	−.50	−.30	.31	.05	−.04	−.32	.06	.06	−.04	−.14	.32	.05
Edmonton	−.10	−.05	−.16	−.23	−.11	−.01	.14	−.32	−.18	−.19	.10	−.02
Freetown	−.12	.06	.04	.07	.11	−.10	.00	−.01	−.07	.14	−.05	−.10
Georgetown	−.07	−.13	−.15	.10	.17	.02	.06	.07	.12	.17	.30	.16
Gjesvar	.21	.11	.10	−.20	−.06	.12	.10	.07	−.11	−.02	−.06	.16
Honolulu	−.09	−.38	−.02	.18	.16	−.04	.07	.02	.06	−.18	−.06	.30
Irkutsk	−.18	.12	−.15	.06	−.10	.28	−.08	.12	.04	.20	.01	−.05
Ivigtut	−.20	−.15	−.37	.03	.02	.18	−.07	.06	−.04	−.08	.03	.00
Jask	.25	−.06	−.12	.08	−.18	−.06	.12	−.10	.06	−.02	.18	.21
Juneau	−.49	−.22	.10	−.07	−.15	−.31	.15	−.18	−.43	.15	−.02	.05
Lagos	−.14	.04	−.52	.28	.02	−.47	.00	−.24	−.25	−.18	.09	.23
Madeira	−.17	−.17	.09	.14	.09	−.13	.03	.14	−.03	.16	.35	.32
Madras	.28	.37	.15	−.09	.03	.04	−.20	−.06	−.05	−.01	.02	.06
Malden Island	−.30	−.31	−.28	−.23	.03	−.01	.00	−.01	.00	−.18	−.02	−.23
Manila	.23	.06	.33	.00	.11	−.12	−.19	−.19	−.17	.21	.10	.21
Markovo	.16	−.22	.47	−.01	−.33	−.46	.00	.37	.12	−.14	.22	−.39
Mexico City	−.34	−.15	.02	−.13	−.03	−.12	−.02	−.05	−.09	.01	.12	.11
Midway Islands	−.04	−.47	.30	.30	.44	.51	−.04	.06	.32	−.37	.30	.54
Montevideo	−.03	−.31	−.22	−.24	.31	.15	.06	.07	.28	−.13	−.31	.05
Moose Facotory	.03	.09	−.30	−.16	−.09	−.13	−.04	−.19	.04	.52	.12	.05
Nome	−.38	−.04	.11	−.10	.27	−.40	−.02	.04	.03	−.25	.30	−.34
Orenburg	−.02	−.11	−.12	−.13	−.03	.14	−.04	−.05	.11	−.05	−.03	.08
Perth	.21	.16	.08	.09	.21	.04	−.23	−.35	−.39	−.07	−.13	.00
Ponta Delgada	.03	.01	.23	.08	−.26	.01	−.03	−.03	−.02	−.04	.23	.18
Port au Prince	−.04	−.02	−.12	−.18	.13	.05	.20	−.06	−.09	−.08	.00	−.30
Port Moresby	.28	.17	.13	−.04	−.04	−.04	−.27	−.26	−.30	.14	.02	.47
Punta Arenas	.02	.07	−.03	−.37	.19	−.29	.07	−.14	.02	−.14	−.12	−.14
Quixeramobin	.05	.03	.24	.19	.27	−.03	−.18	−.06	−.36	.11	.11	.08
Rangoon	.15	.17	.26	−.19	.04	−.39	−.34	−.29	−.16	−.16	.15	.14
Rio de Janeiro	.16	−.25	.13	.13	.10	.00	.04	−.11	.30	−.16	.06	−.17
St. Helena	−.14	−.06	.02	−.19	.21	−.06	−.03	−.12	.01	−.14	.24	.08
St. Vincent	−.06	.18	.18	.03	.17	.09	.08	−.10	−.00	.05	.08	.10
Santiago	.01	−.19	.00	−.26	−.02	−.18	.02	−.09	−.02	−.16	−.48	−.25
South Orkneys	−.07	.19	−.18	.00	.13	.04	.30	.29	.18	−.10	−.34	.09
Southwest Point	.03	−.25	−.25	.15	.08	−.24	.35	.02	.09	.00	−.05	.15
Stykkisholm	−.17	−.23	−.26	−.21	−.05	.06	.03	.00	−.12	−.16	.00	−.22
Sydney	.11	−.06	.33	.12	.19	.06	.02	.28	−.20	.16	.11	.32
Tashkent	−.06	−.05	.17	.04	−.01	.25	.08	.14	−.04	−.08	.41	.19
Tokyo	.01	−.16	.24	−.07	.00	−.10	−.09	.35	.08	−.27	.02	.41
Upernivik	.04	−.11	−.34	.17	.04	.08	.09	.28	.10	−.13	−.09	.05
Ust Zylma	.06	−.06	−.05	−.09	.11	.05	.18	−.16	.24	−.18	−.10	.16
Valencia	.04	−.11	−.06	−.02	.06	−.14	.15	.14	−.10	.12	−.12	−.14
Vienna	.18	−.13	−.05	−.05	.09	−.02	−.02	.00	.04	.05	.04	−.04
Wellington	−.22	−.04	−.26	.11	−.11	−.10	.17	.12	−.16	.50	−.40	.07
Winnipeg	−.04	−.03	−.34	−.17	.02	−.17	.00	−.46	.04	.23	.00	−.14
Yakutsk	.14	.08	−.11	−.12	−.08	.19	−.03	.20	−.18	−.09	.05	−.03
Yenisseysk	.12	−.02	−.03	−.10	−.04	.14	−.01	−.13	−.05	−.04	.13	−.06
Zanzibar	−.24	.30	.21	.18	.07	.11	.07	.04	−.06	−.02	.30	.27
Zi-ka-Wei	−.14	−.15	.02	.02	−.03	.13	.11	−.14	.05	−.27	.01	.00

TABLE 15.—*Correlation coefficients between foreign pressures and United States temperatures, district 4*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.06	0.15	0.24	0.11	-0.21	-0.23	-0.07	0.00	0.13	0.04	0.02	0.17
Alexandria	.32	-.04	.16	.16	-.05	-.12	-.14	.26	.10	-.19	.20	.22
Allahabad	.13	.20	.15	-.28	-.11	.06	-.17	-.17	-.06	.13	-.18	.12
Antananarivo	-.09	.14	.34	-.30	-.18	-.28	.04	.11	-.08	.26	.27	.01
Apia	.09	.03	-.05	.28	.16	.18	-.18	.10	.24	-.06	-.14	.01
Arequipa	.18	.02	.20	-.33	.07	-.03	-.14	-.13	-.16	-.11	.16	.02
Batavia	-.10	.13	.39	-.23	-.17	-.25	.11	.18	-.01	.16	.00	.02
Bermuda	.12	.25	.10	.04	.07	-.03	.10	-.15	.01	-.02	.25	.09
Bouzareah	.01	-.22	.25	.34	.06	.01	-.15	.12	.21	.00	.35	.15
Bulawayo	.07	.15	.26	-.16	-.25	.05	.14	.04	-.29	.19	.34	-.11
Capetown	-.16	.17	.01	.06	.27	.03	.08	.06	-.13	-.05	.13	.16
Colon	-.25	-.05	-.11	-.20	.36	.30	-.04	-.09	.13	-.26	-.27	-.53
Cuyaba	-.02	-.17	.04	.04	.12	.07	.10	.11	.39	.16	-.17	.12
Darwin	-.14	-.10	.29	-.32	-.17	-.26	-.26	-.08	-.12	.22	.11	.04
Dawson	-.22	-.05	-.23	-.09	.04	-.14	-.11	-.15	-.44	.23	-.16	.05
Dutch Harbor	-.43	-.16	.01	.27	.00	-.14	.07	.01	-.18	.11	-.11	-.26
Edmonton	.01	-.04	-.02	-.16	-.06	-.33	-.09	-.31	-.16	.25	.12	-.09
Freetown	-.12	.14	-.08	-.02	.10	-.12	.12	.17	.08	.29	.01	-.02
Georgetown	-.06	-.02	-.52	.03	.19	-.01	.12	.19	.17	.18	.17	.15
Gjesvar	.22	.02	-.07	-.14	.02	-.08	.10	-.18	-.07	-.02	-.07	.00
Honolulu	-.19	-.17	.11	.08	.08	.01	-.11	-.05	-.16	-.03	.12	.50
Irkutsk	-.06	-.20	-.13	.15	-.02	.22	-.13	-.06	-.02	-.09	-.15	-.24
Ivigtut	-.04	-.01	-.25	-.00	-.02	.30	.08	.08	-.10	-.07	-.08	-.24
Jask	.10	.33	-.01	-.07	-.36	-.11	.09	.10	.31	-.18	-.06	.32
Juneau	-.18	-.18	-.01	.02	.20	-.13	.36	-.37	-.32	.23	-.13	-.37
Lagos	-.27	-.12	-.27	.13	-.09	-.36	.06	.15	.07	-.01	-.05	.06
Madeira	-.02	.08	.19	-.22	-.10	-.04	-.05	.11	-.03	.08	-.20	-.04
Madras	.04	.21	.24	.11	-.22	-.13	-.07	-.06	.04	.21	.45	.42
Malden Island	-.20	-.12	.03	-.15	-.02	.01	-.05	.25	-.32	-.26	-.26	-.23
Manila	.02	.26	.39	-.16	-.05	-.12	-.05	-.09	-.12	-.17	-.09	.07
Markovo	-.01	.03	.17	-.04	.09	-.07	.01	.14	.07	.41	.13	-.44
Mexico City	-.15	.04	.31	-.11	-.07	-.27	.03	.06	-.02	.13	.27	.30
Midway Islands	-.28	-.61	.39	.01	.54	.52	-.07	.04	.28	-.32	.25	.58
Montevideo	.05	-.12	-.18	-.13	.36	.32	-.18	-.09	.34	-.11	-.42	.10
Moose Factory	-.02	-.01	-.22	-.02	-.13	.22	.03	-.14	.08	.20	.06	.28
Nome	-.40	.08	-.05	.02	.20	-.34	-.07	.07	-.19	.06	.00	-.52
Orenburg	.05	-.08	-.23	-.16	.09	.23	.13	-.14	.01	-.13	-.12	-.08
Perth	-.09	.03	.14	-.21	-.14	-.21	-.15	-.05	-.05	.24	.04	.01
Ponta Delgada	.19	.08	.18	.24	-.30	-.27	-.01	-.05	.15	.06	.35	.28
Port au Prince	-.08	-.08	-.08	-.10	.11	.01	.15	-.07	.17	-.14	.13	-.11
Port Moresby	-.05	.01	.16	-.18	-.09	-.12	-.13	-.09	-.12	.19	.06	.35
Punta Arenas	.07	.06	.01	-.28	.23	-.18	.05	-.10	.14	-.32	-.21	.07
Quixeramobin	-.06	.07	.23	-.04	-.02	-.30	.11	.14	-.10	.10	.11	.17
Rangoon	-.01	.31	.35	.00	-.02	-.02	-.22	-.20	-.16	.10	-.08	-.04
Rio de Janeiro	.07	-.07	.24	-.03	.28	-.01	.21	.04	.48	-.07	-.07	.04
St. Helena	.08	-.03	.26	.00	.17	.20	.02	.06	.08	.14	.18	.04
St. Vincent	.31	-.13	-.05	.04	.17	.02	.14	-.01	.22	.02	-.10	.30
Santiago	.09	.16	-.10	-.17	.12	.13	-.24	-.21	-.15	.08	-.12	.01
South Orkneys	-.23	.15	-.19	-.13	.22	.21	.19	.11	.16	-.24	-.11	.18
Southwest Point	.11	-.06	-.28	.16	-.06	-.08	.16	-.05	.10	.17	.17	-.29
Stykkisholm	-.02	-.14	-.06	-.12	.11	-.20	.08	-.01	-.21	-.05	-.16	-.30
Sydney	-.05	-.05	.16	.04	-.14	.08	.09	.33	-.12	.26	.06	.00
Tashkent	-.03	-.27	.14	.02	.24	.04	-.04	.09	.32	-.29	.04	.14
Tokyo	-.06	-.19	.00	.05	.14	.15	.05	.41	.13	-.22	-.02	.22
Upernivik	.06	-.01	-.23	.14	-.15	.18	.00	.29	-.09	-.03	-.08	.02
Ust Zylma	.10	-.27	-.19	-.14	.19	.10	.19	-.27	.08	-.11	-.05	-.07
Valencia	.03	-.08	.00	.25	.10	-.13	.13	.11	-.08	.12	-.18	-.02
Vienna	.18	-.28	-.02	.19	.24	.15	-.01	.13	.36	-.14	.06	-.04
Wellington	-.05	.13	-.14	.13	-.11	.00	.17	-.06	-.07	.30	-.36	-.08
Winnipeg	-.05	-.05	-.31	-.13	.00	-.28	.10	-.35	.14	.28	-.14	-.17
Yakutsk	.20	-.18	-.03	.05	-.16	.26	-.10	.00	-.13	-.07	.22	-.19
Yenisseysk	.16	.12	-.31	.03	.06	.10	-.01	-.24	-.23	.07	.08	-.09
Zanzibar	-.26	.15	.39	.09	.10	.02	-.14	.08	.06	.16	.41	.14
Zi-ka-Wei	.02	-.15	.17	.05	.06	.10	-.11	.03	.17	-.38	-.07	-.14

TABLE 16.—*Correlation coefficients between foreign pressures and United States temperatures, district 5*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.24	0.48	0.21	0.21	0.08	0.08	−0.15	−0.19	0.09	0.12	0.24	0.09
Alexandria	.23	.27	.09	.25	−.14	−.09	−.09	.09	.22	−.18	.30	−.05
Allahabad	.38	.27	.26	.08	.04	.19	−.08	−.08	−.12	−.07	.06	.12
Antananarivo	−.03	.23	.23	.05	.12	.03	.12	.13	.06	.19	.16	−.15
Apia	.10	−.27	−.08	.10	.22	.18	.13	.18	.34	.02	−.05	.00
Arequipa	.02	−.10	.00	−.11	.34	.19	−.05	−.05	−.02	.09	.10	.13
Batavia	.32	.35	.43	.15	.14	−.18	−.23	−.10	−.24	−.02	.14	.06
Bermuda	.08	.11	.16	−.20	−.05	−.04	.24	.02	.09	−.11	.09	.07
Bouzareah	−.16	−.18	.31	.21	.12	−.11	.00	.25	.30	.03	.45	−.03
Bulawayo	.02	.25	.16	−.07	.05	−.13	.10	−.08	−.10	−.15	.32	.06
Capetown	−.18	.11	−.11	.13	.26	−.23	.04	−.08	−.04	−.33	.06	.14
Colon	−.26	−.28	−.17	−.17	.34	.35	.20	−.10	.36	.10	−.14	−.02
Cuyaba	.12	.00	.04	−.22	.15	−.05	.26	−.04	.15	−.13	.16	.15
Darwin	.23	.08	.31	−.01	.15	−.14	−.19	−.17	−.22	.12	.23	.30
Dawson	−.19	.00	−.04	−.18	.13	−.15	−.11	.00	−.19	−.23	.03	−.13
Dutch Harbor	−.41	−.20	.17	−.01	.02	−.31	.22	.12	−.11	−.06	.35	.18
Edmonton	.07	.03	−.07	.00	−.12	−.01	−.10	−.12	−.05	−.12	.31	.18
Freetown	−.04	.20	.15	.24	.24	−.07	.02	.06	.06	.06	−.02	−.14
Georgetown	.03	.05	−.01	.06	.15	.00	.22	.29	.27	.14	.39	.20
Gjesvar	.25	.18	−.17	−.27	−.30	.07	.06	−.01	−.13	.07	−.14	.05
Honolulu	−.26	−.45	−.02	.11	.18	.14	−.01	−.05	.17	−.08	−.09	.27
Irkutsk	−.28	.00	−.22	.10	.00	.15	−.21	.16	.14	.12	−.02	−.25
Ivigtut	−.10	−.08	−.33	.10	.17	.00	−.04	−.14	.00	−.20	.04	−.18
Jask	.37	−.12	.00	−.04	−.29	−.19	.08	−.18	.06	−.25	−.03	.11
Juneau	−.22	−.13	.02	−.09	−.28	−.31	.31	−.09	−.31	.09	.13	.10
Lagos	−.12	.01	−.22	.11	.02	−.46	.04	−.24	−.26	−.24	−.09	.14
Madeira	−.02	.15	.32	.17	.10	.01	.10	.08	.09	.18	.24	.31
Madras	.29	.36	.20	.08	.05	.02	−.12	−.02	−.11	−.11	−.08	−.04
Malden Island	−.22	−.18	−.11	−.11	.19	.16	.13	.27	.16	−.03	−.07	−.01
Manila	.29	−.07	.34	.00	.12	−.08	−.12	−.15	−.23	−.17	−.01	−.02
Markovo	.26	−.10	.36	−.05	−.49	−.63	.02	.16	−.10	−.23	.21	−.49
Mexico City	−.26	−.06	.28	.02	.17	−.01	.09	.04	−.07	−.06	−.04	.08
Midway Islands	−.12	−.48	.21	.11	.42	.68	.00	−.15	.40	−.22	.21	.39
Montevideo	−.14	−.29	−.26	−.22	.24	.05	−.07	−.20	.36	−.26	−.31	−.04
Moose Factory	.09	.08	−.14	−.04	−.06	−.09	−.02	−.11	.03	.57	.23	.28
Nome	−.25	.05	.02	−.05	.35	−.50	.06	.23	−.14	−.24	.43	−.20
Orenburg	−.20	−.02	−.32	−.05	−.02	.09	−.16	−.12	.12	−.05	−.09	−.11
Perth	.28	.03	.11	.03	−.01	−.09	−.32	−.04	−.23	.08	−.02	.13
Ponta Delgada	.02	.25	.31	.24	−.21	.00	.05	−.05	.18	.06	.05	.27
Port au Prince	.18	.13	.03	−.06	.16	.07	.36	.14	−.04	.09	.18	.04
Port Moresby	.31	.19	.04	−.10	−.02	−.17	−.24	−.23	−.35	.21	−.21	.22
Punta Arenas	−.01	.06	−.12	−.17	.30	−.36	.14	−.03	.05	−.23	−.15	.09
Quixeramobin	−.01	.00	.18	.05	.12	−.31	.18	.03	−.16	.10	.09	.05
Rangoon	.22	.12	.29	.18	−.03	−.16	−.18	−.07	−.19	−.17	.14	.06
Rio de Janeiro	.18	−.17	.16	.17	.30	.08	.33	−.15	.48	−.12	−.07	−.09
St. Helena	.14	.07	.32	.09	.09	.11	−.17	−.11	.07	−.21	.28	.22
St. Vincent	.00	.18	.16	−.12	.16	.03	.42	.08	.05	−.01	.11	.23
Santiago	−.05	−.23	−.01	−.18	.05	.04	.01	−.15	−.15	.05	−.19	.10
South Orkneys	−.15	.25	−.27	.02	.20	.00	.29	.30	.16	.07	−.50	.15
Southwest Point	.13	−.20	−.10	.06	.04	−.28	.32	−.20	.15	−.01	−.14	.03
Stykkisholm	−.10	−.27	−.31	−.08	.12	.07	−.10	−.05	−.04	−.13	.03	−.23
Sydney	.14	−.15	.25	.14	.12	−.03	−.12	.18	−.27	.17	−.07	−.06
Tashkent	−.08	−.17	.12	.17	−.12	.13	.06	.08	.06	−.12	.24	.08
Tokyo	−.09	−.17	.16	.12	.15	.18	'00	.42	.17	−.23	−.03	.30
Upernivik	−.12	−.07	−.32	.12	.09	−.04	−.02	.04	.13	−.01	−.03	−.11
Ust Zylma	−.02	.04	−.27	−.09	.06	.08	−.02	−.16	.20	−.17	−.30	−.09
Valencia	−.09	−.07	−.08	−.05	.14	−.09	−.11	.10	−.04	−.07	−.30	−.23
Vienna	.17	−.08	.03	−.19	.05	.02	.08	.08	.18	.11	.16	−.15
Wellington	−.17	−.10	−.30	.16	.00	−.11	.04	−.02	−.16	.38	−.34	.10
Winnipeg	.14	.05	−.30	.03	.08	−.16	.01	−.27	.11	.13	.23	.09
Yakutsk	.14	.11	−.14	−.02	−.19	.07	−.15	.18	−.26	−.19	−.05	−.09
Yenisseysk	.00	−.02	−.16	−.02	.14	.13	−.20	−.11	−.02	−.15	.08	−.15
Zanzibar	−.08	.37	.29	.14	.30	.18	.04	.12	−.12	.01	.35	.16
Zi-ka-Wei	−.05	−.06	.24	.13	.23	.16	.06	.23	.28	−.21	.07	−.12

TABLE 17.—*Correlation coefficients between foreign pressures and United States temperatures, district 6*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	−0.10	−0.02	0.23	−0.03	−0.20	−0.15	−0.26	0.01	−0.02	0.21	0.04	0.02
Alexandria	.46	.12	.16	.25	.13	−.08	−.16	.07	.07	.00	.05	−.27
Allahabad	−.15	.17	.18	−.56	−.40	.09	−.14	−.17	−.16	.05	−.03	.05
Antananarivo	−.10	.02	.39	−.37	−.39	−.20	.09	.01	.16	.27	.38	.04
Apia	.21	.23	.18	.32	−.01	.23	−.01	.23	.26	.04	−.09	−.04
Arequipa	.25	.26	.28	−.35	−.07	.08	−.23	.14	.11	.00	.14	−.08
Batavia	−.32	−.22	.30	−.18	−.37	−.29	.08	−.13	−.18	−.02	.11	.11
Bermuda	−.01	.32	−.07	.08	−.07	.10	.05	−.10	.07	−.14	.17	.02
Bouzareah	.16	−.22	.23	.34	.10	.00	−.14	−.06	.10	−.06	.18	−.15
Bulawayo	−.07	−.10	.15	−.27	−.12	.10	.01	−.25	−.40	.10	.47	.06
Capetown	−.01	.06	.13	−.10	.20	.16	−.13	−.13	−.09	−.13	.22	.05
Colon	.08	.16	−.06	−.02	.38	.43	−.07	.12	.36	−.12	−.18	−.57
Cuyaba	−.04	.19	−.09	−.18	.04	.16	.19	.13	.20	.09	−.10	−.04
Darwin	−.33	−.33	.29	−.51	−.38	−.34	−.05	−.12	−.06	.11	.30	.15
Dawson	−.18	−.07	−.24	.06	.02	−.16	.04	−.02	−.45	.13	−.21	−.39
Dutch Harbor	−.01	.23	−.31	.15	.11	.01	.16	.08	−.24	.03	−.21	−.42
Edmonton	.00	−.03	.03	.05	.03	.02	.07	−.05	.12	−.08	.08	−.00
Freetown	.16	.02	−.09	−.04	−.01	−.11	.09	.28	.19	.18	.12	−.04
Georgetown	.04	.06	−.03	−.06	.11	−.07	−.13	.21	−.05	.19	.11	.18
Gjesvar	.32	−.02	−.01	−.16	−.13	−.10	.18	.04	.05	−.12	.09	.23
Honolulu	−.06	.06	.24	−.04	−.07	.17	−.22	.03	−.31	−.09	.09	.34
Irkutsk	.05	−.32	−.08	.21	.12	.16	.08	.12	−.05	.10	.09	−.13
Ivigtut	.14	.04	.06	.02	.24	.31	.16	.19	−.06	−.04	.07	.11
Jask	−.15	−.14	−.07	−.12	−.27	.12	−.39	.23	.21	−.30	−.16	−.02
Juneau	−.05	.02	−.24	.14	−.14	−.03	.30	−.34	−.49	.16	−.06	−.58
Lagos	−.37	−.32	.08	−.04	−.26	−.25	−.12	−.07	−.18	.14	−.18	−.08
Madeira	.09	−.03	.07	.16	−.10	−.18	−.07	−.05	.17	.18	.29	.26
Madras	−.27	−.16	.20	−.25	−.22	−.04	−.11	−.05	−.19	.06	−.09	.00
Malden Island	.28	.06	.13	−.26	−.09	−.16	.00	.01	.16	−.24	−.31	−.26
Manila	−.18	.35	.35	−.40	−.27	−.01	−.14	−.15	−.31	−.23	.03	.06
Markovo	−.07	.01	.33	−.08	.36	.14	.23	.09	.12	−.22	.25	−.40
Mexico City	.01	−.03	.35	.21	.14	.14	−.07	.01	.04	.01	−.14	.04
Midway Islands	−.23	−.46	.00	.24	.48	.51	.03	.00	.30	−.13	.07	.49
Montevideo	.06	.03	−.09	−.08	.36	.37	−.32	−.04	.10	−.07	−.25	.05
Moose Factory	−.07	.11	−.08	.07	−.14	−.53	−.16	−.01	.04	.02	−.18	.19
Nome	−.14	.15	−.04	.14	.33	−.05	.02	.15	−.31	−.02	−.08	−.51
Orenburg	.06	−.16	−.22	−.10	.26	.22	−.24	−.18	.15	−.28	−.14	.15
Perth	.24	−.13	.25	−.20	−.20	−.36	.06	−.32	−.05	.07	.12	.11
Ponta Delgada	.24	.03	.15	.28	−.12	−.33	.01	−.05	.01	.06	.18	.08
Port au Prince	.00	−.11	−.13	.09	−.16	−.02	.15	.09	−.05	.06	−.02	−.07
Port Moresby	−.45	−.39	.14	−.41	−.46	−.28	−.11	−.33	−.25	.08	.14	.17
Punta Arenas	.05	.02	.08	−.14	.17	−.04	−.24	.09	.04	−.07	.06	.01
Quixeramobin	−.11	−.06	.12	−.22	−.18	−.29	.03	.32	−.18	−.09	.04	.01
Rangoon	−.27	.39	.30	−.45	−.43	−.06	−.07	−.15	−.21	−.05	.14	−.19
Rio de Janeiro	.03	.06	.17	−.10	.25	.11	−.11	.22	.49	.11	−.11	−.13
St. Helena	.15	−.11	.22	−.18	−.10	−.10	−.14	−.01	−.09	.01	−.02	−.03
St. Vincent	−.18	−.17	.06	−.13	−.27	−.01	−.13	−.19	−.22	.13	−.05	.19
Santiago	−.02	.32	.11	.04	.04	.20	−.05	−.07	−.05	−.09	−.26	.08
South Orkneys	−.16	.12	−.18	−.15	.36	.02	.13	−.09	.18	−.27	.11	.10
Southwest Point	.08	.13	−.21	.19	.00	.06	.00	−.01	.12	−.08	.00	.23
Stykkisholm	.23	.00	.00	−.05	.14	.14	.07	.25	−.15	.06	.10	−.03
Sydney	−.06	−.17	.08	−.27	−.18	−.16	−.20	.01	−.02	−.02	−.03	.07
Tashkent	.07	−.23	.09	−.05	.35	.36	−.14	.08	.10	.03	−.16	.22
Tokyo	−.07	−.18	−.05	−.14	−.08	.19	.03	.15	−.14	.06	−.06	.27
Upernivik	.17	.12	−.08	.09	.14	.27	.05	.18	−.19	.14	.12	.29
Ust Zylma	.07	−.27	−.30	−.10	−.03	−.06	.04	−.16	.00	−.28	−.12	.25
Valencia	.07	−.12	.07	.35	.12	−.09	.16	.27	−.06	.10	.12	−.28
Vienna	.14	−.35	.18	−.06	.17	.20	.01	.19	.17	.01	.16	−.27
Wellington	.17	.25	−.04	.31	−.03	−.16	−.25	−.06	.08	.14	.04	.04
Winnipeg	.04	−.05	−.16	−.08	.04	−.34	−.07	−.19	.24	.12	−.08	−.12
Yakutsk	.19	−.21	.14	.04	−.06	.23	.17	.01	−.24	.09	.47	−.08
Yenisseysk	.24	−.12	−.16	.03	.03	.02	.14	.05	−.06	.06	.20	.19
Zanzibar	−.01	.03	.36	−.11	.13	.11	.09	.17	.26	.15	.51	.15
Zi-ka-Wei	.08	−.03	.22	.09	−.02	.14	.22	.17	.09	.07	.13	−.08

TABLE 18.—*Correlation coefficients between foreign pressures and United States temperatures, district 7*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.28	0.47	0.29	0.27	0.16	0.24	−0.03	−0.10	0.20	0.01	0.02	−0.08
Alexandria	.20	.40	.13	.21	−.08	−.04	−.02	.01	.16	−.25	.04	−.13
Allahabad	.32	.14	.28	−.05	−.05	.22	.06	.06	.12	−.15	−.08	−.06
Antananarivo	−.23	.31	.39	.12	.14	−.05	.11	.06	.11	−.11	.17	−.29
Apia	−.12	−.36	−.45	.01	.25	.12	.60	.32	.61	.19	.12	.34
Arequipa	−.04	−.05	.00	−.06	.24	.16	−.26	−.17	.01	.00	−.03	.15
Batavia	.48	.27	.35	.10	.07	−.09	−.05	−.06	−.13	−.22	−.10	−.14
Bermuda	−.04	.06	−.02	.01	.08	−.01	.29	.03	.18	−.06	−.13	−.03
Bouzareah	−.01	−.10	.30	.15	.08	−.13	.18	.22	.48	−.09	.24	−.22
Bulawayo	.06	.08	.01	−.06	.12	−.14	.01	−.16	−.24	−.28	−.04	−.05
Capetown	−.09	.06	−.12	.20	.19	−.19	.06	.10	.18	−.29	.00	−.18
Colon	−.23	−.19	−.06	−.11	.08	.22	.02	−.30	.44	.05	.08	.29
Cuyaba	.23	−.04	.13	−.04	.20	−.04	.26	.10	.49	−.35	−.22	−.21
Darwin	.28	.16	.25	−.06	.08	−.05	−.18	−.13	−.02	−.08	−.18	.11
Dawson	−.06	.13	.08	−.10	−.04	−.24	−.10	−.07	−.29	−.19	.36	.02
Dutch Harbor	−.25	−.06	.10	−.14	.02	−.13	.09	−.04	−.32	−.08	.35	.00
Edmonton	.21	.06	−.14	.07	−.14	.01	−.04	−.04	.19	−.12	.33	.03
Freetown	.09	.19	.28	.17	.23	−.25	.21	.19	.26	−.14	.00	−.25
Georgetown	.03	−.02	.04	−.10	.04	−.10	.24	.37	.32	−.08	.19	.00
Gjesvar	−.07	.31	−.22	−.12	−.05	.18	.14	.13	−.15	.02	−.23	−.17
Honolulu	−.27	−.34	−.01	.05	.11	.14	−.05	.03	.09	.07	−.08	.18
Irkutsk	−.24	.06	−.07	.06	.07	.09	−.04	.26	.22	.14	.00	−.38
Ivigtut	−.06	−.02	−.21	.12	.35	−.07	−.10	−.15	−.02	−.20	.13	−.17
Jask	.39	.06	−.04	−.13	−.21	−.15	−.05	−.27	−.04	−.15	.04	.11
Juneau	.10	.03	−.02	−.18	−.45	−.27	.29	−.09	−.15	.06	.27	−.11
Lagos	−.07	−.02	.04	−.06	−.16	−.42	.05	−.23	−.38	−.24	−.18	−.02
Madeira	.04	.16	.22	.29	.12	.13	.37	.22	.46	−.04	.02	.04
Madras	.29	.32	.25	.10	.03	.09	−.07	−.10	−.09	−.13	−.16	−.08
Malden Island	−.15	−.28	−.42	−.13	.12	.11	.19	.29	.41	.00	−.12	.04
Manila	.34	−.11	.29	−.04	.08	.07	−.06	−.07	−.16	.02	−.08	−.07
Markovo	.14	.16	.26	−.18	−.40	−.48	.11	.14	−.12	−.36	.18	−.31
Mexico City	−.11	.06	.11	.20	−.01	−.11	.21	.05	.53	.44	.36	.39
Midway Islands	.09	−.27	.00	.14	.29	.39	.31	−.17	.55	.29	.02	.10
Montevedio	−.29	−.27	−.14	−.09	.21	.04	.14	−.14	.27	−.22	.01	−.20
Moose Factory	.13	−.05	.00	−.01	.09	−.01	−.04	−.29	−.06	.39	.28	.23
Nome	−.23	.02	−.04	−.07	.29	−.42	.07	.14	−.19	−.24	.50	−.13
Orenburg	−.29	.17	−.30	.07	.11	.07	−.12	.04	.14	−.09	.04	−.24
Perth	.36	.04	.31	.19	−.04	−.01	−.02	−.34	−.46	.15	.06	.28
Ponta Delgada	.06	.36	.24	.25	−.07	.17	.08	−.02	.24	.06	−.09	.09
Port au Prince	.04	.05	.02	−.01	−.11	−.01	.26	.08	.12	.01	−.01	.17
Port Moresby	.34	.18	−.03	−.27	−.17	−.26	−.18	−.11	−.25	.05	−.32	−.12
Punta Arenas	−.15	.02	−.25	−.13	.23	−.28	.30	.01	.08	−.14	.05	−.05
Quixeramobin	.21	.05	.24	−.18	−.11	−.35	.11	.01	−.04	−.01	.00	.00
Rangoon	.26	.06	.24	−.08	−.13	.05	.01	−.10	−.06	−.25	−.23	−.18
Rio de Janeiro	.13	−.01	.15	−.02	.12	.03	.24	−.16	.46	−.25	−.29	−.16
St. Helena	−.04	−.03	.23	.11	−.01	.13	−.22	−.06	.07	−.19	.01	.20
St. Vincent	.19	.32	.23	.09	.20	−.08	.20	.13	.21	−.12	.04	.06
Santiago	−.10	−.28	−.07	−.08	.08	−.02	−.04	−.20	−.08	−.08	.01	.24
South Orkneys	−.25	−.02	−.30	.04	.15	−.03	.26	.24	.28	.07	−.16	−.24
Southwest Point	.06	−.08	.03	.09	.11	−.19	.35	−.14	.24	−.03	−.07	−.07
Stykkisholm	−.04	−.18	−.20	−.16	.13	−.17	−.05	.00	−.27	−.10	−.05	−.17
Sydney	.30	−.10	.14	.05	.11	−.19	−.13	−.08	−.28	.01	−.04	.08
Tashkent	−.09	.18	.10	.37	−.24	−.02	.21	.10	.25	.04	.16	−.06
Tokyo	−.07	.12	.36	.19	−.08	−.02	.02	.34	.05	−.47	−.22	−.09
Upernivik	−.12	−.14	−.23	.03	.22	−.02	−.07	.00	−.04	.00	.15	−.21
Ust Zylma	−.20	.22	−.28	−.04	.18	.02	.02	.07	.06	−.08	−.33	−.23
Valencia	−.09	.08	.07	−.19	.11	−.16	.07	.06	.02	−.32	−.30	−.06
Vienna	.11	.05	.13	−.10	−.06	−.20	.18	.12	.29	−.19	.00	−.30
Wellington	.02	−.08	−.19	.15	.13	−.08	.08	−.10	−.13	.16	−.11	.14
Winnipeg	.34	.03	−.15	.07	.16	−.02	−.08	−.22	.23	.00	.43	.08
Yakutsk	.12	.24	.00	−.16	−.15	.02	−.30	.14	−.38	−.20	−.17	−.10
Yenisseysk	−.21	.10	−.08	−.09	.00	−.08	−.03	.18	.13	−.26	−.05	−.25
Zanzibar	−.03	.31	.23	.06	.28	.16	.03	−.06	−.07	.00	.18	.04
Zi-ka-Wei	−.06	−.02	.18	.09	.15	.11	−.10	.25	.22	.00	−.03	−.16

Table 19.—*Correlation coefficients between foreign pressures and United States temperatures, district 8*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	–0.07	0.02	0.23	–0.22	–0.22	–0.18	–0.23	–0.24	–0.12	0.08	–0.04	–0.15
Alexandria	.37	–.07	.14	.04	.10	–.37	–.12	–.13	.00	–.25	–.08	–.24
Allahabad	–.07	.18	.11	–.46	–.50	.06	.09	–.31	.22	–.15	–.07	.06
Antananarivo	.00	.02	.13	–.26	–.17	–.33	.17	–.13	.33	.13	.29	–.09
Apia	.19	.08	–.10	.33	.13	.45	.09	.24	.27	.11	.14	.05
Arequipa	.39	.24	.21	–.30	.22	.36	–.15	.01	.29	–.27	.10	.08
Batavia	–.18	–.16	.19	–.37	–.45	–.35	–.13	–.26	–.45	–.12	–.05	–.08
Bermuda	–.12	.25	.01	.24	.00	.08	.22	.23	.16	–.04	.04	.02
Bouzareah	.14	–.05	.13	.13	.04	–.18	–.19	.00	.29	–.55	.18	–.12
Bulawayo	–.05	–.29	–.05	–.38	–.22	.22	–.21	–.41	–.24	–.20	.19	–.01
Capetown	.08	–.10	.02	–.35	.16	.11	–.10	–.22	.13	–.25	.18	–.15
Colon	–.03	.07	–.14	.11	.09	.45	.14	.17	.37	.01	.16	–.18
Cuyaba	.02	.10	–.28	–.30	–.10	.10	.29	–.06	–.07	–.10	.18	.20
Darwin	–.16	–.24	.16	–.63	–.54	–.47	–.09	–.30	–.20	.01	.05	.07
Dawson	–.03	.00	–.21	.40	.56	–.02	–.12	.44	–.14	.08	–.03	–.23
Dutch Harbor	–.06	.06	–.24	.16	.13	–.04	.11	.37	–.20	–.12	.25	–.25
Edmonton	.11	.09	.13	.04	–.10	.16	–.05	.34	.22	.00	.12	–.10
Freetown	–.07	.12	.01	.04	.02	–.11	.07	.18	.14	–.14	–.05	–.18
Georgetown	.06	.11	.12	–.36	–.32	–.24	.00	.15	–.05	.03	.16	.13
Gjesvar	.02	–.07	–.28	–.18	.22	–.12	.15	–.04	–.07	.12	–.20	.05
Honolulu	–.09	.01	.11	–.18	–.04	.38	–.10	–.24	.00	.09	.03	.20
Irkutsk	–.01	–.31	–.12	.05	–.04	.08	–.13	.16	.06	.14	.11	–.23
Ivigtut	.14	–.40	–.04	.01	.34	.08	.08	–.06	–.02	–.08	.26	–.09
Jask	–.13	–.32	.00	–.07	–.25	.02	–.39	–.25	–.29	–.39	–.18	–.08
Juneau	.00	–.10	–.19	.14	–.16	–.09	.23	.19	–.12	.09	.22	–.46
Lagos	–.31	–.38	.01	–.12	–.11	–.32	–.15	–.18	–.30	–.26	–.13	–.24
Madeira	.13	.18	.36	.04	.12	–.10	.00	.02	.36	.14	.24	.09
Madras	–.17	–.22	.12	–.22	–.42	–.06	–.17	–.24	–.38	–.14	–.15	.00
Malden Island	–.07	.03	.05	.15	.33	.31	.22	.40	.34	.26	–.19	.03
Manila	–.08	.21	.26	–.42	–.38	.47	–.16	–.31	–.46	–.08	–.03	.07
Markovo	–.04	.09	.42	.21	.12	.26	.01	.22	–.15	–.56	.26	–.29
Mexico City	.22	.21	.31	.14	.09	.06	.34	.30	.41	.17	.00	.18
Midway Islands	–.21	–.38	–.40	–.30	.10	.42	.12	–.35	–.25	.30	–.12	.17
Montevideo	–,02	–.07	–.25	–.08	.24	.31	.19	–.16	.15	–.08	.06	–.23
Moose Factory	.05	.00	–.04	–.01	–.21	–.20	–.45	–.13	–.08	.15	.06	.03
Nome	–.17	.19	–.04	.33	.46	–.15	–.06	.07	–.02	–.21	.22	–.24
Orenburg	–.13	–.22	–.24	–.02	.11	.16	–.32	–.06	.30	–.18	–.06	–.07
Perth	–.12	–.08	.20	–.41	–.48	–.34	–.09	–.34	–.19	–.01	–.12	.13
Ponta Delgada	.14	.26	.25	.22	–.11	–.07	–.19	–.12	.23	.03	–.06	–.07
Port au Prince	.11	–.06	–.06	.12	–.37	–.17	.24	.40	.02	.01	.06	.20
Port Moresby	–.21	–.14	–.05	–.58	–.59	–.52	–.06	–.49	–.39	–.07	.06	–.04
Punta Arenas	.07	–.13	–.09	–.34	.26	–.35	–.07	.19	.20	–.24	.29	–.12
Quixeramobin	–.04	–.01	.12	–.23	–.27	–.23	.18	–.07	–.28	–.12	.12	.07
Rangoon	–.16	.34	.25	–.26	–.42	.24	–.03	–.30	–.32	–.17	–.09	–.08
Rio de Janeiro	–.09	.07	.16	–.03	.37	.46	.10	.01	.15	.03	–.09	.00
St. Helena	.25	–.22	.29	–.17	–.32	.09	–.20	–.04	.04	.02	.04	–.03
St. Vincent	–.35	–.32	–.13	–.04	–.32	–.46	–.14	–.21	–.22	–.14	.02	.16
Santiago	–.20	.30	.12	.00	.14	.41	.36	.07	.12	–.02	–.03	.03
South Orkneys	–.14	.03	–.13	–.30	.22	–.14	.10	–.10	.24	–.21	.18	.01
Southwest Point	–.04	–.07	–.08	.23	–.12	.18	–.14	–.09	.07	–.01	.02	–.06
Stykkisholm	.18	.14	–.03	–.05	.14	–.10	.19	.02	–.09	–.01	.06	–.08
Sydney	.07	–.18	.04	–.08	–.31	–.27	–.18	–.37	–.23	–.05	–.17	.06
Tashkent	–.18	–.31	.14	.14	–.03	.08	–.19	–.20	.21	.04	.06	.07
Tokyo	–.26	–.17	–.03	–.15	–.23	.03	.06	–.02	–.16	.01	–.24	.20
Upernivik	.14	–.09	.01	–.02	.36	.02	.07	–.14	–.04	.04	.28	.04
Ust Zylma	–.18	–.18	–.09	–.12	.01	.03	–.08	–.05	.02	–.02	–.18	.00
Valencia	.02	.12	.10	.31	.03	–.28	.00	.09	–.11	–.20	.01	–.15
Vienna	.11	–.25	.00	.29	.11	–.08	.08	.15	–.01	–.22	.15	–.28
Wellington	.31	.10	–.03	.11	.14	–.09	.06	–.16	.20	.10	–.02	–.02
Winnipeg	.12	.08	.00	.01	–.06	.10	–.24	.16	.25	.16	.21	–.08
Yakutsk	.28	–.11	.02	.05	–.12	.01	–.15	.09	–.31	.00	.24	–.21
Yenisseysk	.22	.01	.00	–.04	–.08	–.12	–.20	.12	.26	–.09	.10	–.19
Zanzibar	.03	–.13	.19	–.34	.05	–.09	–.09	–.30	.23	–.02	.24	.03
Zi-ka-Wei	.14	–.07	.18	.01	.07	.29	.08	.07	.03	.27	.09	.00

TABLE 20.—*Correlation coefficients between foreign pressures and United States temperatures, district 9*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.27	0.36	0.14	0.28	0.50	0.44	−0.10	−0.21	0.02	0.07	−0.03	−0.05
Alexandria	.08	.40	.15	.06	−.22	.06	−.01	−.12	−.11	−.17	−.07	−.10
Allahabad	.18	.12	.18	.12	.20	.04	.08	.19	.36	−.17	−.08	−.03
Antananarivo	.12	.09	.10	.38	.20	.26	.43	.07	.06	−.13	−.22	−.22
Apia	.14	−.20	.05	−.40	.00	−.11	.04	−.15	.24	.08	.08	.32
Arequipa	−.14	−.02	−.11	.15	.15	.13	−.16	−.26	.18	−.12	−.27	−.03
Batavia	.36	.19	.11	.32	.36	.40	.08	.09	.22	−.10	−.18	−.21
Bermuda	−.31	.05	−.10	.02	.07	−.03	.04	−.02	.33	.01	−.21	−.11
Bouzareah	.11	−.05	.11	.04	.07	.11	−.07	.00	.15	.19	.15	−.21
Bulawayo	.12	−.13	−.06	.30	.33	.03	.16	−.08	−.40	−.21	−.25	−.36
Capetown	−.11	−.06	−.04	.31	.04	−.05	.22	.16	.19	−.12	−.10	−.25
Colon	−.04	−.09	−.01	−.13	−.19	.10	−.18	−.28	.20	.15	.20	.44
Cuyaba	.22	−.15	.07	.07	.14	−.13	.20	.00	.11	−.14	.30	−.27
Darwin	.31	.16	.03	.25	.27	.28	−.09	−.03	.18	−.02	−.21	.00
Dawson	.03	.27	.11	−.19	−.08	−.09	−.37	−.23	−.05	−.09	.34	.12
Dutch Harbor	.08	.12	.06	−.33	−.26	−.24	−.17	−.15	−.46	−.11	.22	−.09
Edmonton	.22	.26	−.12	.00	.01	−.01	−.06	−.23	.15	−.05	.22	−.11
Freetown	.10	.12	.22	.19	−.03	−.06	.36	.36	.24	−.21	−.04	−.20
Georgetown	.09	.04	.20	−.21	−.06	−.09	.10	.20	.14	−.15	.01	.02
Gjesvar	−.22	.46	−.31	−.01	−.10	.09	.09	.07	−.01	.03	.05	−.20
Honolulu	−.28	−.24	−.10	.14	−.11	−.03	.00	.23	−.09	.04	−.24	.07
Irkutsk	−.18	−.07	−.06	−.20	−.15	−.01	−.07	.06	−.12	.05	.03	−.35
Ivigtut	.08	−.10	−.03	.12	.11	−.30	−.03	−.07	−.08	−.10	.18	−.01
Jask	.46	.14	.07	.08	.14	−.02	.06	−.08	.02	−.13	−.10	.05
Juneau	−.01	.20	.14	−.39	−.31	−.32	−.04	−.10	.23	−.09	.07	−.03
Lagos	.08	−.03	.11	.05	.17	−.04	.15	.09	−.10	−.20	−.14	−.18
Madeira	.02	.07	.05	.16	.01	.10	.40	.14	.17	.03	.03	.00
Madras	.27	.31	.19	.20	.16	.40	.04	−.04	.19	−.10	−.15	−.20
Malden Island	−.22	−.04	−.22	−.24	−.22	.12	−.14	−.12	−.04	.10	−.14	.14
Manila	.25	−.11	−.01	.21	.34	.04	−.04	.20	.38	.01	−.16	−.13
Markovo	.10	.05	−.24	−.31	−.12	−.28	−.04	.46	.04	−.32	.07	.14
Mexico City	−.19	−.02	−.04	.00	.06	.12	.13	.08	.07	.20	.02	.17
Midway Islands	.29	.15	−.20	.38	.03	.01	−.12	.05	.35	.41	−.28	−.14
Montevideo	−.20	−.29	−.08	−.10	−.15	−.26	−.12	−.38	.04	−.17	.11	−.17
Moose Factory	.23	−.01	−.08	.06	.33	.13	−.16	−.29	−.21	.25	.26	−.01
Nome	.10	.26	−.03	−.24	.09	−.23	.06	.02	−.08	−.10	.46	−.01
Orenburg	−.27	.07	.25	.29	−.09	.12	.00	.23	−.22	−.04	.06	−.22
Perth	.20	−.10	.19	.35	.07	.27	−.17	.10	.08	.00	−.11	−.05
Ponta Delgada	.02	.34	.20	.14	.02	.26	.18	.26	−.09	.03	−.16	.03
Port au Prince	.06	.10	.03	−.16	−.15	−.03	−.24	−.12	.07	.09	−.02	.28
Port Moresby	.26	.16	−.18	.09	.24	.11	.10	.15	.14	.00	−.35	−.37
Punta Arenas	−.09	−.05	−.18	−.03	.18	−.07	.36	−.02	.06	.04	.01	−.07
Quixeramobin	.14	−.06	.07	.13	.22	.08	.12	.14	.21	−.08	−.14	−.17
Rangoon	.20	.00	.02	.27	.20	.08	.16	.10	.30	−.14	−.20	−.12
Rio de Janeiro	−.02	−.05	.16	.12	−.01	.08	.37	−.06	.37	.01	−.21	.14
St. Helena	−.14	.05	.01	.11	−.14	.12	−.03	.10	−.01	−.10	.23	.33
St. Vincent	−.01	.10	.02	−.11	.09	−.02	−.22	−.25	−.14	−.17	−.06	−.03
Santiago	−.42	−.38	−.07	−.06	.02	−.19	−.05	−.18	.12	−.06	.07	.40
South Orkneys	.03	.03	−.08	.08	−.02	−.21	.20	.14	.16	.17	−.15	−.26
Southwest Point	.04	−.05	.07	.20	.20	−.30	.13	.14	.17	.05	.10	−.08
Stykkisholm	−.01	−.16	−.17	−.13	−.08	−.26	.01	−.07	−.14	.02	.03	−.02
Sydney	.31	−.05	.00	.22	.24	.00	.15	−.08	.00	−.08	−.08	.04
Tashkent	−.08	−.03	−.13	.43	−.24	−.22	.07	.00	−.06	.01	.16	−.27
Tokyo	−.34	.05	.18	.20	−.19	.03	.19	.05	.18	−.06	−.02	−.09
Upernivik	−.12	−.12	−.10	.06	.08	−.08	.05	−.04	−.06	.03	.22	−.17
Ust Zylma	−.30	.42	−.30	.10	−.03	−.03	.07	.19	−.31	−.08	−.32	−.22
Valencia	.08	.13	.10	−.29	.00	−.03	−.03	−.04	−.04	−.17	−.18	.14
Vienna	.06	.12	.10	−.12	−.13	−.09	−.22	.03	.13	.13	.05	−.05
Wellington	.06	−.18	−.18	.04	.10	−.03	.13	.03	−.17	−.10	−.21	.19
Winnipeg	.34	.00	.07	.07	.25	.06	−.01	−.22	.11	.02	.42	−.01
Yakutsk	.08	.36	.01	−.34	.06	−.12	−.03	.09	−.18	−.12	−.25	.03
Yenisseysk	−.30	−.07	−.02	−.20	−.14	−.08	−.00	.18	.01	−.06	−.05	−.12
Zanzibar	.19	.28	.02	.21	.17	.26	.16	−.18	−.24	−.06	−.17	−.23
Zi-ka-Wei	−.03	−.03	−.03	−.10	.05	.08	.24	.15	.33	.12	.07	.02

TABLE 21.—*Correlation coefficients between foreign pressures and United States temperatures, district 10*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.05	0.13	0.24	0.02	0.18	0.08	-0.29	-0.18	-0.09	-0.06	-0.09	-0.08
Alexandria	.30	.22	.16	.10	-.14	-.04	-.10	-.24	-.09	-.18	-.19	-.16
Allahabad	-.26	.07	.14	-.19	-.15	.37	.00	-.02	.16	-.29	-.03	-.15
Antananarivo	-.04	-.04	.18	.13	-.03	-.02	.20	-.22	.07	-.22	-.01	-.17
Apia	.01	.04	.03	.01	.09	.01	.03	.01	.19	-.02	-.14	.19
Arequipa	.01	.17	.10	-.11	.14	.15	-.30	-.21	.03	-.16	-.18	.02
Batavia	-.10	.27	-.01	.00	.03	-.04	-.09	.01	.12	-.04	-.06	-.08
Bermuda	-.41	.36	-.24	.03	-.19	-.14	-.39	-.47	.07	.01	-.25	-.16
Bouzareah	.14	.14	.22	.11	.02	-.16	-.06	-.10	.08	-.07	.09	-.19
Bulawayo	.08	-.26	.00	.02	.12	-.09	-.04	.04	-.20	-.34	-.08	-.03
Capetown	.08	-.10	.24	.02	-.04	-.10	.01	-.01	.24	-.15	-.04	-.23
Colon	-.12	.14	.00	-.04	-.06	.20	.02	.16	37	.14	.37	.26
Cuyaba	.05	-.06	.05	-.45	.18	-.17	.06	-.25	-.03	-.32	.14	-.25
Darwin	-.13	-.15	-.01	-.20	-.15	-.16	-.20	.00	-.01	.00	-.14	-.06
Dawson	.17	.18	-.04	.13	.07	.11	-.13	-.17	.03	.00	.20	-.13
Dutch Harbor	.22	.26	-.33	-.18	-.04	.06	-.15	-.14	-.45	-.16	.14	-.33
Edmonton	.20	.11	.08	.00	-.22	.18	-.21	-.19	-.02	-.12	.08	-.30
Freetown	.07	.04	.22	.16	-.01	-.20	-.03	-.07	-.06	-.34	-.12	-.10
Georgetown	.03	-.01	.11	-.35	-.28	-.33	-.26	-.07	-.25	-.31	-.13	-.13
Gjesvar	.07	.02	-.43	-.12	.03	-.08	.27	.09	-.21	.30	-.06	-.20
Honolulu	-.25	-.05	.03	-.08	-.04	.24	.08	-.04	.00	-.05	-.06	.01
Irkutsk	.08	-.21	-.03	-.10	-.08	.08	.17	.20	-.01	.14	.16	-.19
Ivigtut	.27	-.15	.12	.03	.45	-.10	.20	.30	-.14	.04	.22	.06
Jask	.05	-.05	.21	.05	.02	.11	-.15	.03	.15	-.11	-.15	.07
Juneau	.25	.31	-.18	-.24	-.46	-.21	-.07	.04	.09	-.08	.17	-.30
Lagos	.01	-.12	.20	-.02	-.07	-.35	.12	.06	-.08	-.04	-.04	-.04
Madeira	.03	.09	.16	.15	-.09	-.10	-.18	-.27	.14	-.15	-.02	-.30
Madras	-.09	-.07	.16	.05	-.03	.16	.04	-.02	.13	-.11	-.05	.00
Malden Island	-.02	-.12	-.24	-.19	-.08	.11	-.20	-.10	.12	.06	-.30	-.02
Manila	-.09	.08	.10	-.10	-.14	.39	.01	.10	.00	.14	.00	.08
Markovo	.04	.09	-.05	.44	-.20	.01	.08	.25	-.34	-.43	.01	.05
Mexico City	.14	.12	.04	-.03	.11	-.07	-.34	-.41	-.05	.05	-.24	-.18
Midway Islands	.05	.10	-.45	.09	.09	.13	-.02	.11	.17	.60	-.17	-.02
Montevideo	-.12	-.19	-.01	.05	.06	.02	.08	-.30	.01	-.21	.22	-.25
Moose Factory	.13	.03	.02	.06	.06	.16	-.06	-.50	-.13	.00	.17	-.29
Nome	.30	.34	-.02	.05	.26	-.12	.07	.07	-.02	-.18	.26	-.17
Orenburg	-.06	-.15	-.17	.07	-.12	.08	.11	.25	-.08	-.02	.07	-.19
Perth	.00	-.31	.08	-.01	-.26	.12	.02	.00	.14	.04	-.09	.09
Ponta Delgada	.16	.30	.09	.17	-.23	.11	-.20	.00	-.13	-.07	-.08	-.26
Port au Prince	-.11	-.04	.01	-.05	-.31	-.18	-.38	-.31	-.04	-.17	-.07	.08
Port Moresby	-.19	-.06	.00	-.25	-.18	-.26	.17	-.02	.10	-.11	.01	-.16
Punta Arenas	-.06	-.11	.04	-.20	.29	-.27	.27	-.14	.06	-.06	.23	-.33
Quixeramobin	-.13	-.17	-.03	.00	.03	-.10	-.13	-.18	-.03	-.20	-.05	.06
Rangoon	-.14	.12	.03	.02	-.11	.25	-.04	.01	.02	-.15	-.11	.07
Rio de Janeiro	-.13	.00	.18	.10	.26	.28	.04	.06	.11	-.05	-.04	.17
St. Helena	.04	-.03	.18	-.19	-.30	.09	-.30	-.04	.04	.07	-.15	-.01
St. Vincent	-.17	-.05	.05	-.04	.04	-.29	-.31	-.09	.07	-.18	.07	.03
Santiago	-.20	-.14	.01	-.12	.04	-.01	-.17	-.28	-.08	-.27	-.03	.09
South Orkneys	.03	-.16	.03	.00	.05	-.40	.24	-.17	.38	.28	-.15	-.46
Southwest Point	-.11	.21	.10	.18	.19	-.14	.08	-.21	.22	.02	.18	-.26
Stykkisholm	.12	-.17	.02	-.22	.19	-.21	.28	.23	-.29	.11	.01	.12
Sydney	.17	-.22	.06	.12	-.06	-.08	.02	-.24	-.01	-.02	-.03	.11
Tashkent	.00	-.04	.02	.33	-.18	-.16	.14	-.13	.15	.10	.12	-.10
Tokyo	-.47	-.06	.00	.11	-.18	.08	.06	-.05	.04	.02	.06	-.01
Upernivik	.04	-.16	.13	.08	.47	-.11	.30	.23	-.15	.06	.22	-.06
Ust Zylma	-.09	.12	-.42	-.08	-.15	-.02	.15	.24	-.29	.16	-.18	-.16
Valencia	.19	.15	.31	-.05	.09	.02	.17	.08	-.10	-.23	-.05	.10
Vienna	.00	.23	.08	.02	-.09	-.22	-.13	-.01	.15	.01	.03	-.06
Wellington	.34	-.05	.08	.09	.14	-.06	.20	-.04	-.08	-.06	.04	.08
Winnipeg	.36	.03	.27	.01	-.03	.19	.04	-.20	.11	.01	.39	-.16
Yakutsk	.22	.17	.02	-.18	.03	-.02	.10	.14	-.18	.17	-.08	-.21
Yenisseysk	.09	.06	-.02	-.03	.03	-.04	.18	.30	.09	.08	-.10	-.25
Zanzibar	.26	.01	.04	.02	.04	-.04	-.08	-.24	-.03	-.23	-.11	-.03
Zi-ka-Wei	.14	-.07	.18	-.01	.07	.29	.08	.07	.03	.27	.09	.00

TABLE 22.—*Correlation coefficients between foreign pressures and United States temperatures, district 11*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.20	0.44	0.05	0.34	0.48	0.38	−0.08	−0.07	−0.02	0.33	0.02	−0.04
Alexandria	−.08	.35	−.06	.04	−.35	.01	.04	.03	−.17	−.19	−.15	−.02
Allahabad	.35	−.05	.11	.27	.34	−.04	−.03	.08	.21	−.39	.06	−.02
Antananarivo	.07	.07	−.08	.44	.24	.31	.18	.23	.11	.04	−.10	.08
Apia	−.01	−.31	−.11	−.48	−.11	−.29	−.24	−.25	−.10	−.13	−.24	.03
Arequipa	−.20	−.12	−.29	.22	.10	−.08	−.12	−.15	.17	−.12	−.41	−.21
Batavia	.45	.35	.04	.36	.41	.48	.17	.20	.19	.18	−.03	−.04
Bermuda	−.12	−.18	.03	−.09	.02	−.02	.01	.17	.22	.15	−.09	.06
Bouzareah	.08	.02	.11	.03	−.01	.01	−.07	.05	−.01	.44	.24	−.02
Bulawayo	.13	−.04	−.14	.31	.34	.06	.04	−.06	−.01	−.05	−.44	−.62
Capetown	−.10	.00	−.25	.35	.03	.05	.00	.11	.13	.03	.05	.05
Colon	−.14	−.11	.03	−.12	−.24	−.14	−.17	−.07	−.04	.00	.09	.23
Cuyaba	.26	−.01	.11	.23	.19	−.08	.19	.13	.32	−.29	−.14	.23
Darwin	.48	.37	.02	.44	.40	.44	.12	.02	.23	.25	−.13	.05
Dawson	.00	.29	.19	−.25	−.05	.01	−.21	−.10	−.04	.05	.31	.10
Dutch Harbor	−.07	−.09	.07	−.45	−.20	−.23	−.38	−.15	−.22	−.15	−.04	−.22
Edmonton	.23	.15	−.06	.03	.01	.12	.12	−.15	.20	.06	.26	−.05
Freetown	.06	.19	.07	.30	.07	.03	.00	.04	.08	.05	.07	−.11
Georgetown	.06	.03	.11	−.04	−.08	−.01	.07	.04	−.12	−.06	.20	.05
Gjesvar	−.36	.38	−.18	.00	−.14	.18	−.11	.14	−.27	−.04	−.04	−.09
Honolulu	−.34	−.32	−.16	.14	−.17	−.08	−.04	−.03	−.14	−.30	−.49	−.06
Irkutsk	−.22	.13	−.04	−.32	−.22	−.10	.10	.11	−.23	.09	−.19	−.14
Ivigtut	−.06	−.04	−.04	.10	.01	−.34	−.13	−.13	.14	−.16	.19	−.18
Jask	.47	.17	−.11	.10	.19	−.11	.10	.01	.07	−.14	−.02	.14
Juneau	.04	.02	.14	−.44	−.25	−.19	−.23	.04	.17	−.25	.17	−.06
Lagos	.23	.15	.11	.10	.19	.11	.10	−.01	.09	−.07	.05	.12
Madeira	−.02	.06	−.04	.17	−.09	.20	.26	.13	.01	.25	.02	.06
Madras	.44	.42	.12	.32	.43	.34	.13	.11	.26	−.13	.02	−.18
Malden Island	−.29	−.09	−.06	−.28	−.41	.01	.13	−.09	−.28	−.17	−.14	.07
Manila	.39	−.30	−.01	.38	.50	−.03	.15	.31	.43	−.11	.06	−.08
Markovo	.14	.04	−.31	−.30	−.01	−.10	.13	−.18	.07	−.17	−.30	.19
Mexico City	.01	.09	−.04	−.03	.00	.28	.17	.13	.04	.28	.13	.04
Midway Islands	.20	.15	−.19	.36	.12	−.06	−.14	−.25	−.02	.12	−.10	−.29
Montevideo	−.19	−.35	−.13	.06	−.28	−.33	−.24	−.03	−.10	−.44	−.14	−.32
Moose Factory	.19	−.12	.07	.06	.29	.11	.09	−.05	−.22	.28	.18	−.11
Nome	−.07	.11	−.07	−.35	.04	−.20	−.01	.01	−.25	.04	−.19	.11
Orenburg	−.40	.23	−.24	.17	−.29	.06	−.11	.17	−.37	−.00	−.11	−.11
Perth	.29	.09	.07	.38	.20	.47	.03	−.13	.15	.04	−.02	−.03
Punta Delgada	.00	−.44	.07	−.15	.19	.29	.09	.41	−.01	.05	−.02	−.01
Port au Prince	.19	.09	.09	−.16	.08	.18	−.13	.05	.11	.05	.06	.34
Port Moresby	.54	.26	−.10	.29	.40	.28	.05	.14	.21	.36	−.11	−.11
Punta Arenas	−.07	.06	−.21	.05	.08	−.02	−.03	−.04	.13	.15	.05	−.05
Quixeramobin	.24	.08	.20	.34	.30	.34	.27	.34	.46	.08	.16	.08
Rangoon	.30	−.21	.02	.40	.37	.02	.23	.30	.42	−.24	.08	.08
Rio de Janeiro	.08	−.11	.00	.24	−.11	.07	.04	.17	.33	−.20	−.04	−.05
St. Helena	.04	.00	−.08	.10	−.07	.16	−.02	.03	−.04	−.12	.37	.34
St. Vincent	.13	.20	.13	.01	.22	.23	−.38	−.24	−.19	−.20	−.26	−.06
Santiago	−.01	−.47	−.10	.02	.14	−.21	.12	.03	.30	−.25	−.05	.10
South Orkneys	.06	10	−.04	.27	−.11	−.21	−.17	.32	−.33	.17	−.13	.16
Southwest Point	.09	−.23	.02	.12	.04	−.22	−.20	.29	−.17	.02	.01	−.14
Stykkisholm	−.12	−.07	−.18	−.10	−.02	−.32	−.05	−.11	.30	−.09	.12	−.02
Sydney	.18	.03	−.13	.12	.03	.09	−.19	−.21	−.04	−.01	−.02	.04
Tashkent	−.02	−.01	−.05	.32	−.26	−.32	−.12	.09	−.33	−.22	.21	−.12
Tokyo	−.11	.13	.13	.01	−.18	−.01	.00	−.31	−.01	−.03	−.08	.01
Upernivik	−.26	.00	−.19	−.02	−.02	−.23	−.12	−.16	.02	−.04	.06	−.28
Ust Zylma	−.12	.36	−.28	.08	−.55	−.41	.08	.22	−.31	−.08	−.53	−.17
Valencia	−.15	−.02	.01	−.01	−.01	.02	.03	−.07	.18	.00	−.14	.04
Vienna	.00	.22	.09	−.10	−.16	−.15	−.14	.10	−.17	.26	.05	.13
Wellington	−.02	−.17	−.21	−.12	.01	−.01	−.34	−.24	−.26	−.07	−.09	−.12
Winnipeg	.26	−.12	−.02	.06	.22	.16	−.06	−.14	−.08	.11	.40	−.01
Yakutsk	.03	.37	−.08	−.34	−.02	−.15	.02	.00	−.18	−.15	−.54	−.04
Yenisseysk	−.28	.07	−.15	−.18	−.16	−.07	−.07	.19	.15	.13	−.30	−.14
Zanzibar	.04	.29	−.02	.14	.17	.17	−.04	.29	−.31	−.18	−.21	−.20
Zi-ka-Wei	−.03	.07	−.08	−.05	.07	.05	.17	.25	.29	.13	.18	.28

TABLE 23.—*Correlation coefficients between foreign pressures and United States temperatures, district 12*

	Winter temperature			Spring temperature			Summer temperature			Fall temperature		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.20	0.39	−0.07	0.13	0.34	0.34	−0.25	−0.27	−0.10	0.38	0.14	0.01
Alexandria	−.20	.24	.03	.10	−.36	.08	−.11	−.08	−.08	−.03	−.08	−.13
Allahabad	.24	−.34	.05	.18	.21	−.03	.08	.05	.18	−.30	−.01	.07
Antananarivo	.21	.24	.04	.32	.23	.32	−.36	.06	.04	.17	.04	.21
Apia	−24	−21	.00	−.28	−.04	−.12	.08	−.25	−.11	−.30	−.34	−.19
Arequipa	−.17	.04	−.20	.20	.12	.17	−.21	−.26	.32	−.13	−.27	−.28
Batavia	.47	.37	.03	.29	.28	.34	.10	−.04	.07	.41	.04	.12
Bermuda	.04	.06	.12	.16	.19	.10	.07	.04	.44	.20	.21	.20
Bouzareah	−.05	.27	.10	.08	−.05	.05	−.11	−.05	.00	.35	.29	.10
Bulawayo	−.06	.04	.01	.16	.16	−.00	.15	−.23	−.16	−.02	.20	−.12
Capetown	−.12	.13	.08	.42	.04	−.07	.02	−.15	.24	.17	.08	.10
Colon	−.46	.02	−.21	.02	−.28	.06	−.10	−.21	.08	−.12	.05	−.22
Cuyaba	.20	.24	.25	.07	.14	.10	.17	−.12	.23	−.21	.18	−.10
Darwin	.35	.45	.02	.25	.31	.30	.19	−.19	.00	.42	−.08	.02
Dawson	−.04	.17	−.09	−.18	−.08	−.02	−.30	−.17	−.10	.13	.12	−.17
Dutch Harbor	−.12	.04	−.24	−.35	−.26	−.18	−.36	−.02	−.48	.11	−.22	−.35
Edmonton	.27	.22	−.02	.02	.01	.02	−.15	−.18	.16	.06	.09	−.26
Freetown	.30	.38	.30	.34	.17	.19	.18	.35	.55	.25	.09	.13
Georgetown	−.02	.16	.18	−.02	.05	.14	−.05	−.04	−.06	−.06	.03	−.15
Gjesvar	−.19	.09	−.29	−.07	−.11	.01	−.07	.26	−.16	−.18	−.15	.03
Honolulu	−.50	−.31	−.27	.14	−.14	.01	.04	−.01	−.25	−.35	−.33	.17
Irkutsk	−.29	.07	.09	−.13	−.20	−.23	.12	.17	.01	−.17	−.29	−.32
Ivigtut	−.10	−.14	−.12	−.12	.18	−.28	.00	−.02	−.16	−.23	−.30	−.36
Jask	.44	.10	−.05	.08	.15	−.17	−.22	.03	.06	−.11	.05	.02
Juneau	.29	−.03	.03	−.30	−.17	−.28	−.20	.07	.37	−.33	.15	−.23
Lagos	.34	.35	.06	.06	.07	−.04	.00	.04	.12	.06	−.03	.10
Madeira	.09	.28	.07	.14	−.07	.33	.30	−.01	.32	.24	.25	.14
Madras	.29	.20	.07	.18	.22	.12	.05	−.15	.02	−.07	−.01	−.06
Malden Island	−.35	−.16	−.09	−.14	−.35	.12	.06	−.03	−.11	−.12	−.21	−.05
Manila	.28	−.33	−.02	.20	.27	−.12	.10	.11	.18	.04	.20	.19
Markovo	.32	.46	−.33	−.26	.01	−.08	.02	.51	.14	.11	−.50	.08
Mexico City	.01	.24	.02	.20	.23	.42	−.02	−.14	.03	.26	.24	.11
Midway Islands	−.13	.04	−.10	−.19	.18	−.17	−.22	−.12	.26	−.22	.21	.21
Montevideo	−.31	−.40	−.26	−.03	−.22	−.23	−.18	−.38	.13	−.50	.13	−.33
Moose Factory	.10	−.08	.06	−.01	.17	.10	−.15	−.38	−.28	.14	.11	−.21
Nome	.01	.28	−.07	−.20	.00	−.17	−.14	−.05	−.27	.22	−.05	−.33
Orenburg	−.26	.17	−.23	.18	−.29	.00	−.08	.38	.03	−.09	−.14	.03
Perth	.27	−.02	−.06	.30	.10	.16	.04	−.23	−.04	.10	−.14	.10
Ponta Delgada	.08	.14	−.02	.20	.15	.30	.13	.02	.16	.11	.23	−.02
Port au Prince	−.06	.11	.16	.10	.00	.18	−.17	−.15	.05	.19	.05	.04
Port Moresby	.50	.29	.04	.12	.19	.14	.13	.10	.10	.36	−.05	.07
Punta Arenas	−.10	.04	−.26	.21	.12	−.04	.09	−.06	−.04	.15	.15	−.08
Quixeramobin	.06	.21	.13	.23	.19	.26	.06	−.01	.34	.38	.26	.23
Rangoon	.32	−.27	.06	.27	.22	.10	.11	.07	.27	−.13	.17	.15
Rio de Janeiro	.10	.07	.10	.20	.04	.17	.13	.09	.32	−.04	.19	−.14
St. Helena	−.12	.12	.02	.16	−.15	.10	−.11	.12	.05	.14	.27	.20
St. Vincent	−.22	−.04	−.17	−.13	−.26	−.18	−.38	−.37	.24	−.09	−.04	−.13
Santiago	−.15	−.30	.02	.13	.07	−.09	−.13	−.09	−.07	−.25	.04	.04
South Orkneys	.13	−.14	−.02	.22	.01	−.19	.07	.05	−.16	−.14	−.10	.34
Southwest Point	.09	.03	.08	.05	.19	−.16	−.08	.08	−.06	−.11	.12	.00
Stykkisholm	−.19	−.21	−.01	−.17	−.08	−.30	.04	.11	−.13	−.20	−.15	−.22
Sydney	−.01	−.02	−.22	.04	.12	−.05	.03	−.15	−.06	−.03	.09	−.02
Tashkent	.00	−.11	−.17	.25	−.29	−.43	.06	.06	.02	−.32	.29	−.04
Tokyo	−.33	.13	.05	.03	−.22	.03	−.12	−.13	.05	−.23	.04	.09
Upernivik	−.29	−.18	−.17	−.19	−.18	−.13	.00	−.13	−.18	−.12	−.22	−.44
Ust Zylma	−.31	.26	−.38	.06	−.24	−.02	−.03	.39	−.19	−.25	−.49	.00
Valencia	−.18	.18	.08	−.31	−.06	.00	.13	.00	−.01	.07	−.16	.00
Vienna	−.11	.52	.18	−.09	−.28	−.10	−.12	.25	.03	.18	.11	.22
Wellington	−.20	−.29	−.25	.06	.00	−.13	.14	−.11	−.20	−.18	.02	−.21
Winnipeg	.24	.09	.10	.08	.20	.19	−.04	−.29	.10	.35	.21	−.10
Yakutsk	−.06	.19	−.14	−.09	.16	−.29	−.35	−.01	−.31	−.21	−.67	−.22
Yenisseysk	−.23	.07	−.17	−.12	−.04	−.02	−.08	.30	.15	.12	−.50	−.24
Zanzibar	−.02	.03	−.05	.04	−.01	.11	.10	−.28	−.15	.00	−.11	−.05
Zi-ka-Wei	.04	−.03	.02	−.01	−.11	−.08	.06	.09	.16	.02	−.16	.08

TABLE 24.—*Correlation coefficients between foreign pressures and United States precipitation, district 1*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.20	0.06	0.17	−0.07	0.04	0.03	−0.21	0.00	−0.28	0.10	−0.10	−0.03
Alexandria	−.16	−.12	.02	−.10	.24	.27	.05	.03	−.04	.15	−.34	.04
Allahabad	.24	−.03	.13	.18	.03	.02	.10	.18	.15	.19	.01	−.12
Antananarivo	−.02	−.04	−.14	.13	.20	.13	.24	−.06	.20	−.05	−.19	.14
Apia	−.07	−.12	−.11	−.18	−.05	−.04	.15	.04	.15	−.14	.02	−.09
Arequipa	.08	−.09	.12	.12	−.06	−.08	.21	.20	.22	−.20	−.24	−.27
Batavia	.24	.20	.07	.03	.11	−.01	.05	.11	.21	.16	−.02	−.05
Bermuda	−.21	−.16	−.08	−.27	.12	−.20	−.27	−.17	−.03	.06	.00	.16
Bouzareah	.06	.18	.32	−.09	.07	.07	.01	−.02	−.25	.04	−.07	.14
Bulawayo	−.02	.15	.05	.12	.07	.00	.10	−.14	.02	.46	−.13	−.16
Capetown	.27	.11	−.12	.05	.09	.17	.08	.10	.13	.22	−.17	−.20
Colon	−.12	−.12	−.26	−.27	.00	−.26	−.05	.13	.07	−.17	.02	−.13
Cuyaba	−.05	−.23	.28	−.03	.28	.20	−.08	.07	−.21	.29	.00	−.29
Darwin	.19	.19	−.14	.06	.03	.02	−.02	.12	.25	−.17	.03	−.23
Dawson	−.02	−.01	.25	−.02	−.09	.27	−.16	−.13	.05	.08	.18	.19
Dutch Harbor	.14	−.04	.16	.04	−.09	.11	.05	−.04	.40	−.21	.05	−.33
Edmonton	−.18	−.08	.06	.05	.10	.07	.09	.12	−.03	−.04	−.10	−.03
Freetown	−.21	.00	.12	.03	.08	−.06	−.01	.01	−.05	.15	.00	.06
Georgetown	−.01	−.10	.12	.11	.02	.00	.04	.04	.01	−.02	−.31	−.28
Gjesvar	.04	.04	.10	.26	.10	−.10	−.10	.12	.14	−.13	.08	−.03
Honolulu	.18	−.15	.00	.04	−.01	−.23	−.10	.02	−.14	−.21	−.07	−.13
Irkutsk	−.10	.09	−.24	.16	−.02	.16	.10	.05	−.19	.05	.00	.13
Ivigtut	−.15	−.12	.02	−.02	−.18	.22	.21	.16	.00	−.01	−.28	.05
Jask	.06	−.03	.13	.04	.22	.19	−.17	.15	−.21	.16	.05	−.04
Juneau	−.22	−.08	.02	.28	.10	.35	−.38	.16	−.13	−.23	−.15	−.20
Lagos	.08	−.08	.15	.03	.10	.09	.15	.21	.24	.10	−.09	−.22
Madeira	−.05	−.07	.09	−.02	.30	−.05	.13	.14	.00	.01	.02	−.01
Madras	.09	.23	.11	.00	.03	−.02	.05	.11	.15	.19	−.05	−.10
Malden Island	.01	−.08	−.10	−.02	.13	−.05	.08	−.17	−.01	−.11	.03	.13
Manila	.09	.06	.11	.06	−.04	−.12	.08	.12	.50	.00	−.02	−.07
Markovo	−.13	.03	.28	.06	−.14	.06	.13	.14	.02	.19	−.28	.32
Mexico City	.00	−.01	.04	−.22	−.02	−.42	−.05	.08	.10	−.07	.04	−.04
Midway Islands	−.18	−.30	.41	.02	−.09	−.20	−.20	.18	−.32	.12	−.09	−.33
Montevideo	−.04	−.11	−.23	−.31	.12	.11	−.10	.07	−.22	.08	−.08	.03
Moose Factory	.04	.26	.24	−.21	−.12	.10	.19	.14	.03	−.25	−.04	.11
Nome	.01	.00	.13	−.04	−.18	.28	.20	−.07	.20	−.08	.02	.12
Orenburg	.32	.12	−.16	.02	.12	.04	.08	.03	−.12	.05	.14	.25
Perth	.19	.24	.15	.01	.06	−.18	.13	−.04	.21	−.27	−.02	−.05
Ponta Delgada	.06	.16	−.01	−.20	.21	−.20	−.06	.24	−.31	.10	.07	−.07
Port-au-Prince	.00	.00	.21	−.24	.07	−.19	−.26	−.12	.00	.15	−.06	−.04
Port Moresby	.40	.23	−.10	.20	.04	.12	.32	.18	.13	−.01	−.07	−.22
Punta Arenas	.05	−.04	−.16	.14	−.12	.16	.09	.12	−.10	.35	.02	−.26
Quixeramobin	.09	−.03	.09	−.05	−.08	−.15	−.03	.05	.08	−.19	−.11	−.13
Rangoon	.12	.00	.03	.00	.14	.04	.14	.19	.08	.18	−.08	−.05
Rio de Janeiro	−.06	−.28	−.02	−.26	.08	.00	−.10	.24	−.32	.07	.16	−.16
St. Helena	.00	−.20	.37	.16	.28	.00	.05	.10	.08	.32	−.07	−.33
St. Vincent	.04	.05	.01	.11	.33	.25	−.32	.06	−.26	.13	−.23	−.28
Santiago	.02	−.04	.00	−.08	−.39	−.05	.06	−.01	.08	−.09	−.11	−.14
South Orkneys	−.22	.02	−.51	.04	.00	−.14	.20	−.22	.20	.25	.05	.05
Southwest Point	−.17	.01	.01	−.35	.18	.04	−.05	.11	.08	−.07	.21	.02
Stykkisholm	−.06	−.12	−.04	.07	−.10	.22	.19	.13	.22	−.14	−.30	.03
Sydney	.16	.32	.04	−.02	−.15	−.23	−.11	−.15	.31	−.23	.12	.14
Tashkent	−.42	−.19	.14	.05	.39	.33	.04	−.03	−.06	−.02	−.13	.10
Tokyo	−.07	−.28	.01	.50	.20	.02	−.10	−.14	.04	.03	−.06	−.17
Upernivik	−.20	−.06	−.01	−.13	−.14	.11	.18	.04	.18	−.16	−.13	.08
Ust Zylma	−.16	.11	−.11	−.02	.07	−.11	.02	−.06	−.24	.18	.10	.33
Valencia	.23	.06	−.28	−.04	−.19	.07	.00	.04	−.08	.06	−.12	.26
Vienna	.30	−.06	−.19	.14	−.06	.15	−.28	.00	−.11	.03	−.12	.25
Wellington	.02	.35	−.29	−.03	−.18	−.13	.00	.23	.07	−.29	.07	.02
Winnipeg	−.14	.00	.19	−.07	.20	.08	.20	.18	−.01	−.15	−.21	−.08
Yakutsk	−.03	.16	−.07	.20	−.18	.15	.37	−.02	.06	−.09	−.03	−.02
Yenisseysk	−.01	.07	−.12	.00	−.10	.22	.19	.22	−.04	.34	−.20	.11
Zanzibar	.18	.14	.22	.15	.04	.18	.17	−.06	−.01	.21	−.17	.05
Zi-ka-Wei	−.11	−.21	.02	.10	.01	.06	.03	−.14	−.18	.16	−.02	.20

TABLE 25.—*Correlation coefficients between foreign pressures and United States precipitation, district 2*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.14	0.15	−0.18	0.08	0.08	0.03	0.28	−0.01	−0.05	−0.15	−0.04	−0.07
Alexandria	−.49	.08	−.15	−.27	.21	.10	.12	−.13	.14	−.12	.05	−.06
Allahabad	.57	−.21	.21	.28	.30	−.14	.29	.27	.20	−.03	−.20	−.13
Antananarivo	.03	.09	−.23	.02	.07	.04	−.03	−.01	−.17	−.26	−.17	−.11
Apia	−.28	−.51	−.25	−.27	−.37	−.16	.14	−.10	−.20	−.02	.03	−.12
Arequipa	−.01	−.38	−.24	−.09	−.35	−.33	.34	.24	−.15	−.27	−.13	.04
Batavia	.54	.40	−.06	.16	.20	.07	−.05	.07	.15	−.11	−.06	−.10
Bermuda	.04	−.29	.04	−.20	.03	.01	−.43	−.16	−.07	.19	−.01	.04
Bouzareah	−.55	−.05	.00	−.14	.06	.11	.06	.07	−.40	−.01	.01	−.05
Bulawayo	−.15	.30	−.06	.19	.19	−.02	.19	.31	.21	.14	−.06	.10
Capetown	−.03	−.10	−.13	.08	−.09	.00	.36	.22	−.17	.18	−.09	−.17
Colon	.05	−.36	−.07	−.33	.22	−.25	.18	.10	−.29	.46	.34	.01
Cuyaba	.30	−.08	.03	.21	.31	.41	−.07	−.18	−.37	.20	.08	−.25
Darwin	.48	.41	−.24	.19	.00	−.04	.04	.14	.04	−.11	.00	−.21
Dawson	.04	.18	.27	.02	.02	.27	−.18	−.27	.06	.13	.33	.01
Dutch Harbor	−.14	−.36	.47	−.02	−.21	−.26	−.13	−.13	.08	−.33	.05	.02
Edmonton	−.27	−.20	−.16	.10	−.03	−.20	.03	.02	−.09	−.40	−.30	.07
Freetown	.07	.03	.22	.06	−.04	−.16	.05	−.19	−.11	−.20	−.30	−.16
Georgetown	−.03	−.05	−.02	−.01	.09	.08	.00	−.01	.02	−.19	−.27	−.47
Gjesvar	−.09	−.01	.01	.22	.00	−.12	−.02	−.06	.16	−.09	−.04	.30
Honolulu	−.09	−.36	−.41	−.02	.08	−.06	.13	.12	.02	.08	.04	−.13
Irkutsk	−.30	.40	−.26	.12	.17	.08	.04	.01	−.08	−.04	−.11	.16
Ivigtut	−.29	−.19	−.02	.20	−.26	−.02	.25	−.08	.14	.11	−.07	.05
Jask	.30	−.01	−.19	−.01	.18	.10	.41	.02	.09	−.07	−.08	−.01
Juneau	−.11	.00	.25	.26	.20	.48	−.53	.25	.03	−.02	.00	.38
Lagos	.36	.11	−.24	−.04	.14	.21	−.15	.03	.08	−.10	−.04	−.11
Madeira	−.08	.02	−.05	−.28	−.01	−.04	.10	.16	−.25	−.36	−.32	−.17
Madras	.53	.39	−.22	.09	.31	.09	.25	.06	.21	−.06	−.10	.01
Malden Island	−.36	−.37	−.32	−.28	−.21	−.31	−.07	−.30	−.38	−.21	−.22	−.03
Manila	.52	−.45	−.09	.24	.16	−.26	−.02	.05	.17	.06	−.05	.03
Markovo	.03	−.12	−.27	.07	−.12	−.14	.27	.07	.10	.00	−.21	−.06
Mexico City	−.40	−.15	−.15	−.26	.00	−.07	−.05	.02	−.08	−.14	−.26	−.31
Midway Islands	.01	−.01	.12	.14	.10	.10	−.25	.20	−.50	.23	.10	.08
Montevideo	−.11	−.20	−.19	−.15	.10	.06	.07	.13	−.17	.20	.14	.02
Moose Factory	−.25	−.05	−.03	−.25	−.06	.05	−.02	.04	.07	−.20	−.10	.00
Nome	.19	−.21	.23	−.13	−.12	.05	.20	−.30	.18	−.25	−.09	−.21
Orenburg	−.39	.08	−.02	.17	−.11	−.19	.24	.05	.01	.36	.14	.06
Perth	.46	.41	−.15	.13	.12	−.04	.04	.17	.10	.04	.09	−.11
Ponta Delgada	−.31	−.05	−.05	−.20	.08	−.25	−.16	.23	−.22	−.35	−.21	−.11
Port-au-Prince	.08	−.01	.18	−.24	.07	.00	−.13	−.08	−.06	−.09	−.05	−.21
Port Moresby	.66	.43	−.06	.19	.20	.23	.02	.21	.12	−.17	.02	−.25
Punta Arenas	.18	−.04	−.02	.14	−.01	.31	.15	.22	−.07	.08	.13	−.17
Quixeramobin	.32	.07	.17	−.03	.00	.03	−.23	−.30	−.36	−.23	.00	−.20
Rangoon	.54	−.42	−.19	.01	.34	−.18	.06	.06	.03	−.08	−.19	.04
Rio de Janeiro	.00	−.25	.03	−.19	.00	−.11	.05	.08	−.20	−.14	−.05	−.18
St. Helena	.03	.11	.17	.17	.28	.09	.15	.33	.14	.20	−.12	.02
St. Vincent	.16	.32	.03	−.10	.10	.29	−.03	−.05	.03	.04	−.03	−.26
Santiago	.15	−.37	−.13	−.09	.04	−.14	.06	.05	−.07	.02	−.11	−.08
South Orkneys	−.18	.00	−.05	−.04	.28	.09	.09	−.02	.07	.12	.07	−.20
Southwest Point	−.13	−.33	.19	−.31	−.06	.04	.06	−.14	.03	−.18	.00	−.02
Stykkisholm	−.19	−.21	−.15	.34	−.20	.08	.16	−.06	.22	.16	−.11	.08
Sydney	.13	.28	.10	.17	.03	−.18	.04	.18	−.09	.14	−.06	−.12
Tashkent	−.12	.05	.14	−.19	.33	.16	.25	−.22	.06	.00	.18	−.13
Tokyo	.22	.16	.16	.09	−.02	.10	.03	−.06	.16	−.02	−.26	−.07
Upernivik	−.35	−.26	−.09	.00	−.21	.02	.23	−.09	.22	.18	−.12	−.15
Ust Zylma	−.18	.16	.25	.11	−.02	−.03	.03	.00	.13	.18	−.13	.26
Valencia	−.14	.17	−.09	.27	.23	−.06	−.06	.12	.09	−.13	.12	.20
Vienna	−.05	.16	.12	.11	.20	.34	−.27	.00	−.30	.20	.13	.04
Wellington	−.26	.07	−.08	.19	−.21	−.11	−.03	.33	−.34	−.19	−.21	.05
Winnipeg	−.27	−.11	−.04	.05	−.04	−.20	.16	.03	−.17	−.43	−.28	−.05
Yakutsk	−.12	.20	−.14	.02	.08	−.05	.13	.06	.07	−.07	−.04	.01
Yenisseysk	−.30	.18	−.20	.15	.08	.17	.12	.05	.09	.09	−.27	.15
Zanzibar	−.07	.06	−.24	.06	.21	.18	−.03	.04	−.37	−.01	−.07	.18
Zi-ka-Wei	−.14	.13	−.22	−.07	.11	−.07	.25	−.29	−.12	.10	−.10	.25

TABLE 26.—*Correlation coefficients between foreign pressures and United States precipitation, district 3*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.15	−0.03	0.19	−0.08	−0.04	−0.08	0.13	0.44	0.19	0.21	−0.10	−0.11
Alexandria	.24	.04	.02	.03	.29	.18	−.07	.01	.03	.13	−.30	.15
Allahabad	−.19	.16	−.03	.02	−.14	.20	.19	.34	.39	.13	−.03	−.13
Antananarivo	−.32	−.29	−.36	−.28	−.03	−.10	−.04	.21	.34	.00	.05	.19
Apia	−.10	.00	.10	.30	.20	.21	−.37	−.34	−.11	−.05	.00	−.13
Arequipa	−.05	−.12	−.05	.11	−.15	−.07	.21	.33	.17	−.32	.02	−.15
Batavia	−.29	−.10	.05	−.19	−.15	−.25	.13	.37	.46	.08	.10	.00
Bermuda	.05	−.09	−.02	.00	−.08	−.15	−.39	−.29	−.37	−.08	.10	.12
Bouzareah	.14	.07	−.04	.11	.07	.19	.15	.08	−.14	.03	−.21	.18
Bulawayo	.28	.06	−.15	−.05	−.20	.29	.17	.32	.41	.28	.04	−.22
Capetown	.06	.31	−.16	−.08	−.02	.29	.01	.38	.15	.19	.13	−.11
Colon	−.02	.30	−.27	.19	.13	−.20	−.14	.05	.20	−.28	.11	−.24
Cuyaba	−.07	−.04	−.19	−.13	.18	.16	−.17	.27	.01	.09	−.06	−.13
Darwin	−.24	−.16	−.03	−.17	−.19	−.21	.21	.58	.55	−.02	.20	−.18
Dawson	−.03	−.06	.34	−.30	−.14	.03	.25	−.10	.22	.32	−.06	−.03
Dutch Harbor	−.45	−.36	.05	−.11	−.12	.15	−.27	−.23	.22	.06	−.37	−.46
Edmonton	.05	−.13	−.13	−.23	.08	.09	.21	.14	−.28	.14	−.11	−.05
Freetown	−.35	−.31	−.18	−.31	−.23	−.19	−.04	−.14	−.24	.09	.04	.20
Georgetown	−.24	−.33	−.31	.02	.08	−.01	−.10	.02	−.21	−.05	−.16	−.19
Gjesvar	−.02	−.09	.12	.20	.17	−.06	.02	−.14	.12	−.01	−.09	.10
Honolulu	.18	.14	.20	.28	.34	−.10	−.16	−.01	−.20	−.20	.00	−.14
Irkutsk	.25	.18	.06	−.09	.09	.10	.18	−.19	−.17	−.06	−.20	.06
Ivigtut	.14	.26	−.05	−.25	−.06	.42	.04	.13	−.23	.09	−.21	.02
Jask	−.01	.23	.08	−.02	−.09	.08	−.08	.16	.24	.11	.10	.02
Juneau	−.10	−.29	.18	−.08	−.13	.11	.22	.05	−.06	−.07	−.28	−.32
Lagos	−.27	−.01	.05	−.26	−.38	−.17	.14	.25	.30	.10	.02	−.01
Madeira	−.32	−.36	−.30	.01	.03	−.31	−.06	.02	−.14	−.12	−.01	−.01
Madras	.01	.18	.08	−.10	−.12	.00	.22	.46	.41	.15	.03	−.01
Malden Island	.01	−.21	−.07	.27	.25	.11	−.22	−.32	−.22	−.12	.09	.05
Manila	−.14	.32	.10	−.04	−.20	−.10	.30	.35	.45	.00	.06	−.05
Markovo	−.03	.09	.22	−.20	.09	.30	.17	−.49	−.41	.26	−.30	.35
Mexico City	.11	−.01	−.10	.09	.10	−.09	−.29	−.10	−.14	−.09	.18	−.03
Midway Islands	.02	−.06	.25	.03	.18	−.16	−.23	.28	−.55	.00	−.09	−.15
Montevideo	.32	.18	.27	−.13	.29	.26	−.27	.21	−.32	−.10	−.06	−.11
Moose Factory	−.13	−.24	.00	−.05	−.14	.08	−.02	−.01	−.07	−.20	−.01	.01
Nome	.02	−.10	.06	−.31	−.27	.15	−.12	−.32	.04	.19	−.32	−.05
Orenburg	.14	.22	−.08	−.28	.12	.08	.23	−.25	−.19	−.30	−.22	.10
Perth	−.12	.11	.26	.10	−.14	−.24	.28	.40	.57	−.11	−.12	−.20
Ponta Delgada	−.04	−.09	−.19	−.03	.02	−.40	−.08	−.07	−.17	−.16	.02	−.20
Port-au-Prince	−.24	−.08	−.08	−.01	.10	−.05	−.25	−.16	−.06	−.12	.04	.01
Port Moresby	−.07	−.33	.09	−.08	−.13	−.06	.38	.47	.58	−.10	.26	−.14
Punta Arenas	.18	−.05	−.20	−.02	.01	.24	.14	.19	−.26	.15	.10	−.17
Quixeramobin	−.09	−.11	−.10	−.01	−.11	−.12	.10	.19	.18	−.28	.08	.01
Rangoon	−.18	.23	−.04	−.12	−.19	.07	.24	.35	.28	.20	.02	−.04
Rio de Janeiro	−.10	−.15	−.02	−.24	.02	−.12	−.29	−.02	−.34	−.11	−.04	−.10
St. Helena	−.01	−.07	.12	−.04	.33	.05	.23	.30	.13	.24	−.09	−.27
St. Vincent	.05	.18	.07	.24	.20	.18	.13	.24	.07	−.22	−.29	−.35
Santiago	.06	.10	.14	.20	.08	.26	−.12	−.13	−.26	−.01	.04	−.16
South Orkneys	−.14	−.12	−.33	.09	.22	.37	.11	−.02	−.07	.08	.26	.30
Southwest Point	−.02	−.13	−.13	−.14	.07	.12	−.38	−.20	−.07	−.02	.11	.10
Stykkisholm	−.06	.17	.06	−.05	−.06	.42	.09	.07	.04	−.02	−.07	.00
Sydney	.02	−.01	−.03	−.08	−.22	−.11	−.16	−.04	.53	−.24	−.06	−.05
Tashkent	.04	.11	−.12	−.18	.26	.32	.24	−.14	−.13	−.03	−.30	.12
Tokyo	−.07	.16	.07	.13	.06	−.01	.00	.12	.24	−.02	−.24	−.17
Upernivik	.01	.25	−.07	−.19	−.04	.28	.14	−.08	−.11	−.02	−.13	.09
Ust Zylma	.15	−.16	−.08	−.14	.22	.06	.16	−.17	−.24	.20	−.01	.07
Valencia	.09	−.19	−.04	.13	−.20	.08	−.11	.00	.04	.12	.16	.03
Vienna	.21	−.07	−.06	.01	.15	.00	−.10	.08	−.02	.00	−.07	.17
Wellington	.10	.01	−.07	.07	−.09	.02	.14	.07	.05	−.28	.05	−.16
Winnipeg	−.11	−.28	−.15	−.22	.00	.00	.24	.17	.08	.00	−.19	−.04
Yakutsk	.27	.28	−.02	−.10	.08	.12	.28	.27	−.05	.13	.01	.00
Yenisseysk	.16	.24	.08	−.13	.14	.26	.28	.16	.15	.41	.24	.09
Zanzibar	.20	.07	.12	.14	−.08	.16	−.02	.19	.46	.02	.00	−.03
Zi-ka-Wei	.07	.04	.07	.08	−.12	.12	.03	.00	−.23	.10	−.15	.10

TABLE 27.—*Correlation coefficients between foreign pressures and United States precipitation, district 4*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.14	−0.14	−0.01	−0.25	−0.26	−0.02	0.08	0.07	0.05	0.02	−0.07	0.02
Alexandria	.05	−.35	−.14	−.19	.28	.07	−.05	.00	.13	.15	−.20	.20
Allahabad	−.20	.09	.07	−.08	−.12	−.06	.25	.21	.24	.20	.03	−.02
Antananarivo	−.16	−.11	.06	−.32	−.06	.05	.19	.31	.26	.00	.26	.36
Apia	−.13	−.18	.00	.21	−.19	−.02	−.04	−.22	−.06	−.08	−.11	−.26
Arequipa	.11	−.10	.08	−.30	−.48	−.37	.50	.18	−.05	−.05	.14	.00
Batavia	−.14	−.06	.05	−.31	−.16	−.03	.19	.16	.32	.16	.19	.06
Bermuda	−.11	.17	−.14	.02	.06	.03	−.22	−.20	.00	.11	.10	.10
Bouzareah	.43	.42	.32	−.05	−.06	.22	−.03	−.09	.43	.12	−.05	.19
Bulawayo	.24	−.03	.19	−.09	−.06	.32	.29	.13	−.15	.17	−.07	−.11
Capetown	.15	.12	.04	−.11	−.03	.42	.13	.14	−.01	.07	−.01	−.01
Colon	−.25	−.11	−.38	−.14	−.04	−.28	.13	−.03	−.23	−.20	−.08	−.33
Cuyaba	−.25	−.04	.16	.02	−.11	.26	−.10	.07	−.24	.14	−.11	−.19
Darwin	−.36	−.22	.00	−.20	−.15	−.10	.16	.32	.26	.00	.12	−.07
Dawson	−.08	.02	−.11	−.07	.30	.27	.06	−.07	.18	.20	−.11	−.19
Dutch Harbor	−.10	.25	−.21	−.15	−.03	.04	−.06	−.22	.55	.07	−.31	−.37
Edmonton	−.23	−.22	.17	.04	.35	.15	.25	.09	−.04	.00	.06	−.09
Freetown	.04	−.20	−.33	−.43	−.27	.03	.04	−.11	−.11	.28	.03	.26
Georgetown	.03	−.25	−.15	−.07	−.05	.05	.04	−.08	−.08	.03	−.21	−.11
Gjesvar	.08	−.13	.16	.30	.14	−.12	−.02	−.03	.18	−.18	−.17	.06
Honolulu	.19	.04	−.03	−.18	.07	−.15	−.01	.03	.02	−.29	−.07	.03
Irkutsk	.27	−.08	−.10	−.12	.06	.03	.31	−.08	−.25	−.15	−.09	.12
Ivigtut	.01	−.13	−.04	−.10	−.07	.25	.17	.25	−.24	.03	−.13	.15
Jask	−.08	−.06	.07	−.07	−.07	.01	.06	−.14	−.01	−.05	−.13	−.05
Juneau	.00	.00	.08	.23	.35	.21	−.37	.17	−.02	−.16	−.20	−.32
Lagos	.24	−.09	.11	−.28	−.32	.15	.05	−.01	.18	.05	−.06	.08
Madeira	.15	−.04	−.02	.01	.00	−.09	.06	.03	−.25	−.02	.01	.10
Madras	−.22	−.07	.02	−.36	−.08	−.04	.25	.15	.29	.11	.08	−.06
Malden Island	.02	.08	.29	−.06	.00	−.16	.15	−.10	−.07	−.16	.17	.01
Manila	−.19	.47	.22	−.06	−.10	−.08	.17	.19	.34	.06	.19	.04
Markovo	−.17	.04	.07	−.11	.40	.26	.26	.00	.09	.25	−.20	.22
Mexico City	.05	−.09	.00	.10	.07	.00	−.10	−.05	.03	−.06	.08	−.06
Midway Islands	−.12	.44	.42	−.07	−.05	−.09	−.11	.32	−.52	.01	−.12	.13
Montevideo	.15	.05	−.10	−.17	.04	.22	.10	.20	−.16	−.11	−.31	.12
Moose Factory	.31	.38	.12	−.02	.01	−.09	−.17	−.02	−.05	−.16	−.02	.02
Nome	−.30	.23	−.28	−.20	.06	.32	.01	−.25	.43	.11	−.35	−.17
Orenburg	.17	.00	.13	.06	.19	−.12	.15	.13	−.18	−.22	−.22	−.29
Perth	−.35	.02	.04	−.05	−.01	−.17	.12	.14	.29	−.04	.01	−.03
Ponta Delgada	.40	.15	−.07	−.05	.11	−.34	.00	−.04	−.23	.04	.07	−.07
Port-au-Prince	.00	−.12	−.24	.02	.01	.03	−.10	−.20	−.09	−.17	−.44	−.14
Port Moresby	−.20	.18	.29	.06	−.06	.14	.54	.34	.40	.12	.34	.05
Punta Arenas	.08	.15	.18	.05	−.10	.44	.24	−.11	−.29	.10	.10	−.10
Quixeramobin	.14	−.12	.00	−.09	−.14	.09	−.04	−.17	−.11	−.20	.05	.06
Rangoon	−.11	.37	.11	−.32	−.20	−.03	.29	.18	.27	.28	.19	.02
Rio de Janeiro	−.08	−.08	−.06	−.43	−.18	−.02	−.07	.00	−.18	−.02	.07	.02
St. Helena	.23	−.25	.11	.04	.14	.22	.03	−.04	−.18	.27	−.07	−.19
St. Vincent	.08	−.17	.00	.23	−.20	−.13	.10	.10	−.11	−.18	−.32	−.21
Santiago	−.14	.11	.00	.13	.03	.11	−.03	−.04	−.04	−.02	−.12	−.23
South Orkneys	−.02	−.03	−.15	.06	.23	.22	.21	.06	−.05	−.24	.27	.17
Southwest Point	−.13	.15	−.09	−.11	.05	.30	−.28	.06	−.04	−.08	.09	.27
Stykkisholm	−.02	−.09	.07	.09	.14	.16	.18	.10	.08	.01	−.01	.11
Sydney	−.20	.16	.10	−.18	−.04	−.15	.07	.23	.34	−.03	.03	.08
Tashkent	−.04	−.24	.17	−.31	.49	.29	.05	.00	−.32	−.10	−.13	.18
Tokyo	−.10	−.15	−.04	.03	−.13	.13	−.18	−.15	−.06	.02	−.33	−.11
Upernivik	.01	−.02	.00	−.10	.06	.20	.27	.12	.16	−.08	−.05	.15
Ust Zylma	.08	−.03	−.25	.16	.04	−.21	.28	.10	−.32	−.07	−.06	.29
Valencia	.32	.04	−.25	.19	−.11	.10	.10	−.05	.12	.31	.29	.08
Vienna	.20	−.12	−.27	.08	.02	−.30	−.20	.05	−.04	.02	.00	.29
Wellington	.01	.39	.27	.07	−.15	−.02	.09	.19	−.10	−.07	.24	−.17
Winnipeg	.00	−.20	.14	−.02	.16	.00	.22	.07	.00	−.13	−.03	−.17
Yakutsk	−.05	−.26	−.04	.04	.17	.15	.13	−.10	−.08	.01	−.02	.05
Yenisseysk	.08	.07	−.14	.28	.09	.23	.16	−.05	−.23	.31	−.23	.20
Zanzibar	.02	−.02	.27	−.17	−.16	.09	.10	.10	.20	−.01	−.08	−.09
Zi-ka-Wei	.16	−.05	.21	.06	−.31	.09	.11	−.29	−.21	−.03	−.05	.08

TABLE 28.—*Correlation coefficients between foreign pressures and United States precipitation, district 5*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	-0.14	0.05	0.05	-0.07	-0.33	-0.01	0.06	0.36	0.20	0.25	0.19	0.16
Alexandria	.09	-.05	.00	.14	.14	.14	-.06	.04	-.14	.20	-.07	.21
Allahabad	.01	.15	-.19	-.07	-.06	-.12	.05	.16	.28	-.04	.21	.19
Antananarivo	.04	-.16	.17	-.35	-.18	-.14	-.15	.21	.23	.25	.22	.40
Apia	.07	-.02	-.10	.18	-.08	.08	-.34	-.30	-.36	-.30	-.35	-.28
Arequipa	.21	-.13	.19	-.23	-.25	-.29	.02	.22	-.27	.02	.15	.03
Batavia	.18	.17	.27	-.23	-.04	.15	.22	.21	.42	.30	.16	.34
Bermuda	.05	-.04	.05	-.13	.00	-.19	-.38	-.17	-.27	-.07	.14	.01
Bouzareah	-.11	-.27	-.08	.15	-.04	.15	-.05	-.10	-.09	.13	.07	.29
Bulawayo	.22	-.01	.12	-.08	-.24	.34	.10	.30	.24	.22	.23	.17
Capetown	.08	.14	-.14	-.10	.07	.37	-.01	.26	-.11	.13	.26	.39
Colon	-.02	-.18	-.16	-.13	-.08	-.32	-.26	.04	-.14	-.45	-.10	-.21
Cuyaba	-.05	-.20	-.20	.06	-.03	.06	-.43	.22	.07	-.07	.02	.20
Darwin	.02	.10	.09	-.13	-.05	.04	.19	.41	.36	.32	.06	.22
Dawson	-.24	-.12	-.06	-.30	.13	.14	.10	-.11	-.07	.29	-.12	-.32
Dutch Harbor	*-.11*	*-.12*	*-.19*	*.03*	*.19*	*.01*	*-.22*	*-.24*	*.16*	*-.02*	*-.12*	*-.58*
Edmonton	-.04	.00	.14	-.30	-.01	.04	.19	.02	-.19	.27	.08	-.09
Freetown	-.21	-.05	-.04	-.38	-.25	-.08	.04	-.02	-.05	.46	.34	.38
Georgetown	-.22	-.12	-.26	-.07	-.03	-.09	-.24	-.11	-.10	.25	.16	.19
Gjesvar	.24	.07	-.18	.12	.18	.06	.05	.02	.14	-.09	-.13	-.03
Honolulu	-.12	-.10	-.01	.01	.03	-.34	-.25	.08	-.26	-.34	-.28	.11
Irkutsk	-.09	-.06	.12	.12	-.04	.23	.30	-.30	-.22	-.14	-.12	-.10
Ivigtut	.03	.24	-.04	.15	-.26	.34	.16	.33	-.30	-.22	-.27	-.10
Jask	-.18	.00	-.20	-.01	-.15	.06	-.18	.24	.26	00	.13	-.02
Juneau	-.37	-.20	.11	.05	.17	.06	-.21	-.17	-.26	-.24	.04	-.48
Lagos	-.03	.13	-.28	-.14	-.16	.16	-.09	.23	.30	.16	.22	.24
Madeira	-.26	-.03	-.10	-.01	-.06	-.28	-.15	.00	-.17	.18	.16	.19
Madras	.17	.14	.22	-.23	.00	.10	.09	.20	.33	.13	.22	.28
Malden Island	-.22	-.27	-.06	-.01	.14	-.24	-.38	-.47	-.24	-.15	.10	-.03
Manila	.12	.18	.32	-.02	.03	-.11	.21	.21	.28	-.12	.25	.24
Markovo	.04	.11	.25	-.02	.27	.46	.17	-.35	-.04	-.26	-.24	-.28
Mexico City	.09	.07	.10	-.07	.02	-.06	-.36	-.05	-.14	-.01	.18	.14
Midway Islands	-.20	-.17	*.11*	.02	.13	*.06*	-.13	*.58*	-.26	-.12	*.14*	*.19*
Montevideo	.15	.05	.03	-.04	.01	.11	-.23	.28	-.27	.39	.24	-.06
Moose Factory	-.04	-.10	-.02	-.03	-.12	.03	-.03	.11	.08	.11	-.01	-.06
Nome	-.18	.03	.01	-.24	.01	.24	-.07	-.38	.10	.27	-.09	-.27
Orenburg	.10	-.21	-.16	-.09	-.10	.06	.11	-.04	-.20	-.37	-.24	-.05
Perth	.08	.21	.35	-.11	.11	.00	.29	.22	.24	-.01	.05	-.06
Ponta Delgada	-.21	-.24	.17	.09	-.13	-.45	-.12	-.13	-.02	.11	.27	.02
Port-au-Prince	-.06	-.22	-.15	-.24	.02	-.11	-.29	-.19	-.11	.01	.01	-.05
Port Moresby	*.01*	-.06	*.19*	*.11*	.09	.15	.30	.34	*.51*	.42	.29	.34
Punta Arenas	.14	-.22	-.22	-.18	-.16	.24	-.20	-.09	-.08	.05	.24	.07
Quixeramobin	.07	-.06	-.08	-.14	.03	-.01	-.02	.04	.18	.15	.31	.39
Rangoon	-.03	.20	.28	-.18	-.13	-.24	.20	.17	.33	.00	.39	.25
Rio de Janeiro	.02	-.02	-.10	-.22	-.11	-.11	-.39	.14	-.19	.04	.24	-.13
St. Helena	.12	.06	.04	-.09	.11	.13	.26	.20	-.14	.13	.22	.01
St. Vincent	-.17	-.05	-.09	.11	-.01	.13	-.08	.03	-.07	.07	-.01	.00
Santiago	.18	.17	.19	.06	.11	-.06	-.27	.03	-.15	-.18	-.14	-.26
South Orkneys	.04	-.06	-.08	.00	.11	.25	-.08	-.32	.10	-.35	.19	.50
Southwest Point	-.12	-.10	-.13	.13	-.11	.26	-.31	.18	.00	-.09	-.02	.02
Stykkisholm	.16	.22	-.05	.07	-.04	.30	.19	-.03	-.17	-.20	-.05	-.10
Sydney	.03	.16	.15	-.09	-.04	.14	.08	.19	.44	-.07	-.11	.03
Tashkent	-.19	-.10	-.10	-.21	.11	.32	.13	.10	-.24	-.07	.01	.16
Tokyo	.03	-.22	-.08	-.18	.11	-.07	.04	-.10	-.32	.06	.08	.13
Upernivik	.05	.18	.05	.24	-.11	.20	.20	.14	-.17	-.20	-.15	-.14
Ust Zylma	.04	-.20	-.11	.07	-.06	-.01	.23	-.07	-.21	-.25	.04	.02
Valencia	.03	-.19	.26	.17	-.21	-.03	.00	.06	.00	-.28	.07	-.02
Vienna	-.02	-.22	*.05*	*.04*	.24	*.16*	*-.01*	.08	.07	-.04	.02	.22
Wellington	-.01	.04	-.08	.02	-.24	.15	.26	.10	.07	-.16	.18	-.19
Winnipeg	-.24	-.03	.00	-.25	-.08	.02	.17	.18	-.02	.32	-.04	.02
Yakutsk	.07	.22	.02	.13	.00	.39	.19	-.43	.08	.10	.00	-.04
Yenisseysk	.11	.12	-.01	.22	-.04	.17	.26	-.16	-.15	.14	-.05	-.05
Zanzibar	-.02	-.01	.24	-.16	-.24	-.01	-.07	.12	.34	-.10	.13	.11
Zi-ka-Wei	.06	-.15	.04	-.08	-.19	.13	.00	-.37	-.22	.06	-.18	.10

TABLE 29.—*Correlation coefficients between foreign pressures and United States precipitation, district 6*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.16	0.32	−0.11	−0.06	−0.21	0.30	0.05	0.04	0.07	0.08	−0.04	0.14
Alexandria	−.30	−.04	−.06	−.19	.04	.13	.02	.01	.00	.32	−.07	.37
Allahabad	.58	−.20	−.02	.24	.16	.05	.08	.11	.08	.25	.08	.10
Antananarivo	.30	.35	.17	.24	.37	.40	−.05	.17	−.01	.10	.14	.41
Apia	−.30	−.34	−.13	−.26	−.21	−.13	.05	.01	.08	−.26	−.27	−.28
Arequipa	−.18	−.44	−.14	−.01	−.10	−.16	.19	−.13	−.13	−.18	.04	.03
Batavia	.39	.40	.20	.17	.18	.17	.07	.13	.24	.36	.21	.19
Bermuda	.01	−.19	.18	.06	.03	.29	−.24	−.22	−.22	.12	.23	.18
Bouzareah	−.17	.23	.19	−.16	.11	.35	−.18	−.01	.03	.22	.01	.26
Bulawayo	.18	.38	.25	.08	.28	.28	.10	.17	.38	.23	.09	−.03
Capetown	.01	.07	.03	.21	.29	.10	.12	.19	−.03	.06	−.15	.12
Colon	−.31	−.55	−.22	−.40	−.08	.26	.01	.04	−.10	−.39	−.32	−.16
Cuyaba	.07	.10	.04	.16	.08	.26	−.29	.13	−.14	−.26	−.10	−.25
Darwin	.39	.39	.15	.19	.24	.20	−.04	.21	.15	.32	.10	−.01
Dawson	.11	.25	.22	−.06	.31	.20	−.19	.10	.22	−.02	−.08	.13
Dutch Harbor	−.38	.07	.02	−.22	−.06	−.04	.05	−.16	.69	.05	−.02	.10
Edmonton	−.04	−.06	−.06	.41	.32	.15	.02	.00	−.38	−.10	.03	.10
Freetown	.13	.24	.25	.14	.16	.20	−.06	−.19	−.30	.37	.28	.32
Georgetown	.15	.16	.30	.17	.21	.21	.08	.00	.14	.17	−.04	−.05
Gjesvar	−.08	−.14	.14	.34	−.10	.03	.05	.11	−.06	−.05	−.02	−.12
Honolulu	−.16	−.50	−.36	.08	.17	−.17	−.01	−.01	.44	−.54	.25	−.12
Irkutsk	.11	.23	−.46	.06	.24	−.02	.08	.02	.02	−.08	−.24	.17
Ivigtut	−.30	.08	−.14	−.03	−.20	−.13	−.41	.20	.10	−.06	−.25	.08
Jask	.08	−.29	−.22	−.37	−.09	−.20	.27	−.15	−.08	.06	−.11	.05
Juneau	.12	.18	.18	.23	.40	.40	−.45	.12	−.22	−.13	−.10	.14
Lagos	.28	.15	.02	−.22	−.12	.01	.04	−.01	.12	.08	−.01	.09
Madeira	.09	.25	.18	.08	.06	.13	−.03	.02	−.49	.07	.06	.15
Madras	.39	.28	.00	.04	.24	−.03	.15	.24	.22	.17	.08	−.03
Malden Island	−.38	−.40	−.20	.01	−.07	−.04	.04	−.04	.13	−.07	.33	.29
Manila	.32	−.41	.15	.26	.14	−.43	.06	.01	.34	−.18	.14	.08
Markovo	−.24	−.10	−.37	−.35	.02	−.09	−.03	−.03	−.17	.12	−.29	.15
Mexico City	−.26	−.04	.15	.19	.22	.21	−.18	−.13	.01	−.09	.09	.04
Midway Islands	.00	−.45	.48	.11	−.12	−.14	−.07	.17	−.28	−.46	.14	.18
Montevideo	−.26	−.30	−.24	−.18	−.03	−.16	.00	.17	.08	−.22	.31	.06
Moose Factory	.00	.08	−.09	.00	.01	.06	.13	.10	.00	.06	−.09	−.01
Nome	−.29	.10	−.03	−.32	.00	.15	.13	−.15	.54	.26	−.23	.11
Orenburg	−.09	−.06	−.31	.16	.02	−.22	.21	.09	−.39	−.14	−.33	.16
Perth	.26	.27	−.05	.18	.23	.02	.04	.20	.10	−.02	.12	−.08
Ponta Delgada	−.02	−.10	.01	−.26	.27	−.06	.06	.21	−.32	.12	.18	−.02
Port-au-Prince	.05	.05	.13	.08	.20	.27	−.11	−.30	−.13	.05	.06	−.07
Port Moresby	.45	.56	.32	.23	.11	.22	.18	.21	.14	.44	−.01	.03
Punta Arenas	.12	.15	.07	.23	−.04	.12	.16	−.10	.00	.21	−.04	−.03
Quixeramobin	.31	.13	.39	.12	.13	.03	−.06	−.11	.10	−.04	.02	.00
Rangoon	.42	−.31	.14	−.04	.32	.03	.13	.11	.12	.17	.19	.19
Rio de Janeiro	−.03	−.30	−.02	−.52	−.23	−.22	.03	−.03	−.10	−.33	.18	−.01
St. Helena	.14	.17	.35	.24	.29	.33	−.06	−.25	−.19	.12	.04	−.04
St. Vincent	.12	.18	.14	.06	−.06	.15	.21	.14	.10	.11	−.05	−.10
Santiago	.19	−.28	−.21	−.06	−.02	−.02	−.08	−.15	−.08	−.33	−.16	−.19
South Orkneys	.11	.15	.08	.46	.01	.04	.24	.16	.12	.05	−.10	−.04
Southwest Point	.02	−.17	−.10	−.15	−.20	.24	−.09	−.01	−.06	−.12	−.04	.23
Stykkisholm	−.11	−.02	.09	.17	.09	.00	.05	−.03	.34	−.11	−.07	−.03
Sydney	−.09	.17	.19	−.12	.16	−.02	.14	.19	.22	.13	.22	.08
Tashkent	.00	−.15	−.13	−.21	.13	.04	−.06	.14	−.30	−.25	−.01	.23
Tokyo	.02	.07	−.08	.12	−.16	−.02	.05	−.09	.29	−.21	−.08	.16
Upernivik	−.23	.08	−.14	−.17	−.10	−.06	.03	.26	.40	−.17	−.20	−.16
Ust Zylma	.10	−.30	−.12	.26	.02	−.06	.25	.06	−.27	.04	−.01	.22
Valencia	.12	−.02	−.10	−.10	.15	.28	.07	−.24	.12	.41	.08	−.04
Vienna	.03	.14	.11	−.13	−.03	.17	−.11	−.36	.02	.14	−.04	.37
Wellington	−.53	.18	−.18	−.06	−.06	.08	.23	.26	−.03	−.11	.14	−.27
Winnipeg	−.11	−.04	−.19	.24	.25	.03	.14	.04	−.30	−.03	−.04	−.05
Yakutsk	−.23	.03	−.23	.08	−.02	−.04	.15	.01	.07	.01	−.24	.19
Yenisseysk	.08	.27	−.39	.22	.20	.28	.18	−.05	−.32	.29	−.32	.12
Zanzibar	.07	.29	.26	.13	.25	.38	−.07	.15	.04	.12	−.02	.18
Zi-ka-Wei	−.10	−.06	−.39	.09	.09	−.35	−.06	−.24	.07	−.19	−.14	.17

TABLE 30.—*Correlation coefficients between foreign pressures and United States precipitation, district 7*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.00	−0.21	−0.30	0.11	0.13	0.25	0.11	0.30	−0.05	0.44	0.25	0.06
Alexandria	.00	.00	−.12	.00	.14	.09	−.04	.14	−.17	.19	.11	.17
Allahabad	−.06	.40	−.26	.15	.30	−.38	−.07	.05	.13	−.02	.08	.15
Antananarivo	.17	−.14	.01	−.08	.00	−.02	−.19	.23	−.06	.43	.17	.29
Apia	.43	.38	.33	−.19	−.20	−.13	−.29	−.03	−.35	−.24	−.31	−.32
Arequipa	.21	.13	.22	−.13	−.18	−.26	−.01	−.08	−.03	.18	.09	−.07
Batavia	.01	−.02	−.28	.21	.35	.44	.20	.10	.13	.35	.11	.20
Bermuda	.06	.02	.14	−.16	.01	−.21	−.10	.00	−.04	.04	.23	.32
Bouzareah	.07	.00	−.19	−.02	.17	.31	.05	.06	−.26	.29	.07	.30
Bulawayo	.12	−.10	−.13	.17	.00	.08	−.02	−.21	−.07	.30	.30	−.05
Capetown	.05	−.11	−.08	.14	.25	.15	−.02	−.12	.00	.19	.24	.38
Colon	.38	−.26	.25	−.05	−.18	−.11	−.38	−.11	−.03	−.22	−.43	−.23
Cuyaba	−.14	−.04	−.11	.31	−.03	−.05	−.17	−.23	.20	.11	.19	.13
Darwin	.05	−.09	−.21	.20	.15	.30	−.04	.12	.14	.43	.22	.20
Dawson	−.07	−.20	.01	−.10	.11	−.05	.14	−.07	.05	.11	−.25	.05
Dutch Harbor	.44	.17	.38	.25	.18	−.12	−.13	.04	.38	−.04	−.33	.05
Edmonton	.00	−.02	.40	−.23	−.03	−.31	.11	−.02	−.20	.30	.08	.04
Freetown	−.05	−.17	−.31	−.23	−.31	−.17	−.01	−.04	−.05	.43	.22	.11
Georgetown	.33	.25	.08	−.10	−.12	−.06	.02	.07	.05	.27	.18	.28
Gjesvar	−.07	.14	−.10	.01	−.06	.00	−.03	−.14	.37	−.16	.09	−.07
Honolulu	.21	.23	−.11	−.11	.07	−.39	−.23	.02	−.05	−.15	−.16	.18
Irkutsk	.15	−.10	.02	−.02	−.03	.21	.08	−.22	−.29	−.10	−.17	−.03
Ivigtut	.04	.17	.21	.30	−.33	−.04	−.14	.01	−.26	−.29	−.14	−.27
Jask	−.31	.07	−.15	.08	.08	−.04	.03	.22	−.19	.10	.16	.03
Juneau	−.36	.08	.33	.24	.32	−.23	−.19	−.05	−.24	−.17	−.08	.20
Lagos	−.01	.04	−.04	−.06	.12	.28	−.14	.15	.02	.14	.28	.13
Madeira	−.07	.03	−.16	−.08	−.04	−.21	.11	.25	−.16	.35	.22	.39
Madras	−.02	.00	−.34	.08	.36	.30	.07	−.01	.15	.11	.06	−.04
Malden Island	.17	.45	.65	−.16	.02	−.10	−.16	−.30	−.12	−.09	.21	.00
Manila	.04	.09	−.29	.24	.33	−.12	.18	−.01	.23	−.25	.07	.09
Markovo	.17	−.08	−.16	−.06	.01	.06	.22	−.44	.13	.25	−.02	−.13
Mexico City	.14	.25	.33	−.23	.05	−.04	.04	.19	.04	.12	.29	.28
Midway Islands	.20	.52	−.23	.12	−.20	.16	.05	.32	−.01	−.71	.10	.14
Montevideo	.25	.24	.27	−.26	−.03	−.28	−.32	.11	−.15	−.06	−.28	.08
Moose Factory	.29	.14	.11	−.04	.17	−.05	.13	.31	.01	.13	−.40	−.01
Nome	.53	.03	.06	−.06	.04	.08	.07	−.28	.19	.32	−.19	.05
Orenburg	.12	−.15	−.08	.12	−.32	.03	.00	−.08	−.36	−.14	−.28	.05
Perth	−.08	−.06	.03	.07	.14	.28	−.03	−.06	.10	.11	.00	.14
Ponta Delgada	−.10	.11	.01	.13	−.03	−.27	.11	.16	−.07	.15	.09	.23
Port-au-Prince	.40	.17	.14	−.30	−.06	−.25	−.09	−.09	.18	.17	.14	.14
Port Moresby	.05	−.05	−.23	.20	.35	.25	.19	.17	.24	.41	.08	.26
Punta Arenas	.21	.07	−.06	−.24	−.10	.14	−.37	.07	.06	.18	−.14	.28
Quixeramobin	.00	−.11	−.14	−.07	.17	.14	.03	.11	.20	.25	.31	.17
Rangoon	.01	.47	−.28	.23	.27	−.35	.19	−.02	.14	−.04	.25	.08
Rio de Janeiro	.22	.05	−.04	−.08	−.12	−.14	−.26	−.01	−.13	−.01	.07	−.26
St. Helena	.00	.16	−.36	.16	.07	.08	.44	.11	−.07	−.04	.32	.12
St. Vincent	.04	−.10	−.12	−.11	.06	.14	−.05	.17	−.14	−.01	−.01	.13
Santiago	.40	.27	.38	−.11	.00	−.26	−.04	.10	.06	−.04	−.02	−.07
South Orkneys	.08	.33	.24	−.09	.04	.06	−.23	.12	−.17	−.07	−.23	.34
Southwest Point	.17	.06	.12	.22	−.11	.01	−.14	.20	−.40	−.10	−.26	.22
Stykkisholm	.01	.29	.00	.09	−.20	.06	.08	−.08	.10	−.31	.14	−.27
Sydney	.07	.10	−.12	.06	.06	.17	.00	.06	.27	−.06	−.19	−.14
Tashkent	.11	−.25	−.33	−.07	−.11	.20	.03	.10	−.43	−.19	.05	−.09
Tokyo	.00	−.25	−.40	−.06	.03	.05	.12	−.12	.05	−.06	.14	.15
Upernivik	.18	.18	.18	.19	−.37	.02	−.07	.02	−.08	−.18	−.10	−.23
Ust Zylma	.05	.17	−.08	.18	−.14	−.01	.01	−.26	−.14	−.31	−.04	.11
Valencia	.09	.10	.08	.11	.00	.04	.13	.01	.13	.35	−.04	−.11
Vienna	.10	−.22	.02	−.05	.10	.30	.07	−.02	.01	.10	−.03	.27
Wellington	.14	−.11	.06	−.06	−.25	.22	−.16	−.04	.05	−.03	−.11	−.28
Winnipeg	.00	−.05	.20	−.05	−.01	−.18	.12	.14	−.12	.38	−.18	−.03
Yakutsk	.14	−.15	.18	.19	.04	.31	−.01	−.22	.02	.04	−.12	.33
Yenisseysk	.03	−.08	−.09	.06	.06	.05	.07	−.19	−.09	.07	−.11	.10
Zanzibar	.24	.09	−.10	−.04	.01	.18	−.05	.01	.03	.25	.17	−.06
Zi-ka-Wei	−.01	−.15	−.03	−.26	.12	.08	.12	−.31	−.25	−.29	.12	.11

TABLE 31.—*Correlation coefficients between foreign pressures and United States precipitation, district 8*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	0.07	0.24	−0.06	0.27	0.48	0.25	0.12	0.10	−0.02	0.49	0.08	0.14
Alexandria	−.22	.18	.00	.15	−.18	.05	.12	.10	−.11	.48	.02	.06
Allahabad	.40	.09	−.14	.36	.44	−.22	−.05	.15	.09	.07	.08	.13
Antananarivo	.04	.22	.15	.27	.30	.32	−.20	.01	−.28	.35	.02	.42
Apia	−.33	−.44	−.12	−.52	−.01	−.22	−.01	−.02	−.34	−.39	−.40	−.27
Arequipa	−.44	−.62	−.17	.09	−.12	−.32	.09	.02	−.42	−.04	−.22	−.19
Batavia	.38	.45	.17	.46	.57	.34	−.04	.05	.17	.32	.20	.29
Bermuda	.00	.02	.20	−.06	−.04	.07	−.10	.01	−.08	−.01	.00	.10
Bouzareah	−.22	−.04	.24	.11	.03	.20	−.08	.00	−.25	.22	.11	.04
Bulawayo	.27	.32	.20	.31	.17	.05	.09	.36	.10	.14	.12	.07
Capetown	−.19	.01	−.21	.54	.30	−.03	.24	.22	−.35	−.11	−.02	.33
Colon	−.42	−.05	.07	−.32	.13	−.26	.09	.07	.06	−.32	−.34	−.04
Cuyaba	−.02	−.22	−.02	.28	.23	−.07	−.29	.05	.05	−.04	−.11	−.16
Darwin	.31	.28	.01	.34	.45	.37	−.06	.19	.06	.37	.17	.18
Dawson	.18	.35	.29	−.32	−.16	−.23	.03	−.34	−.06	.20	.05	.09
Dutch Harbor	.02	.00	.12	−.12	−.26	−.11	.07	−.25	.19	−.04	−.18	−.04
Edmonton	−.10	.03	−.07	.06	.08	−.26	.21	−.19	−.19	.01	−.13	.13
Freetown	−.15	−.19	−.06	.12	.08	.12	−.08	−.02	−.03	.28	.29	.27
Georgetown	−.06	−.11	.29	.09	.17	.04	.14	−.02	.11	.06	.07	.01
Gjesvar	−.12	.20	−.03	.10	−.22	.12	−.03	.01	.16	−.13	.04	−.02
Honolulu	−.15	−.38	−.13	.23	−.22	−.35	.07	.17	−.05	−.44	−.32	−.12
Irkutsk	−.03	.16	−.39	−.27	.04	.07	.09	−.08	−.26	−.20	−.25	.13
Ivigtut	.06	.10	−.04	.03	−.17	−.21	.03	−.04	.07	−.22	−.09	.08
Jask	.10	−.20	−.04	.21	.33	−.16	.26	.15	.26	.14	−.10	.10
Juneau	−.03	.17	.02	.04	−.20	.01	−.08	−.22	.06	−.18	−.30	.20
Lagos	.17	.31	−.02	.21	.20	.08	.10	.23	.38	.10	.12	.18
Madeira	−.31	−.02	.09	.29	.10	.11	−.09	−.01	−.33	.16	.04	.08
Madras	.44	.38	−.02	.32	.48	.12	.02	.16	.07	.25	.15	.15
Malden Island	−.46	−.48	−.20	−.35	−.29	−.10	−.03	−.16	−.36	−.32	−.16	.02
Manila	.54	−.14	.16	.38	.44	−.31	−.13	.04	.19	−.21	.18	.08
Markovo	−.02	.01	−.48	−.45	.16	−.26	−.16	.00	.38	−.04	−.17	.09
Mexico City	−.38	−.09	.08	.01	−.11	.05	−.14	−.10	−.20	−.24	−.09	−.08
Midway Islands	−.12	−.32	.43	.63	−.08	.07	−.33	.14	−.36	−.50	−.08	.14
Montevideo	−.30	−.25	.01	−.10	.08	−.49	−.29	.41	−.09	−.38	−.39	.19
Moose Factory	.11	−.02	.02	.05	.21	.00	.05	.13	.00	.02	−.12	−.22
Nome	−.09	.15	.01	−.17	−.15	−.11	.14	−.28	−.08	.33	−.02	.04
Orenburg	−.26	−.11	−.36	.03	.04	.03	.28	.00	−.36	−.14	−.39	.07
Perth	.32	.24	.17	.29	.30	.14	−.14	.18	.16	−.09	.26	.14
Ponta Delgada	−.36	−.07	.17	.18	.23	.09	−.08	.13	−.27	−.12	.04	.01
Port-au-Prince	−.06	.02	.08	−.15	.17	.13	−.12	−.09	.05	.04	.03	−.03
Port Moresby	.38	.27	.18	.40	.36	.43	−.04	.42	.26	.50	−.16	.16
Punta Arenas	.04	.20	.12	.08	.10	.16	−.28	−.32	−.19	.22	−.26	.13
Quixeramobin	.38	.11	.44	.25	.35	.12	−.10	.06	−.01	.04	.26	.08
Rangoon	.28	−.13	−.04	.34	.45	−.21	−.06	.15	.18	−.05	.15	.07
Rio de Janeiro	−.24	−.37	.06	−.02	.08	−.17	−.09	.13	.15	−.26	.10	.09
St. Helena	−.14	.46	−.04	.32	.16	.19	−.01	−.01	−.07	−.10	.26	.12
St. Vincent	−.02	.25	.14	.13	.09	.17	.13	.08	.00	.21	.12	−.09
Santiago	.17	−.38	−.02	−.24	−.07	−.38	−.23	.11	−.01	−.51	−.32	−.28
South Orkneys	.00	.17	.12	.14	.11	.12	.02	.03	−.12	.22	−.11	.20
Southwest Point	.05	−.20	.02	.07	−.04	−.11	.00	.12	−.06	−.28	−.27	−.03
Stykkisholm	.11	.03	−.12	−.08	−.11	−.13	−.08	−.07	.14	−.19	.13	.08
Sydney	.16	.10	.19	.04	.27	.20	.18	.44	−.01	−.16	.10	.02
Tashkent	.14	−.14	−.26	.12	−.08	−.12	.10	.13	−.10	−.12	−.11	−.02
Tokyo	.05	−.11	.01	.32	−.16	.07	−.09	−.10	.12	−.09	.16	−.01
Upernivik	.06	.06	−.15	.02	−.18	−.14	−.07	.06	.18	−.25	−.11	.00
Ust Zylma	−.04	.00	−.14	.08	.03	.16	.23	−.10	−.09	.25	−.22	.14
Valencia	.00	−.07	.07	−.14	.18	.22	−.08	−.01	.00	.39	.05	−.10
Vienna	−.01	−.04	.06	−.09	.02	.21	−.04	−.04	.00	.36	.07	.04
Wellington	−.26	.09	−.23	−.12	−.12	−.06	−.06	.23	−.23	−.08	.06	−.19
Winnipeg	−.12	.03	−.19	.08	.20	−.23	.05	−.24	−.28	.01	−.08	−.13
Yakutsk	.16	.11	−.27	−.16	−.05	−.06	−.07	−.22	.17	.12	−.20	.25
Yenisseysk	−.14	.30	−.39	−.01	−.04	−.02	.15	−.16	−.31	.31	−.24	.11
Zanzibar	−.09	.15	.15	.32	.19	.40	−.08	.15	.26	.25	−.07	.07
Zi-ka-Wei	−.16	.04	−.40	−.12	.09	.02	.02	−.28	−.12	.01	−.08	.19

TABLE 32.—*Correlation coefficients between foreign pressures and United States precipitation, district 9*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	−0.03	−0.34	0.02	−0.13	−0.03	−0.09	0.16	0.27	0.24	0.22	0.16	0.10
Alexandria	.26	−.07	−.03	.06	.25	.14	−.01	.33	.23	.08	.07	.12
Allahabad	−.51	.16	.13	−.23	−.09	.10	−.06	−.06	.06	.34	.11	−.02
Antananarivo	−.37	−.03	.03	.09	−.21	−.13	−.22	.10	−.05	.19	.08	−.08
Apia	.28	.24	.38	.06	−.16	−.15	−.38	−.13	−.17	.08	−.02	.03
Arequipa	.23	.30	.28	−.11	.01	−.06	−.01	.15	.09	.14	.04	−.03
Batavia	−.46	−.37	.08	−.12	−.08	.04	.04	.08	.00	.04	−.01	.08
Bermuda	−.12	.25	−.34	−.12	−.06	−.13	.11	.38	.02	−.18	.07	−.05
Bouzareah	−.01	−.14	−.36	−.06	−.05	−.15	.07	.42	.18	−.11	.36	.31
Bulawayo	−.42	−.34	−.05	.00	.18	.17	−.09	−.09	.07	.16	.19	.08
Capetown	−.20	.07	.00	−.28	−.25	.10	−.23	.02	.11	.04	.12	.09
Colon	.35	.50	.09	.15	−.18	−.12	−.14	.01	−.02	−.15	−.01	.05
Cuyaba	−.09	.06	.00	−.10	−.13	−.28	.08	.20	.41	−.02	.07	.33
Darwin	−.65	−.52	.08	−.05	−.16	−.05	.01	−.02	−.05	.00	.11	.05
Dawson	−.14	−.12	−.17	.12	.02	−.21	.05	.30	−.14	.20	−.08	−.25
Dutch Harbor	.23	.34	−.33	.29	.54	.02	−.02	.46	.11	−.25	.12	−.03
Edmonton	−.12	−.22	−.02	−.18	−.24	−.10	.20	.00	.11	.24	.09	−.07
Freetown	−.19	−.56	−.18	−.17	−.21	−.12	−.15	−.04	.01	−.09	−.13	−.11
Georgetown	−.15	−.25	−.31	−.13	−.15	−.27	.00	.07	.08	−.10	−.08	.15
Gjesvar	.25	.09	.05	−.05	.08	.16	.03	−.30	.19	.28	−.20	−.04
Honolulu	.16	.44	.34	−.28	.07	−.20	−.15	−.02	−.24	.12	.17	.19
Irkutsk	.19	−.14	.22	.14	.18	.22	.03	−.30	−.02	.08	.19	.15
Ivigtut	.17	−.10	.10	.13	−.08	.10	−.11	−.45	−.04	.02	−.05	−.12
Jask	−.20	.04	.27	−.24	−.08	.18	.16	.14	.04	.12	.03	.12
Juneau	−.14	.00	−.03	.26	.07	.06	.03	.13	−.17	−.03	.10	−.40
Lagos	−.23	−.18	−.10	−.07	.13	.34	−.11	.00	.00	−.19	.06	−.10
Madeira	−.02	−.27	−.25	−.08	−.33	−.03	.12	.29	.07	−.07	.12	.05
Madras	−.40	−.13	.07	.12	.12	−.04	−.03	.02	−.01	.24	.00	.04
Malden Island	.27	.19	.22	−.04	.06	−.28	.21	.10	−.06	.20	.03	−.12
Manila	−.39	.53	.17	−.09	−.03	.11	.04	−.26	−.12	.18	−.01	.18
Markovo	.12	.10	.27	.22	.01	.35	.07	−.34	.25	−.16	.21	−.36
Mexico City	.10	−.10	−.19	−.22	−.20	−.26	.22	.27	.11	−.15	.08	−.06
Midway Islands	.33	.24	−.61	−.12	−.10	.03	.20	−.14	.00	.04	.02	−.16
Montevideo	.36	.29	.21	.16	.01	−.02	−.14	.03	.10	−.02	−.18	.10
Moose Factory	−.01	−.05	.04	.14	−.09	−.10	−.16	.24	−.12	.10	.11	−.05
Nome	.43	.19	−.20	.08	.05	−.14	−.15	.03	−.26	−.12	.16	−.17
Orenburg	.27	−.10	.21	.02	−.01	.15	.00	−.25	−.03	.08	−.06	−.02
Perth	−.32	−.19	.06	−.18	−.04	.10	.00	−.11	−.14	−.01	.09	.21
Ponta Delgada	.26	.00	−.18	−.01	−.16	−.09	.22	.03	.27	.14	.13	.06
Port-au-Prince	−.21	−.25	−.32	−.22	−.25	−.23	.20	.26	.20	−.04	−.07	−.01
Port Moresby	−.56	−.58	.04	.00	−.29	−.15	−.25	.03	.05	−.09	−.10	.15
Punta Arenas	.15	.06	.20	−.27	−.23	−.17	−.30	−.06	.17	−.08	−.09	.04
Quixeramobin	−.46	−.38	−.30	−.25	.15	−.10	.13	.20	.21	−.01	.05	.26
Rangoon	−.44	.37	.09	−.11	−.13	.06	.08	.15	.14	.26	−.04	−.01
Rio de Janeiro	−.06	.07	.09	.02	−.19	−.18	−.10	−.01	.17	.07	−.10	.02
St. Helena	−.03	−.31	−.48	−.10	−.10	.17	.16	.12	.11	.05	−.01	−.24
St. Vincent	−.15	−.45	−.13	.12	.20	.31	−.02	.17	−.04	.12	−.13	.40
Santiago	.05	.30	.13	−.08	−.16	−.10	.13	.16	.02	.04	−.13	−.04
South Orkneys	.09	.12	−.01	−.10	−.32	−.18	−.58	.04	−.34	−.28	−.05	.34
Southwest Point	−.04	.16	−.20	.24	−.14	.18	−.13	.19	−.24	−.11	.09	−.22
Stykkisholm	.01	−.06	.16	−.07	−.04	.11	−.12	−.44	.10	−.02	−.22	−.07
Sydney	−.22	−.16	.08	.06	.04	.22	−.15	.00	−.28	−.02	−.28	.04
Tashkent	.19	.05	.07	−.07	−.14	.30	.22	.06	−.14	−.06	.00	−.06
Tokyo	−.06	−.04	−.09	−.17	.20	−.14	.12	.08	−.16	.03	.14	−.07
Upernivik	.11	−.15	.18	.14	−.14	−.04	−.05	−.40	−.15	.12	−.12	.08
Ust Zylma	−.08	.14	.14	−.05	.12	.11	.03	−.19	.11	.19	.08	.00
Valencia	.10	.02	.11	−.04	.04	−.06	−.25	.07	.27	−.04	.00	−.04
Vienna	.06	−.13	−.22	−.01	.04	−.04	−.11	.42	.02	−.45	.12	.00
Wellington	.26	.11	.25	−.06	−.06	.16	−.26	−.15	−.22	.08	−.14	−.17
Winnipeg	−.03	−.24	.12	−.20	−.16	−.03	−.04	.11	−.14	.20	−.14	−.13
Yakutsk	.27	−.04	.19	.28	−.05	.28	−.26	−.26	−.03	.08	.40	.12
Yenisseysk	.02	−.18	.16	−.02	−.06	−.01	−.08	−.43	.23	.08	.20	.10
Zanzibar	−.06	−.29	−.11	−.02	.01	−.09	−.17	.16	.18	.26	.19	−.06
Zi-ka-Wei	.11	.09	.28	−.16	.23	−.01	.25	−.01	.09	.18	.20	.28

TABLE 33.—*Correlation coefficients between foreign pressures and United States precipitation, district 10*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	−0.05	−0.04	0.13	0.00	0.12	0.11	−0.10	0.12	−0.31	0.27	0.13	0.25
Alexandria	.15	.08	.06	−.08	−.16	.06	.06	.24	.07	.22	−.03	.24
Allahabad	.01	.07	.04	.38	.38	−.06	−.12	−.22	−.28	.22	.11	.17
Antananarivo	−.14	−.06	.13	.07	.13	.10	−.08	.05	−.03	.26	.19	.32
Apia	.03	.18	−.07	−.45	−.19	−.15	.08	.47	.23	−.31	−.30	−.07
Arequipa	.02	.12	.28	.04	−.12	−.33	.00	.03	.09	−.11	.12	.04
Batavia	−.02	.09	.24	.33	.43	.40	−.20	−.25	−.38	.30	.22	.19
Bermuda	−.13	.08	.16	−.08	−.02	.02	.30	.01	.10	−.08	.18	.08
Bouzareah	−.18	−.07	.05	.13	.00	.13	.16	.13	.06	.06	.10	.16
Bulawayo	.04	.02	.19	.27	.31	.03	−.29	−.29	−.29	.28	.27	.01
Capetown	−.02	.00	−.02	.35	.08	−.05	.13	−.13	−.11	.12	.03	.04
Colon	.00	−.22	−.15	−.42	−.12	−.38	.08	.00	.16	−.34	−.11	−.18
Cuyaba	−.32	−.22	−.36	.31	.04	.11	.08	−.08	.02	.03	−.29	−.08
Darwin	−.08	−.03	.00	.33	.28	.33	.36	−.18	−.14	.33	.24	.15
Dawson	−.16	−.23	−.09	−.10	.15	.11	.03	−.20	−.19	.31	.18	.02
Dutch Harbor	.35	.43	−.13	−.20	−.18	−.20	.38	−.16	.24	−.10	−.09	−.32
Edmonton	−.21	−.13	.25	.14	.16	−.01	.10	−.06	−.02	.24	−.02	.32
Freetown	−.26	.01	.05	.15	.10	.06	.01	.07	.15	.46	.35	.40
Georgetown	.05	.10	−.03	.13	.13	.06	.22	.27	.34	.12	−.03	.10
Gjesvar	.52	.01	−.13	.01	−.13	.05	−.14	−.10	.31	−.04	.05	−.17
Honolulu	−.04	.04	.03	−.05	−.22	−.27	−.23	.12	.02	−.30	−.04	.11
Irkutsk	.06	−.28	.06	−.11	.00	−.04	−.01	.05	−.14	−.08	−.21	.03
Ivigtut	.04	−.13	−.01	−.37	−.25	−.04	−.31	−.21	−.11	−.02	−.38	.20
Jask	−.24	−.06	.21	−.04	.04	−.11	−.18	.03	−.40	.02	−.20	.01
Juneau	−.44	−.11	.07	−.02	.44	.04	.46	−.45	−.37	−.06	−.32	−.18
Lagos	−.21	.17	−.28	.18	.29	−.26	−.02	.07	−.28	.20	−.10	.13
Madeira	−.37	−.10	.15	.15	−.09	.05	.27	.13	.09	.17	.26	.31
Madras	.04	.03	.13	.14	.49	.20	−.16	−.19	−.37	.26	.11	.18
Malden Island	.03	.02	.07	−.34	−.44	−.31	.31	.33	.31	−.28	.05	−.17
Manila	−.05	.24	.20	.40	.51	−.33	−.24	−.26	−.22	−.22	.13	.04
Markovo	.03	−.09	.08	−.04	.12	.00	−.15	−.07	.08	.12	.00	−.16
Mexico City	.14	.15	.12	.00	.04	.07	.45	.33	.08	−.10	.23	.27
Midway Islands	−.30	−.13	.16	.06	−.06	.01	.28	.06	.36	−.24	.02	.14
Montevideo	−.10	−.04	.12	−.07	−.11	−.24	−.04	.06	.02	−.18	−.31	.34
Moose Factory	.14	.19	.22	.15	.20	−.03	.11	.14	−.01	−.22	−.22	.16
Nome	.08	.28	−.07	−.17	−.18	.01	.12	−.28	−.02	.10	−.13	−.04
Orenburg	.15	−.49	.04	.07	−.15	−.13	−.01	−.28	.06	−.14	−.24	−.03
Perth	−.02	−.02	.18	.19	.32	.33	.07	−.22	−.17	.15	.20	.19
Ponta Delgada	−.21	.03	.40	−.11	.12	−.08	.26	−.09	−.09	.11	.25	.10
Port-au-Prince	.00	.12	−.07	−.03	.26	.01	.32	.11	.33	.15	.03	.13
Port Moresby	−.14	.06	−.12	.43	.41	.45	−.11	−.08	−.17	.42	.18	.15
Punta Arenas	.12	−.08	.31	.13	−.12	.06	−.12	.21	−.10	−.12	−.02	.36
Quixeramobin	−.15	.03	−.17	.24	.31	.27	−.08	.07	−.12	.15	.26	.20
Rangoon	−.15	.20	.21	.25	.42	−.11	−.02	−.18	−.33	.09	.26	.00
Rio de Janeiro	−.25	.24	.18	−.03	−.27	−.11	.16	.28	−.29	−.03	.09	−.02
St. Helena	−.06	.00	.05	.19	.32	.16	.10	−.08	.14	.10	.17	.02
St. Vincent	−.09	.00	−.01	−.07	.01	.14	−.04	.20	.09	.29	.08	.24
Santiago	.26	.00	.06	.00	.08	−.14	.15	.08	−.04	−.13	−.10	−.13
South Orkneys	.11	.17	−.08	.28	.10	−.01	.20	.04	.01	−.10	.15	.13
Southwest Point	.00	.00	−.02	.00	−.24	.07	.44	−.09	.02	−.14	−.03	.01
Stykkisholm	.16	.09	−.17	−.03	−.03	.14	−.35	.01	−.03	−.03	−.16	.19
Sydney	.16	−.05	.29	−.08	.11	.26	−.16	.04	−.06	.08	.09	−.01
Tashkent	−.11	−.12	−.02	−.16	−.10	−.06	−.08	.09	.12	.01	−.26	.11
Tokyo	−.08	−.20	−.12	−.03	−.11	.23	.00	.06	.20	−.05	.23	.02
Upernivik	.32	.03	.04	−.01	−.20	.03	−.31	−.05	−.06	−.01	−.29	.04
Ust Zylma	.17	−.23	−.04	.34	−.25	.00	−.02	−.34	.16	−.20	.03	−.08
Valencia	.26	.02	.15	−.12	.16	.12	.33	.15	−.29	.17	−.05	.01
Vienna	−.02	−.14	.02	.00	−.02	.16	.35	.19	.29	−.06	.01	.15
Wellington	.08	.00	.07	.17	−.22	.06	.05	.09	.14	−.15	.08	−.02
Winnipeg	−.24	.14	.23	.22	.15	−.16	−.07	−.08	.12	.01	−.31	.19
Yakutsk	.30	−.25	−.15	−.06	−.03	−.06	−.12	−.12	−.14	.18	.28	.00
Yenisseysk	.18	−.24	.09	.09	−.07	.09	.07	−.14	.01	.23	.04	.03
Zanzibar	.03	−.17	.20	.00	−.07	.02	−.08	−.02	−.06	.17	.24	−.10
Zi-ka-Wei	−.01	−.07	−.12	−.18	.09	−.03	−.05	.04	−.18	−.11	−.08	.05

TABLE 34.—*Correlation coefficients between foreign pressures and United States precipitation, district 11*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	−0.04	0.01	−0.06	−0.21	−0.21	−0.22	0.01	0.05	0.16	0.01	0.18	0.15
Alexandria	.17	.26	−.04	−.21	.11	.18	−.01	.09	.26	.08	.11	−.00
Allahabad	−.22	.06	.22	−.03	−.22	.10	.02	−.09	.05	.12	−.02	.23
Antananarivo	−.29	−.15	−.08	−.05	−.17	−.24	−.12	.06	−.10	.00	−.03	−.14
Apia	.30	.17	.22	.17	.04	.22	−.17	−.23	−.02	.00	−.07	−.03
Arequipa	−.28	−.06	−.29	−.02	.00	−.17	.11	−.02	−.17	.00	.11	.15
Batavia	−.10	−.11	.17	.03	−.12	−.22	.14	.07	.10	−.09	.02	.20
Bermuda	−.23	−.04	−.38	−.32	−.07	−.26	.12	−.06	.01	−.24	−.21	−.33
Bouzareah	.05	−.08	−.10	−.32	−.38	−.32	.33	.19	.14	−.12	.35	.20
Bulawayo	−.30	−.21	−.01	.05	.00	−.04	.01	.18	.15	.08	.19	.27
Capetown	−.28	.06	−.23	−.26	−.15	−.15	−.37	−.11	.10	−.16	.13	−.00
Colon	−.05	.07	−.29	.23	−.11	−.36	.17	−.25	−.06	−.09	.12	−.09
Cuyaba	.19	.01	.11	−.06	−.13	−.13	.14	.27	.34	−.25	−.08	.26
Darwin	−.30	−.32	.18	−.10	−.31	−.34	.26	.10	−.09	−.05	−.02	.34
Dawson	−.26	.12	.04	.09	−.16	−.27	.37	.00	.10	.00	.32	−.43
Dutch Harbor	.02	.30	−.08	.22	.47	−.02	.15	.15	.15	−.06	.27	−.33
Edmonton	−.01	.00	−.20	−.09	−.48	−.40	−.04	−.21	.03	.24	−.04	−.45
Freetown	−.22	−.20	−.18	−.12	−.22	−.50	−.41	−.27	−.14	−.41	−.29	−.34
Georgetown	−.03	−.13	−.13	−.24	−.28	−.38	−.01	−.01	−.06	−.23	−.07	.13
Gjesvar	.04	.23	.06	.18	.09	.05	.21	.43	.22	.21	−.21	−.21
Honolulu	−.08	−.07	.10	−.25	.14	.04	.13	−.09	.12	.18	.08	.18
Irkutsk	−.16	.27	.40	.24	.23	.37	.21	.10	.17	.26	.38	−.21
Ivigtut	.10	.09	−.01	.33	.12	.09	−.10	−.01	−.16	−.15	.22	−.01
Jask	.36	.19	.14	.05	.13	.30	.15	−.10	.19	.11	.24	.21
Juneau	−.22	.02	.12	.40	−.13	−.02	.22	.09	.13	−.08	.29	−.40
Lagos	−.02	−.03	.11	−.15	.19	.11	−.01	.00	.02	−.13	.07	−.02
Madeira	.03	−.23	−.23	−.38	−.21	−.53	−.18	−.24	.04	−.30	−.08	−.12
Madras	−.18	.19	.26	.24	.00	.14	.11	.02	.13	.06	.02	.24
Malden Island	.03	.05	−.09	−.02	.03	−.06	.16	.08	.01	−.20	−.32	−.32
Manila	−.22	.26	.16	−.02	−.08	.30	.28	.09	−.05	.17	.06	.36
Markovo	−.05	.03	.28	.20	−.17	−.07	−.02	−.13	−.12	−.18	.02	−.14
Mexico City	−.26	−.29	−.47	−.44	−.31	−.45	−.28	−.50	−.17	−.31	−.26	−.35
Midway Islands	.42	−.07	−.24	−.11	−.39	.06	.34	−.31	.27	.30	.03	.22
Montevideo	.17	.11	.03	.02	.08	.11	−.02	−.10	.12	.04	.00	.18
Moose Factory	.26	.07	.13	−.21	−.17	−.02	.22	−.13	.02	.11	.13	−.04
Nome	−.04	.34	.07	.10	.22	−.02	−.11	.05	−.23	−.26	.24	−.16
Orenburg	−.04	.15	.13	−.04	.00	−.12	.14	.11	−.15	−.05	.22	−.16
Perth	−.21	−.29	.16	−.12	−.15	−.20	.01	.02	−.05	.14	.05	.34
Ponta Delgada	.19	.12	−.08	−.08	−.27	−.25	.12	−.24	.25	−.04	−.02	.00
Port-au-Prince	−.08	−.25	−.29	−.34	−.38	−.50	.10	−.26	−.07	−.23	−.26	−.24
Port Moresby	−.15	−.23	−.02	−.26	−.38	−.50	.04	.20	.18	−.15	.02	.24
Punta Arenas	.06	.05	.15	−.14	.03	−.05	−.10	−.43	−.10	−.07	.00	−.22
Quixeramobin	−.18	−.29	−.23	−.31	−.17	−.61	.09	.05	.25	−.20	−.08	.18
Rangoon	−.33	−.01	.06	.02	−.10	.13	.11	.10	.13	.03	−.13	.26
Rio de Janeiro	.29	.04	−.17	.06	−.02	−.07	−.02	−.27	.05	−.02	−.18	.10
St. Helena	−.18	−.19	−.16	−.22	−.10	.05	.13	−.20	.02	.12	−.05	−.18
St. Vincent	.06	.07	−.02	.05	.02	.00	.26	.24	.29	.07	.11	.25
Santiago	−.30	−.18	−.19	−.13	−.05	−.02	−.32	−.31	−.23	.01	−.23	.01
South Orkneys	.35	.10	−.11	−.36	.26	.02	−.36	.25	−.18	−.10	−.05	.12
Southwest Point	.10	.02	−.28	−.28	−.05	.09	.00	−.15	.00	−.16	.21	−.12
Stykkisholm	−.08	−.12	.03	.31	.03	.15	−.13	.03	−.08	.05	−.16	−.14
Sydney	−.13	−.26	−.08	.01	−.01	−.24	−.08	.22	−.23	.15	−.10	.31
Tashkent	.09	.13	−.02	.04	.17	.14	.33	.19	.24	.08	.31	.02
Tokyo	−.06	.22	.11	−.03	.02	.07	−.20	.08	.01	.03	−.03	.02
Upernivik	−.05	−.10	.04	.20	.18	−.11	−.09	.01	−.20	−.06	.18	.15
Ust Zylma	−.17	.29	.04	−.05	.11	.12	−.02	.22	.05	.10	.06	−.20
Valencia	.03	.08	.09	.00	−.08	.00	−.06	.02	.20	.09	.08	.10
Vienna	.22	.10	−.11	−.30	−.01	.07	.06	.20	.10	−.22	.22	−.03
Wellington	.02	.08	−.11	.16	.13	.01	−.20	−.21	−.38	.35	−.16	−.07
Winnipeg	.16	−.24	.03	−.17	−.37	−.07	.08	−.16	−.01	.12	.24	−.26
Yakutsk	.14	.29	.25	.43	.16	.05	.01	.06	−.16	.12	.18	−.02
Yenisseysk	−.40	−.01	.09	.07	−.22	.15	−.06	−.06	−.15	−.23	.18	−.24
Zanzibar	−.12	.14	.02	.17	.02	−.17	.04	.19	.20	−.06	.10	.13
Zi-ka-Wei	−.07	.32	.38	−.03	.19	.45	.12	.05	.08	.25	.14	−.02

TABLE 35.—*Correlation coefficients between foreign pressures and United States precipitation, district 12*

	Winter precipitation			Spring precipitation			Summer precipitation			Fall precipitation		
	SON 1	JJA 2	MAM 3	DJF 1	SON 2	JJA 3	MAM 1	DJF 2	SON 3	JJA 1	MAM 2	DJF 3
Aden	−0.04	−0.08	0.27	0.05	0.05	−0.12	0.25	−0.04	0.21	0.17	−0.02	0.18
Alexandria	.21	.11	.10	.05	.04	.14	−.06	−.01	.12	.06	.03	.08
Allahabad	−.16	.28	.09	.06	−.04	.16	.03	−.18	.03	.12	.06	.18
Antananarivo	−.21	−.10	.12	−.01	−.23	−.32	−.22	.18	−.03	.19	.00	−.09
Apia	.16	.03	−.13	−.14	−.21	−.19	−.19	−.07	−.18	−.06	−.11	−.03
Arequipa	.34	.21	.38	−.11	−.05	−.21	.04	.16	−.07	−.25	−.46	−.29
Batavia	−.14	−.04	.31	.10	.10	.09	.11	−.03	.02	−.06	.09	.22
Bermuda	−.01	.21	−.14	−.18	−.29	−.22	.07	.36	.01	−.14	−.32	−.36
Bouzareah	−.18	−.25	.10	−.02	−.05	−.14	.06	.07	.06	−.06	.22	.17
Bulawayo	−.10	.00	.11	.08	.23	−.04	−.18	.04	.04	.12	.05	−.02
Capetown	−.20	.06	−.03	−.04	−.18	.02	−.22	−.06	−.09	−.07	.03	.12
Colon	−.01	−.07	−.06	−.13	−.04	−.04	−.02	−.09	−.04	−.08	.11	−.13
Cuyaba	−.11	−.34	−.21	−.08	.17	−.26	.18	−.16	.22	−.04	−.05	.21
Darwin	−.17	−.12	.03	.10	−.12	.01	−.02	−.09	−.17	−.06	.17	.37
Dawson	−.31	−.29	−.02	.19	.31	.39	.29	.29	−.13	.17	.21	−.06
Dutch Harbor	.34	.06	.15	−.18	.18	−.09	.15	.20	.11	.01	.00	−.30
Edmonton	−.33	−.04	.29	−.07	−.10	.06	.16	.03	−.02	.18	.05	−.07
Freetown	−.07	.08	.04	.06	−.07	−.34	−.18	−.03	.08	−.19	−.09	−.13
Georgetown	.05	−.05	−.10	−.19	−.34	−.50	−.01	.06	−.04	−.26	−.10	.13
Gjesvar	.50	.14	−.27	−.14	−.10	.20	−.11	−.07	.09	.24	.17	.08
Honolulu	.06	−.07	−.03	−.23	−.11	.01	−.02	.01	.03	−.06	−.11	−.13
Irkutsk	.09	−.23	.17	−.13	.04	.20	.11	−.06	.07	.26	.17	.20
Ivigtut	−.07	−.24	−.19	.09	.18	.13	−.06	−.34	.16	−.18	.05	.19
Jask	−.15	−.02	.18	.03	.11	.35	.29	−.12	.01	−.01	−.04	.28
Juneau	−.53	−.37	.11	−.01	.25	.28	.05	.13	−.13	−.22	−.08	−.21
Lagos	−.26	−.05	−.17	.19	.25	.13	.02	.00	.09	−.28	.13	−.01
Madeira	−.18	−.18	.07	−.19	−.25	−.29	−.03	.22	.02	−.12	−.04	−.22
Madras	−.09	−.07	.22	.17	.18	.29	.01	−.15	.04	.06	.15	.34
Malden Island	.05	.01	.09	−.33	−.12	−.31	.00	−.02	−.36	−.06	−.32	.02
Manila	−.07	.37	.32	.10	.25	.20	.09	−.11	−.15	.12	.13	.19
Markovo	−.13	−.13	.20	.30	.05	.30	.06	−.07	.10	−.37	−.07	.00
Mexico City	.02	−.03	.06	−.37	−.22	−.32	.06	−.02	−.06	−.38	−.26	−.45
Midway Islands	−.17	−.16	.09	−.26	−.01	.33	.25	−.25	.17	.08	.01	−.26
Montevideo	−.01	.02	.06	.35	.05	.00	−.11	.11	.20	−.07	−.13	.08
Moose Factory	.11	.23	.10	.02	−.26	−.17	−.08	.31	−.04	.12	.06	−.37
Nome	−.10	.11	−.02	.07	.31	.07	−.02	.16	−.35	−.10	.10	.02
Orenburg	.13	−.26	.03	−.05	−.19	.15	.09	.01	−.16	−.01	.11	−.05
Perth	−.14	−.06	.32	.05	.03	.28	−.05	−.05	−.28	−.11	.21	.24
Ponta Delgada	.03	.15	.28	−.10	−.28	−.11	−.01	−.14	.10	−.06	−.10	−.03
Port-au-Prince	.11	.03	−.11	−.33	−.37	−.36	.11	.21	−.12	−.21	−.33	−.28
Port Moresby	−.16	−.11	−.15	.05	.09	−.05	−.08	−.10	−.16	−.01	−.20	.10
Punta Arenas	−.11	−.09	.08	−.07	−.03	−.21	−.11	−.21	.13	.23	−.01	−.05
Quixeramobin	.00	−.14	−.11	−.03	.13	.01	.05	.02	.01	−.19	.03	−.03
Rangoon	−.19	.36	.29	.04	.08	.10	.17	−.02	.20	−.07	.02	.23
Rio de Janeiro	−.30	−.09	.26	−.05	−.15	−.08	.06	−.24	.25	.00	−.14	.04
St. Helena	.06	−.09	.08	−.14	−.14	.02	−.05	−.18	−.06	.06	.01	−.04
St. Vincent	.07	.06	−.01	−.01	.12	.16	.03	−.04	−.06	.01	.03	.02
Santiago	.00	.10	.18	−.12	−.12	−.10	−.05	−.02	−.22	−.19	−.36	−.29
South Orkneys	−.14	.19	−.16	−.02	−.21	−.48	−.32	.15	−.24	.22	−.04	.21
Southwest Point	−.07	−.05	−.22	.08	−.25	.02	.13	.18	.04	−.12	−.11	−.39
Stykkisholm	.06	.00	−.24	−.04	.03	.10	−.13	−.24	.10	−.07	−.02	.11
Sydney	.25	.02	.19	−.04	−.04	.13	−.15	.13	−.50	.02	−.06	−.01
Tashkent	−.00	−.06	.16	−.16	.06	.24	.10	.12	−.15	.20	.08	−.16
Tokyo	.10	−.37	−.02	−.13	−.07	.09	−.13	−.07	−.11	.20	.10	.02
Upernivik	.05	−.16	−.07	.04	.03	.00	.00	−.27	−.02	−.13	.04	.20
Ust Zylma	.09	.00	−.16	−.15	−.23	.22	−.14	.08	.03	−.05	.05	.11
Valencia	.05	.15	.09	.06	−.04	−.14	−.10	.13	.17	.04	−.03	−.12
Vienna	.13	−.27	.08	.13	−.14	−.03	.04	.22	−.12	−.12	.11	−.18
Wellington	.33	.08	.12	−.11	.09	−.01	−.21	−.05	−.32	.12	−.07	.02
Winnipeg	−.11	.07	.15	−.01	−.16	.03	−.05	.11	−.24	.00	.03	−.26
Yakutsk	.31	−.12	−.03	.27	.01	.22	−.14	−.12	−.20	−.03	.17	.20
Yenisseysk	.12	−.07	.11	−.12	−.30	.01	−.12	−.22	.01	.02	.22	.05
Zanzibar	.12	−.19	.14	−.20	.11	−.29	.02	.17	.03	.10	−.07	.02
Zi-ka-Wei	.07	−.05	.15	−.01	.16	.26	.14	−.09	.13	.41	.05	.40

TABLE 36.—*The oscillations*

Year	North Atlantic oscillation				North Pacific oscillation	Southern oscillation			
	DJF	MAM	JJA	SON	DJF	DJF	MAM	JJA	SON
1888	−4	−9	−5	−1	−8	0	−1	−5	−7
89	+1	+3	+4	+3	+9	−8	−3	+4	+6
90	+9	+6	+4	+4	−6	+7	+6	+5	+3
91	+5	−6	−5	+5	+1	0	−5	−5	−3
92	−4	−6	−5	−2	+3	−2	+7	+7	+7
93	−6	+3	−4	−7	−6	+4	+5	+6	+4
94	+7	+6	+8	0	+1	+5	+6	+4	+3
95	−8	+1	−3	+1	−2	+3	+5	+1	−3
96	+2	+7	+2	−5	+4	0	+2	−2	+5
97	−2	+4	−2	+3	+7	−4	−3	0	0
98	+4	0	+3	+4	+2	+2	+1	0	+5
99	+1	−8	+1	+5	−1	+2	−1	−7	−5
1900	−6	−3	−4	+3	+3	−4	−9	−2	−1
01	−2	−1	+7	+3	−2	−4	−2	−2	−2
02	−7	−1	−10	+3	+4	−4	−4	−5	−10
03	+6	+7	−5	−2	+1	−8	−4	+2	+4
04	−1	+5	−3	+3	−3	+5	+1	−6	−1
05	0	+1	+2	−5	−2	−5	−9	−6	−4
06	+4	−2	0	+4	+5	−4	−3	+3	+4
07	+1	+5	−2	+3	−5	+6	−4	−4	+1
08	+1	+2	+1	+7	+8	0	+1	+2	+3
09	+4	−7	+4	−3	+1	+2	+4	+6	+5
1910	−1	+3	−4	−5	0	+5	+5	+5	+6
11	+3	+3	−3	−1	−4	+5	0	−4	−4
12	−1	+4	−4	−2	+2	−7	−3	0	+1
13	+6	+7	+4	+4	0	0	+3	−5	−5
14	+2	+5	+6	+3	+5	−6	−5	−4	−9
15	−2	−5	−5	−6	+2	−6	−5	−1	+6
16	−1	−6	−2	+1	−5	+4	+6	+9	+7
17	−7	−9	−4	+1	−3	+9	+7	+9	+7
18	−5	+5	+1	+4	−5	+9	0	−6	−6
19	−3	0	+8	−7	+10	−7	−6	−4	−3
1920	+1	+6	+6	+12	−5	−3	−3	−1	+4
21	+3	+8	+3	+3	+8	+4	+4	+3	−2
22	+3	0	+11	−2	−2	+2	+2	+1	+1
23	+2	0	+4	−3	−5	+2	−1	−1	−2
24	−1	−10	0	+5	+5	−2	+1	+4	+2
25	+7	0	+6	−5	−3	+4	0	−1	−8
26	−2	0	−4	−5	+6	−8	−4	−1	−1
27	0	0	−1	−6	0	+2	+3	+1	−3
28	0	−4	−7	−3	−2	−1	+2	+1	+2
29	−1	−2	−4	+3	−4	+1	+1	−1	−2
1930	+5	−1	+2	−4	−8	−1	−1	−4	−8
31	-------	−5	−7	+4	-------	-------	+1	-------	−1
32	-------	-------	-------	−1	-------	-------	−2	-------	+1
33	-------	-------	-------	-------	-------	-------	0	-------	+2

TABLE 37.—*Correlation coefficients between oscillations and United States temperatures*

NORTH ATLANTIC OSCILLATION

Districts	1	2	3	4	5	6	7	8	9	10	11	12
N. A. O. (DJF):												
1 MAM	+0.26	+0.30	+0.20	+0.24	+0.09	+0.13	+0.05	+0.20	+0.12	+0.14	−0.04	+0.03
2 JJA	−.01	+.03	+.14	+.05	+.22	−.07	+.17	−.01	+.16	−.15	+.13	+.06
3 SON	+.05	.00	+.05	+.16	−.02	−.11	−.04	−.06	−.04	−.09	+.08	+.32
N. A. O. (MAM):												
1 JJA	−.19	−.13	+.13	−.02	+.20	−.17	+.19	−.11	+.08	−.22	+.02	−.06
2 SON	+.02	+.15	+.03	+.11	−.12	−.02	−.14	−.14	−.13	−.10	−.15	+.21
3 DJF	+.39	+.10	+.33	+.20	+.32	+.10	+.27	+.10	+.12	+.01	+.08	−.06
N. A. O. (JJA):												
1 SON	+.08	+.07	+.13	+.21	+.13	+.06	−.02	+.02	−.04	−.18	.00	+.13
2 DJF	+.04	+.26	+.16	+.08	+.24	+.05	+.20	+.19	+.15	+.18	+.01	+.13
3 MAM	−.14	−.32	−.17	−.27	−.08	−.25	+.04	−.17	+.19	+.03	+.22	+.22
N. A. O. (SON):												
1 DJF	+.18	+.14	+.34	+.18	+.27	+.06	+.18	+.03	+.16	+.02	+.13	+.03
2 MAM	+.26	+.19	+.24	+.28	+.07	+.08	−.02	−.05	+.06	−.13	+.02	−.19
3 JJA	+.13	+.23	+.29	+.42	+.20	+.26	+.21	+.21	+.09	+.18	−.26	+.05

SOUTHERN OSCILLATION

Districts	1	2	3	4	5	6	7	8	9	10	11	12
S. O. (DJF):												
1 MAM	+0.03	−0.09	−0.04	−0.21	−0.09	−0.34	+0.01	−0.40	+0.33	+0.05	+0.43	+0.30
2 JJA	−.13	+.07	−.08	−.16	−.16	−.15	−.16	−.30	+.12	+.14	+.07	+.02
3 SON	+.20	+.10	+.20	+.18	+.06	+.08	−.04	−.04	−.13	−.02	−.14	+.08
S. O. (MAM):												
1 JJA	+.24	−.13	+.18	−.02	+.12	+.02	+.09	+.25	−.07	+.04	−.12	−.09
2 SON	−.23	−.31	−.30	−.03	−.16	−.14	+.08	+.05	+.14	+.08	−.12	−.17
3 DJF	−.29	−.13	−.24	−.17	−.33	−.09	−.38	−.09	−.20	−.13	−.22	−.19
S. O. (JJA):												
1 SON	−.17	−.27	−.23	−.18	−.14	−.14	+.04	+.01	+.04	−.02	−.22	−.34
2 DJF	−.30	+.07	−.32	+.02	−.38	+.26	−.40	+.22	−.32	+.00	−.49	−.47
3 MAM	+.01	+.06	+.01	+.13	+.06	+.25	+.07	+.52	−.21	+.13	−.32	−.16
S. O. (SON):												
1 DJF	−.25	.00	−.23	+.01	−.32	+.25	−.36	+.12	−.27	+.12	−.49	−.41
2 MAM	−.02	+.15	−.04	+.17	−.08	+.45	+.04	+.52	−.24	+.11	−.42	−.27
3 JJA	+.18	−.09	+.20	+.09	+.19	+.18	−.13	+.36	−.29	−.13	−.34	−.16

NORTH PACIFIC OSCILLATION

Districts	1	2	3	4	5	6	7	8	9	10	11	12
N. P. O. (DJF):												
1 MAM	+0.25	+0.10	+0.23	+0.09	+0.11	−0.09	+0.08	−0.29	+0.25	−0.02	+0.29	−0.16
2 JJA	−.05	+.05	+.05	+.06	−.17	−.05	−.06	−.41	+.27	+.13	+.05	+.08
3 SON	+.19	+.23	+.21	+.28	.00	+.30	−.04	+.12	+.01	+.15	−.03	+.10

TABLE 38.—*Correlation coefficients between oscillations and United States precipitation*

NORTH ATLANTIC OSCILLATION

Districts	1	2	3	4	5	6	7	8	9	10	11	12
N. A. O. (DJF):												
1 MAM	−0.26	−0.15	+0.16	0.00	−0.05	−0.16	−0.09	−0.02	+0.01	−0.06	−0.40	0.00
2 JJA	−.15	+.06	−.14	−.14	−.17	−.17	+.02	+.03	+.16	+.26	+.07	+.35
3 SON	+.19	+.02	+.09	+.10	+.20	+.16	+.32	−.07	+.01	−.03	+.05	−.30
N. A. O. (MAM):												
1 JJA	−.22	−.19	−.18	−.19	−.35	−.02	−.13	−.06	+.02	+.33	+.12	+.12
2 SON	+.36	+.12	+.16	+.13	+.19	+.21	−.07	−.02	+.15	+.24	+.02	−.04
3 DJF	−.04	+.13	+.01	−.05	.00	+.02	+.09	+.22	−.15	+.25	−.11	+.21
N. A. O. (JJA):												
1 SON	+.17	−.24	−.07	.00	+.22	+.22	+.04	+.12	+.05	+.11	+.03	−.06
2 DJF	+.20	+.21	−.28	.00	−.25	+.09	−.02	+.27	+.03	+.07	+.07	+.12
3 MAM	−.21	−.04	−.35	−.16	−.31	+.07	−.16	+.24	−.08	−.02	−.20	−.23
N. A. O. (SON):												
1 DJF	+.20	+.10	+.08	+.15	−.03	+.02	+.01	−.06	+.02	+.02	+.29	+.20
2 MAM	.00	+.19	+.03	−.14	+.10	−.01	+.21	+.17	+.12	+.04	−.06	−.04
3 JJA	−.14	−.11	+.03	−.08	+.19	−.15	+.12	−.11	.00	+.25	+.06	−.17

SOUTHERN OSCILLATION

Districts	1	2	3	4	5	6	7	8	9	10	11	12
S. O. (DJF):												
1 MAM	+0.19	+0.11	−0.06	+0.05	−0.01	+0.04	+0.12	+0.21	−0.01	+0.21	−0.29	+0.09
2 JJA	+.26	+.28	+.47	+.31	+.28	+.10	+.06	+.16	−.04	−.13	−.09	+.02
3 SON	−.10	+.02	−.12	+.21	+.11	+.02	+.15	−.06	+.14	+.08	+.22	−.05
S. O. (MAM):												
1 JJA	−.04	−.06	−.32	−.20	−.40	−.08	−.20	−.03	−.11	+.22	−.14	−.12
2 SON	−.01	+.12	−.03	−.18	−.38	−.28	−.29	−.35	−.08	−.32	−.09	−.11
3 DJF	−.11	−.05	+.14	−.06	+.02	−.23	+.40	−.08	+.12	−.06	−.13	−.07
S. O. (JJA):												
1 SON	−.09	+.09	−.08	−.07	−.24	−.41	−.31	−.45	−.01	−.07	+.02	−.05
2 DJF	−.15	−.41	+.18	+.15	−.04	−.44	+.19	−.38	+.43	.00	.00	+.09
3 MAM	−.16	−.11	+.01	−.02	−.23	−.24	−.36	−.48	−.13	−.38	+.17	−.06
S. O. (SON):												
1 DJF	−.28	−.52	+.16	+.14	−.04	−.50	+.09	−.36	+.51	+.15	+.21	+.17
2 MAM	.00	−.09	+.21	+.17	−.06	−.21	−.33	−.42	+.02	−.41	+.25	−.06
3 JJA	−.19	−.11	−.46	−.24	−.35	−.23	−.15	−.13	+.05	+.22	+.01	+.12

NORTH PACIFIC OSCILLATION

Districts	1	2	3	4	5	6	7	8	9	10	11	12
N. P. O. (DJF):												
1 MAM	+0.04	+0.01	+0.01	+0.08	+0.15	−0.09	+0.20	+0.21	−0.02	+0.10	−0.15	0.00
2 JJA	+.12	+.23	+.21	+.21	+.16	+.18	+.06	+.28	−.06	+.03	+.08	−.06
3 SON	.00	−.04	−.04	+.21	+.22	+.14	−.02	−.09	+.17	.00	+.45	+.23

Two methods suggest themselves for comparing the three oscillations with United States temperatures and precipitation by districts: (1) To examine whether values of the oscillation for any one quarter indicate the persistence of a correlation one, two, and three quarters later with temperature and precipitation values for a particular district or districts in the United States; and (2) to see whether for conditions in the United States, for some particular quarter and districts, a consistent correlation is found one, two, and three quarters before with the oscillations. Both, it would seem, might point the way to further studies.

Persistence in the district.—There are a few cases that have coefficients of 0.20 or more, of the same sign, for one quarter of the oscillation with the three quarters following in the United States:

The southern oscillation (June–July–August) has negative correlation coefficients with temperature in district 11 of −0.22, −0.49, and −0.32 for the three quarters following; and with temperatures in district 12 of −0.34, −0.47, and −0.16.

The southern oscillation (September–October–November) has negative correlation coefficients with temperatures in districts 9, 11, and 12 for the three following quarters; district 9 being −0.27, −0.24, and −0.29; district 11 being −0.49, −0.42, and −0.34; and district 12 being −0.41, −0.27, and −0.16. For the same quarter of the southern oscillation (September–October–November), district 6 temperature shows correlation coefficients of +0.25, +0.45, and +0.18 for the three quarters following, while district 8 temperature shows +0.12, +0.52, and +0.36.

The southern oscillation (June–July–August) when correlated with precipitation in districts 6 and 8, shows negative correlation coefficients, district 6 being −0.41, −0.44, and −0.24; and district 8 being −0.45, −0.38, and −0.48.

The southern oscillation (September–October–November) correlated against district 6 (precipitation) shows −0.50, −0.21, and −0.23; and against district 8 (precipitation) −0.36, −0.42, and −0.13 for the three quarters following.

The North Atlantic oscillation (September–October–November) gives +0.34, +0.24, and +0.29 against district 3 temperature; and +0.18, +0.28, and +0.42 against district 4 temperature. The North Atlantic oscillation (March–April–May) gives +0.33, +0.24, and +0.25 against district 10 precipitation for the three quarters following.

The North Pacific oscillation shows no case in which a relation persists through the three quarters following. There are, however, several in which it persists for two quarters. For example, North Pacific oscillation (December–January–February) shows against district 8 temperature, −0.29, −0.41, and +0.12; and against district 9 temperature, +0.25, +0.27, and +0.01. Again the North Pacific oscillation (December–January–February) shows against district 4 precipitation, +0.08, +0.21, and +0.21; and against district 8 precipitation, +0.21, +0.28, and −0.09.

Persistence of conditions in the oscillation.—This approach brings to light some rather interesting cases. United States winter temperatures, district No. 5, have correlation coefficients with the North Atlantic oscillation for the three preceding quarters of +0.27, +0.24, and +0.32.

United States winter temperatures and the southern oscillation present the most outstanding case, as shown by the following table.

TABLE 39

United States winter temperature	(Southern oscillation preceding year)		
	SON	JJA	MAM
District 1	−0.25	−0.30	−0.29
District 3	−.23	−.32	−.24
District 5	−.32	−.38	−.33
District 7	−.36	−.40	−.38
District 9	−.27	−.32	−.20
District 11	−.49	−.49	−.22
District 12	−.41	−.47	−.19

More attention might profitably be given to this case. United States winter precipitation in district 6 gave coefficients with the southern oscillation of −0.50, −0.44 and −0.23; and somewhat similar relations were shown in districts 8 and 2.

There were in addition a number of cases with correlation coefficients for two consecutive quarters of the same sign, and a few that had the same sign for two quarters, and the opposite sign for the third quarter, all exceeding ±0.20.

It is regrettable that it has not been possible to follow this further before publication of the preliminary results, and it is hoped that interested investigators will pursue the idea.

Walker (**99**) has pointed out that December–January–February rainfall of Florida (−0.60) appears to be inversely related to the southern oscillation of the previous September-October-November; while that of Montana (+ 0.64), Idaho (+0.54) and Wyoming (+0.56) is directly related. The present study gives +0.51 for district 9, and for districts 2 and 6 it gives −0.52 and −0.50, respectively. Others equally interesting can be seen by an inspection of the table.

7. RELATION OF MONSOON RAINFALL TO CONDITIONS IN THE UNITED STATES

A meteorological phenomenon on so vast a scale as the monsoon may well serve to give some indications of subsequent conditions in the United States. As it is not too convenient to obtain up-to-date records of the monsoon in this country, a manuscript record received from the Director of the Indian Meteorological Department is here published as table 40; the data are for the Peninsula and not for the whole of India.

The monsoon data were related to both temperature and precipitation (see table 41) in the United States.

TABLE 40.—*Monsoon rainfall* (*Peninsula*)

[Departures in inches]

Year	0	1	2	3	4	5	6	7	8	9
1880									−4.6	+2.9
1890	+1.3	+1.0	+9.9	+4.0	+5.7	−0.6	+2.0	+0.8	+1.0	−16.6
1900	+2.6	−3.9	−4.2	+3.2	−8.4	−6.2	+1.9	−1.7	+4.3	−0.9
1910	+4.2	−7.2	−0.5	−1.3	+8.6	−2.4	+4.6	+6.7	−11.1	+2.0
1920	−10.5	+1.5	−3.0	−2.1	−2.9	−3.6	+2.7	+3.4	−0.4	−3.7
1930	−0.8	+4.2	+1.1	+7.4	+4.1	+0.2	−1.0			

Data for 1888–1921 are taken from Indian Met. Mem. vol. XXIII, pp. 36–37, and data for 1922–36 were furnished by the Indian Met. Dept.

NOTE.—If data prior to 1888 are desired they will be found in Memoirs of the Indian Met. Dept., vol. XXIII, p. 36. (1921–24).

TABLE 41.—*Monsoon rainfall*

WITH UNITED STATES TEMPERATURES

District	Same year	First year following				Second year following
	SON	DJF	MAM	JJA	SON	DJF
1	−0.02	−0.30	−0.19	−0.08	−0.30	+0.05
2	−.10	−.03	−.22	−.21	−.44	−.14
3	−.13	−.33	−.15	−.29	−.27	+.05
4	−.16	−.08	−.13	−.26	+.02	−.15
5	−.21	−.31	−.24	−.25	+.01	−.13
6	−.09	+.13	+.03	+.09	−.24	−.24
7	−.03	−.33	−.24	−.30	+.21	−.15
8	+.03	+.12	+.18	+.19	−.01	−.31
9	−.05	−.26	−.34	−.30	+.28	−.05
10	+.13	−.02	−.09	−.08	+.08	−.25
11	−.24	−.37	−.31	+.01	+.04	+.08
12	−.08	−.37	−.23	−.05	−.18	+.06

WITH UNITED STATES PRECIPITATION

District	SON	DJF	MAM	JJA	SON	DJF
1	−0.06	−0.13	−0.10	+0.13	−0.08	+0.30
2	−.02	−.28	−.06	−.03	+.22	+.11
3	−.03	+.01	+.03	−.06	−.03	+.41
4	−.05	+.07	+.16	−.06	−.35	+.13
5	+.08	+.00	+.08	−.07	−.47	+.32
6	−.25	−.60	−.22	−.17	−.52	+.04
7	−.17	+.21	−.13	+.11	−.19	+.27
8	−.33	−.23	−.33	−.14	−.32	+.19
9	+.00	+.28	+.00	+.06	−.07	+.04
10	−.20	+.32	−.27	+.07	−.34	−.03
11	+.12	−.16	+.24	−.27	−.04	+.23
12	−.20	+.26	−.02	−.15	−.04	−.05

The monsoon rainfall season is roughly from May to September. The first complete quarter following the monsoon season is the winter quarter in the United States beginning 2 months after the end of the monsoon season; the second quarter, March–April–May; the third, June–July–August; the fourth, September–October–November; and the fifth, December–January–February of the second year following.

Comparison of monsoon rainfall with United States temperatures showed that the monsoon was related inversely to the following winter temperatures on the Pacific coast and over northern districts (districts 1, 3, 5, 7, 9, 11, and 12); and practically the same was true for the following spring (March, April, May).

In the summer a similar relation was evident over northern districts of the interior (districts 2, 3, 4, 5, 7, and 9). By the following fall, inverse relations showed in the Lake region and in the Gulf and Atlantic States; while in the second winter following, inverse relations were in evidence in the Gulf States and southern Rocky Mountain region (districts 6, 8, and 10). The only season in which positive correlation was shown was during the following fall—September, October, November—over the northern Rocky Mountain and Northern Plateau regions (districts 7 and 9). These indications seem to show that the influence of conditions which caused the monsoon rainfall was able to affect temperature conditions over interior districts of the northern United States during the following winter, spring, and summer; over southern districts in the following fall; and over southern districts in the second winter following. To obtain some idea of the extent of the monsoon effect so far as temperature is concerned, correlation coefficients were worked out between monsoon rainfall and subsequent temperature conditions at Nome, Dawson, Edmonton, and Moose Factory, as shown by the following table:

TABLE 42.—*Monsoon rainfall with conditions in Alaska, Hawaii and NW Canada*

	Following year—			
	DJF	MAM	JJA	SON
Nome (temperature)	−0.18	−0.30	−0.03	−0.26
Dawson (temperature)	−.21	−.06	−.06	−.03
Edmonton (temperature)	−.44	−.17	−.13	+.08
Moose Factory (temperature)	−.40	+.01	+.01	+.05
Honolulu (pressure)	−.23	−.05	+.18	+.17

The table seems to indicate that following above-normal monsoon rains, temperatures were below normal in the following winter over western Canada, but that there was little relation in the spring, summer, and fall. This was confirmed by a negative correlation coefficient with Honolulu pressure, which acts in opposition to Canadian northwest pressures during the winter but showed small correlation coefficients in the spring, summer, and fall.

As to subsequent precipitation conditions in the United States, a rather different situation resulted. The following winter showed plus correlation coefficients over California, the Plateau and northern Rocky Mountain region (districts 7, 9, 10, and 12) and minus correlation coefficients over the Gulf and South Atlantic States (districts 2, 6, and 8). In the spring months negative coefficients are found in the Gulf States and the southern Rocky Mountain and southern Plateau regions (districts 6, 8, and 10). In the summer months the relations found were small, but were still negative in the Gulf States and also in the Pacific States. In the following fall, good negative departures were noted in the southern Plateau, the southern Rocky Mountain region, the Plains States, the Gulf States and the Ohio and Mississippi Valleys (districts 4, 5, 6, 8, and 10). In the second winter following, positive coefficients were found in the northern Plains States, the Upper Mississippi Valley, the Lake region and the North Atlantic States (districts 1, 3, 5, and 7).

8. SPECIAL DATA REGARDING THE OPENING AND CLOSING OF NAVIGATION IN BERING SEA

It is believed desirable to publish data regarding the opening and closing of navigation at St. Michael Bay, Alaska, entrance to which is by way of the Bering Sea. The data were obtained from the records of Williams Steamship Co., San Francisco; the Northern Commercial Co. of Seattle, Wash.; and the Collector of Customs, Nome, Alaska. Only parts of this record have previously been published. The record in full is given herewith in table 43.

TABLE 43.—*Opening and closing of navigation in St. Michael Bay, Alaska*

Opening			Closing		
Date	Number of days after May 24	Departures from average	Date	Number of days after Oct. 9	Departures from average
1875, May 25	1	−16	1875, Nov. 20	42	+12
1876, June 8	15	−2	1876, Nov. 6	28	−2
1877, June 13	20	+3	1877, Nov. 15	37	+7
1878, June 15	22	+5	1878, Nov. 16	38	+8
1879, June 9	16	−1	1879, Nov. 9	31	+1
1880, June 27	34	+17	1880, Dec. 6	58	+28
1881, June 11	18	+1	1881, Dec. 7	59	+29

TABLE 43.—*Opening and closing of navigation in St. Michael Bay, Alaska*—Continued

Opening			Closing		
Date	Number of days after May 24	Departures from average	Date	Number of days after Oct. 9	Departures from average
1882, June 9	16	−1	1882, Nov. 25	47	+17
1883, June 8	15	−2	1883, Nov. 21	43	+13
1884, June 10	17	0	1884, Oct. 10	1	−29
1885, May 30	6	−11	1885, Nov. 5	27	−3
1886, June 5	12	−5	1886, Nov. 13	35	+5
1887, June 14	21	+4	1887, Nov. 2	24	−6
1888, June 8	15	−2	1888, Nov. 18	40	+10
1889, June 23	30	+13	1889, Nov. 16	38	+8
1890, June 6	13	−4	1890, Nov. 11	33	+3
1891, June 9	16	−1	1891, Nov 14	36	+6
1892, June 11	18	+1	1892, Nov. 7	29	−1
1893, June 10	17	0	1893, Nov. 5	27	−3
1894, June 23	30	+13	1894, Nov. 1	23	−7
1895, June 18	25	+8	1895, Dec. 7	59	+29
1896, June 25	32	+15	1896, Nov. 21	43	+13
1897, June 23	30	+13	1897, Oct. 25	16	−14
1898, June 13	20	+3	1898, Oct. 31	22	−8
1899, June 10	17	0	1899, Nov. 7	29	−1
1900, June 8	15	−2	1900, Nov. 22	44	+14
1901, July 3	40	+23	1901, Nov. 2	24	−6
1902, June 5	12	−5	1902, Nov. 2	24	−6
1903, June 18	25	+8	1903, — —		
1904, June 20	27	+10	1904, Nov. 1	23	−7
1905, May 31	7	−10	1905, Nov. 4	26	−4
1906, June 7	14	−3	1906, Nov. 9	31	+1
1907, June 6	13	−4	1907, Oct. 31	22	−8
1908, June 8	15	−2	1908, Nov. 1	23	−7
1909, June 13	20	+3	1909, Nov. 4	26	−4
1910, June 16	23	+6	1910, Nov. 7	29	−1
1911, June 14	21	+4	1911, Nov. 16	38	+8
1912, June 19	26	+9	1912, Nov. 7	29	−1
1913, June 4	11	−6	1913, Nov. 16	38	+8
1914, May 31	7	−10	1914, Nov. 10	32	+2
1915, June 1	8	−9	1915, Oct. 29	20	−10
1916, June 8	15	−2	1916, Nov. 14	36	+6
1917, June 7	14	−3	1917, Nov. 3	25	−5
1918, June 24	31	+14	1918, Oct. 24	15	−15
1919, June 6	13	−4	1919, Nov. 15	37	+7
1920, June 19	26	+9	1920, Nov. 17	39	+9
1921, June 8	15	−2	1921, Oct. 29	20	−10
1922, June 4	11	−6	1922, Nov. 10	32	+2
1923, June 10	17	0	1923, — —		
1924, June 3	10	−7	1924, Oct. 21	12	−18
1925, June 2	9	−8	1925, Nov. 14	36	+6
1926, May 26	2	−15	1926, Nov. 23	45	+15
1927, June 11	18	+1	1927, Nov. 8	30	0
1928, June 4	11	−6	1928, Oct. 13	4	−26
1929, May 26	2	−15	1929, Oct. 28	19	−11
1930, June 3	10	−7	1930, Nov. 6	28	−2
1931, May 30	6	−11	1931, — —		
Sum	970		Sum	1,672	
$\frac{\Sigma}{n}$ = 17.02 = June 10			$\frac{\Sigma}{n}$ = 30.096 = Nov. 8		

9. CONCLUSION

To emphasize our belief that no simple solution is to be found for the general problem of long-range weather prediction, it is desired to present the results of the following brief study, which are not encouraging:

This study consisted of taking four of the coldest, and four of the warmest, winters in district No. 1, and relating them to precedent pressure departures at foreign stations. Accordingly, three charts were made for each of the eight cases, on which were entered the departures from normal pressure at the 60 foreign stations for first, second, and third quarters before the winter in district No. 1. Warm winters (December–January–February) were selected as follows:

1890	+4.56
1899	+5.32
1913	+4.12
1919	+3.69

and cold winters as follows:

1904	−6.26
1905	−5.98
1918	−7.16
1920	−5.01

Unfortunately, owing to the fact that in *World Weather Records* some pressures are given in inches and others in millibars or millimeters, and further by reason of the decrease in amount of mean variability of the quarterly pressure with approach to the equator, it was somewhat difficult to get a clear picture of the situation. However, from a careful inspection of the 24 charts it was soon quite clear that when comparing charts for the four cold winters, for example, one quarter before, that the major precedent conditions were not at all similar; and the same held true for the second quarter before, as well as the third quarter preceding. This was quite disappointing. The same was true of the four warm winters.

Perhaps district No. 1 is too small an area from which to expect to find significant precedent world conditions. Again in some cold New England winters, the cold masses are brought down through one channel, and in others through some other channel; in some cases we have outbreaks of cold air over western Canada and in others over eastern Canada, both of which might affect New England.

The next step was to have recourse to a plan of procedure that had been tried before, which is to take as a start one independent variable, preferably a strong one, and find the correlation coefficient and regression equation; and then to apply the regression equation to obtain a table of predicted values.

Next the predicted values were subtracted from the actual values and residuals were obtained which would be used as a new series to compare with some other independent variable or variables. To carry out the plan, an inspection of the correlation charts showed that Darwin, Batavia, and Manila (March–April–May) three quarters before had correlation coefficients of 0.46, 0.51, and 0.41, respectively, with winter temperatures of district No. 1. To eliminate any chance errors the three were combined by a proper adjustment by weighting the individual departures according to their standard deviations, taking into consideration of course the different units employed in the original observations. The combined values gave a correlation coefficient with district No. 1 winter temperatures of +0.47. Knowing from other studies that the November temperatures in district No. 1 show an important relation with winter temperatures (December–January–February) in the same district, as shown by a correlation coefficient of +0.42, it was thought worth while to use the Darwin-Batavia-Manila combined data (March–April–May preceding) and the November temperatures in district No. 1 in a multiple correlation coefficient.

Winter temperatures were computed from formulae based on (*a*) Darwin, Batavia, Manila (March–April–May preceding) combined, (*b*) November temperature in district No. 1, and (*c*) a combination of (*a*) and (*b*) as follows:

Winter temperature district No. 1, 1.297 *a*.
Winter temperature district No. 1, 8.7574 *b*.
Winter temperature district No. 1, 2.723 *a*+0.513 *b*.

After working out the predicted value from the latter formula for each year, it was subtracted from the actual value, and the resultant values or corrections were graphed and compared with quarterly values of pressure at the 63 foreign stations in the hope of finding some other series of data that would take care of the corrections which, when combined in a multiple correlation coefficient with (*a*), (*b*), or (*c*), would improve the predicted results. However, no satisfactory solution was found.

It is hoped that it will be possible at a later time to round out this preliminary survey to include comparisons between foreign temperatures and precipitation, and temperatures and precipitation in the United States.

Regrettably, only a very few of the studies herein referred to attempt to explain the relations on a definite physical basis. These, as well as several others that do not have a physical background, seem to warrant further investigation, as follows:

(1) Extent and distribution of arctic ice should receive more attention.

(2) The southern oscillation SON, JJA and MAM in relation to winter temperatures in the United States shows extreme consistency, although the coefficients are not particularly large. If we can check the intermediate stages in the sequence of events in regions between the oscillation region and the United States, we should develop some valuable results.

(3) Monsoon rainfall (peninsula) has a number of negative correlations with temperatures in United States: (*a*) Following winter and spring in districts 1, 3, 5, 7, 9, 11, and 12; (*b*) following summer in districts 2, 3, 4, 5, 7, and 9; (*c*) fall of following year in districts 1, 2, and 6; and (*d*) the second winter following in districts 6, 8, and 10. These negative relations, particularly in winter, spring, and summer, are too consistent and widespread to dismiss without further study. If the relation is real, which its consistency and extent both seem to indicate, it should be possible to check the intermediate stages as suggested with respect to the southern oscillation.

(4) Certain relations uncovered in the present investigation, eight in number, should also receive careful inspection by reason of the extent of the region involved. With one exception they concern temperature in the United States:

a. Positive correlations between winter temperatures in northern districts of the United States, and the preceding SON pressure in the East Indies.

b. Positive correlations between winter temperatures in districts 1, 3, 5, and 7, and preceding JJA pressure over the region from Kamchatka southward to Australia and over the East Indies.

c. Positive correlations between winter temperatures in districts 1, 2, 3, 4, 5, 6, 7, and 8, and preceding MAM pressure from eastern Africa eastward and northeastward over India, the East Indies, and Australia.

d. Negative correlations between winter temperatures in districts 1, 2, 3, and 4 and precedent MAM pressure over northeastern Canada and western Greenland and between temperatures in districts 5, 6, 7, 8, 9, 10, 11, and 12 and preceding MAM pressures over northern Russia and northern Siberia. Both of these are, no doubt, linked up with ice and snow cover.

e. Negative correlations between spring temperatures in districts 1, 2, 3, 4, 5, 7, 9, and 11, and preceding JJA pressures over Alaska and Kamchatka; and positive correlations between spring temperatures in districts, 1, 2, 4, 5, 6, 8, and 10, and preceding JJA pressures over Korea, Japan, and Midway.

f. Negative correlations between spring temperatures in districts 1, 2, 3, 4, 5, 9, 10, and 12, and preceding DJF pressures over Canada.

g. Negative correlations between fall temperatures in districts 1, 2, 3, 4, 5, 6, and 7 with preceding DJF pressures over northern Alaska.

h. Positive correlations between winter precipitation in districts 1, 2, 6, 8, 10, and 11 with preceding MAM Alaska pressures.

(5) Large-scale weather phenomena can be utilized as weather indices. Such large-scale phenomena might include rainfall over a large area, like the monsoon rainfall; the Nile flood; strength of the trade winds; maximum temperatures over large areas; etc.

(6) The strength of the westerlies, using as an index for the North Atlantic the pressure difference between the Azores and Iceland, and for the North Pacific the pressure difference between Honolulu and northern Alaska (more particularly in the colder season), can be employed as a weather index. The westerlies are an essential part of the general atmospheric circulation, at least so far as United States weather is concerned. Since it has been shown that variation in the strength of the westerlies should have a direct bearing on the placement and magnitude of the cyclonic eddies to the north of them and the anticyclonic eddies to the south of them, it seems of prime importance that further careful investigation of the possibilities of using them as weather indices should be undertaken.

(7) Trends of temperature and rainfall should form a fundamental background for seasonal forecasts.

(8) In most all suggestions that have been made regarding seasonal forecasting, little attention is given to the conditions at the place at the time the forecast is made. The latter should have an important bearing on the subsequent conditions, examples of which have been pointed out by Reed and others. It seems desirable to emphasize the importance of taking such conditions into consideration in future studies of a statistical nature.

(9) Critical regions in which marked changes take place in the general circulation from season to season should be studied carefully to see if changes in these regions cannot be utilized to anticipate the changes in the general circulation. For this purpose pilot-balloon observations could be employed even if there were not available radiosonde observations. Possibly a good record of accurate cloud observations might suffice. Perhaps indirect evidence such as mentioned in (5) can be utilized.

In recent unpublished papers C. O'D. Iselin has pointed out some interesting relations in connection with the Gulf Stream. He finds that when the Gulf Stream current is weak, some of the warmer surface water is found considerably to the west of its normal position off the southern New England coast. When the Gulf Stream is strong, the warmer surface water is found at considerable distances off the southern New England Coast. He reasons that in years when the Gulf Stream current is weak, the warmer water off the southern New England coast would affect the weather of southern New England. Water temperature observations in former years were rather infrequent over the ocean between Bermuda and New England and it would be impossible to get a long period record for critical study. However, the author points out that when the Gulf Stream current is strong, the mean tide heights at Bermuda are higher than when the Gulf Stream current is weak; and, further, that the opposite effect is present in tide observations at Charleston, S. C. It would appear therefore that tide observations at Charleston, S. C., should furnish an index of the strength of the Gulf Stream. This situation suggests that the correlation study between gage readings at Charleston, S. C., and weather in New England might be a profitable one.

In conclusion, searching inquiry into the mechanics and physical explanations should be made so far as it is possible to do so. This should not mean of course that statistical and empirical investigations should be discontinued. The latter have often furnished pertinent suggestions and pointed the way to the ultimate explanation of the physical processes.

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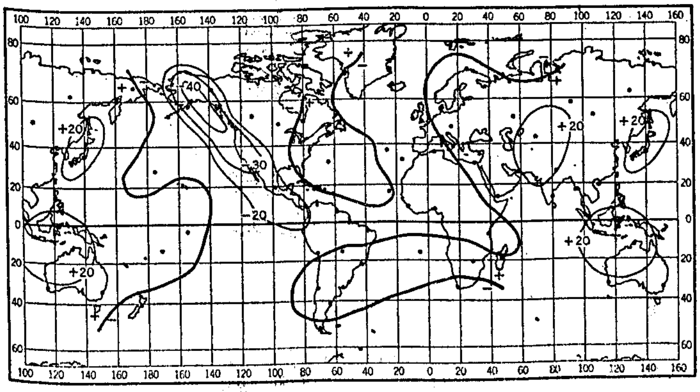

Chart 4. Correlations between district No. 1 U. S. winter temperatures and SON foreign pressures (1 quarter before).

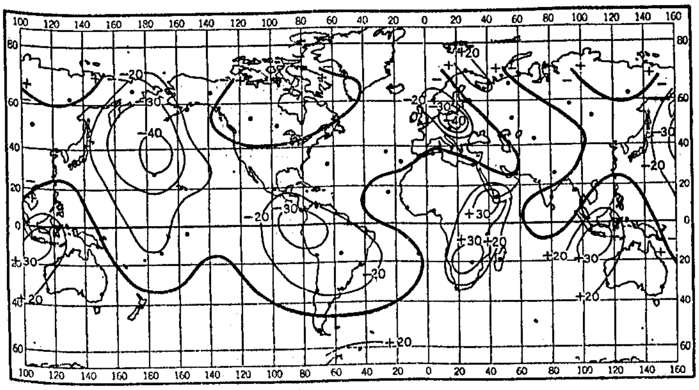

Chart 5. Correlations between district No. 1 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

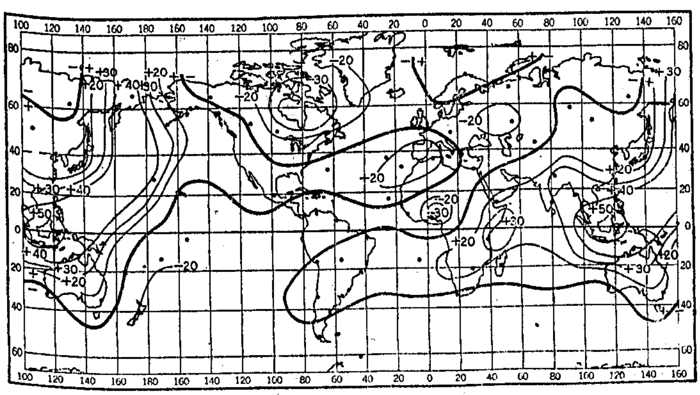

Chart 6. Correlations between district No. 1 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

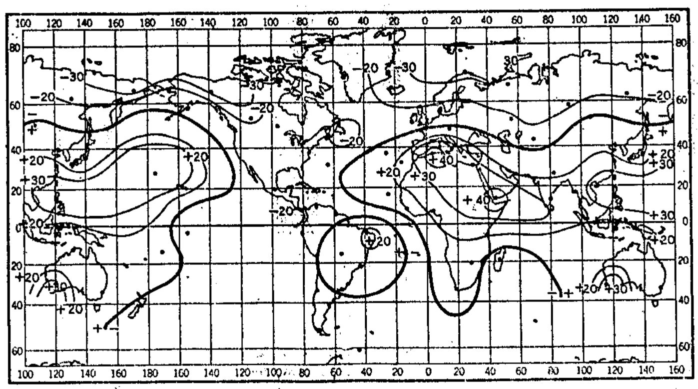

Chart 7. Correlations between district No. 1 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

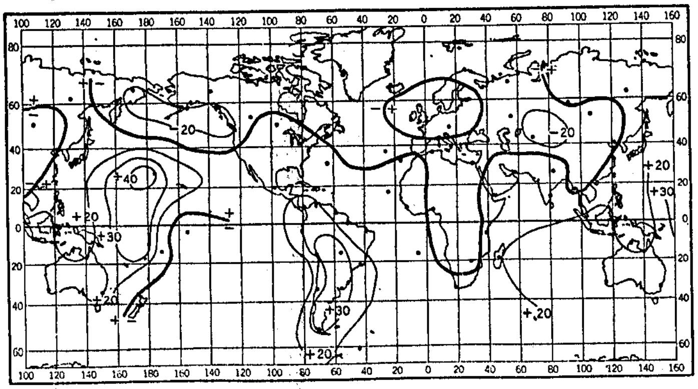

Chart 8. Correlations between District No. 1 U. S. spring temperatures and SON foreign pressures (2 quarters before).

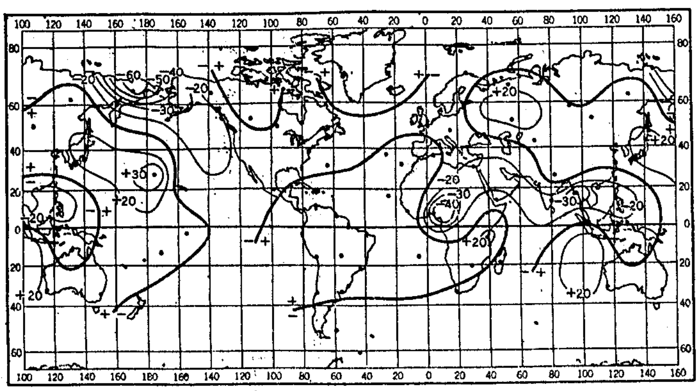

Chart 9. Correlations between district No. 1 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

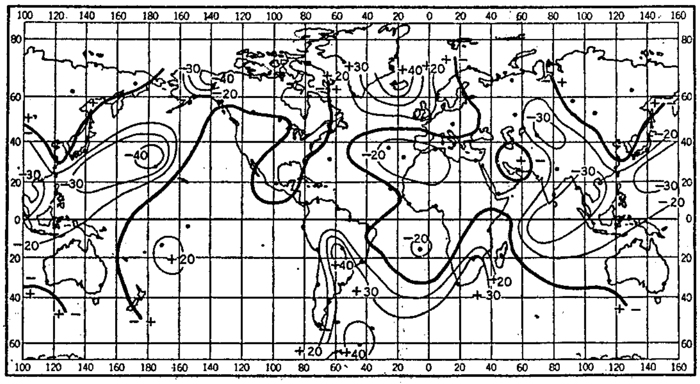

Chart 10. Correlations between district No. 1 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

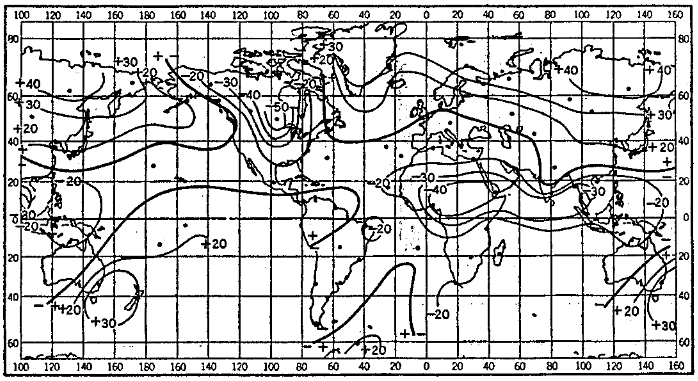

Chart 11. Correlations between district No. 1 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

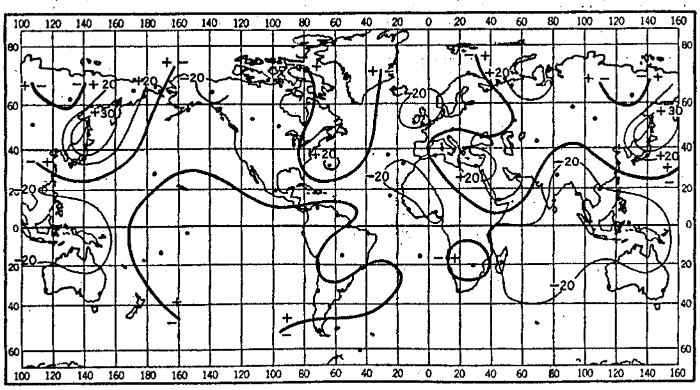

Chart 12. Correlations between district No. 1 U. S. summer temperatures and SON foreign pressures (3 quarters before).

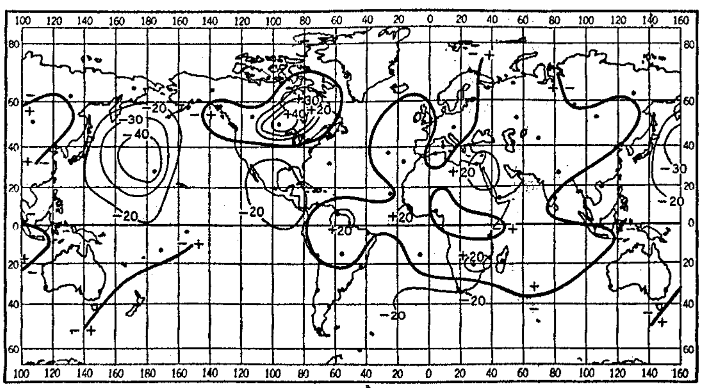

Chart 13. Correlations between district No. 1 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

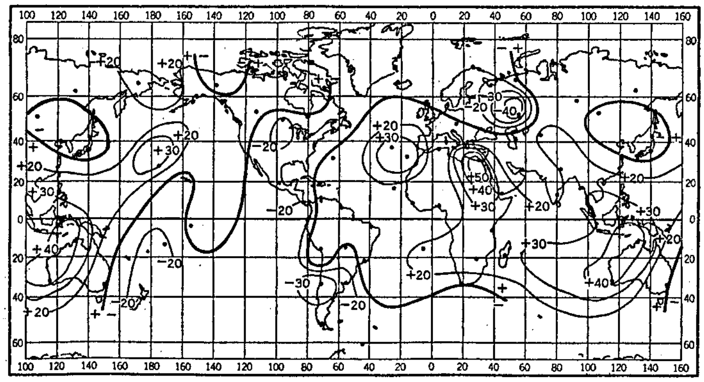

Chart 14. Correlations between district No. 1 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

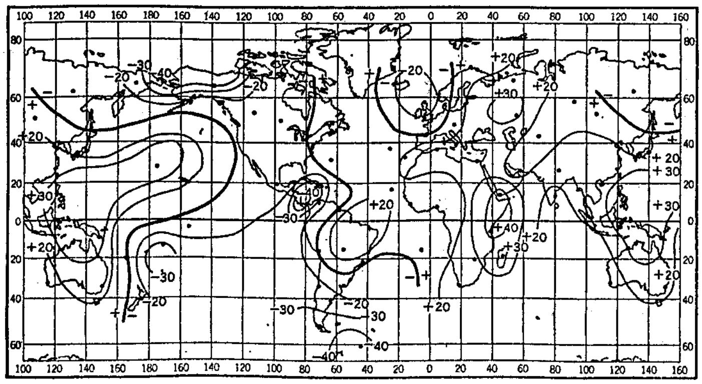

Chart 15. Correlations between district No. 1 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

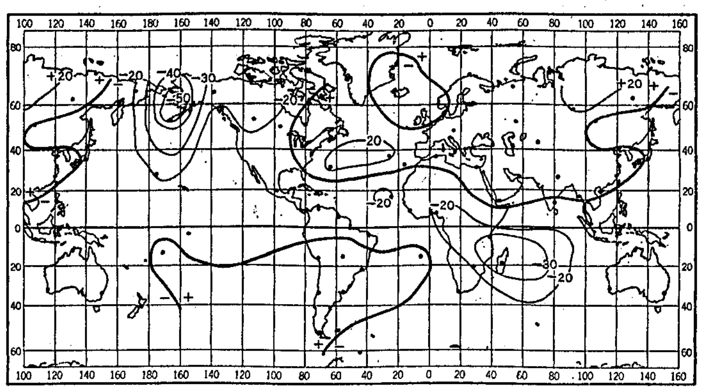

Chart 16. Correlations between district No. 2 U. S. winter temperatures and SON foreign pressures (1 quarter before).

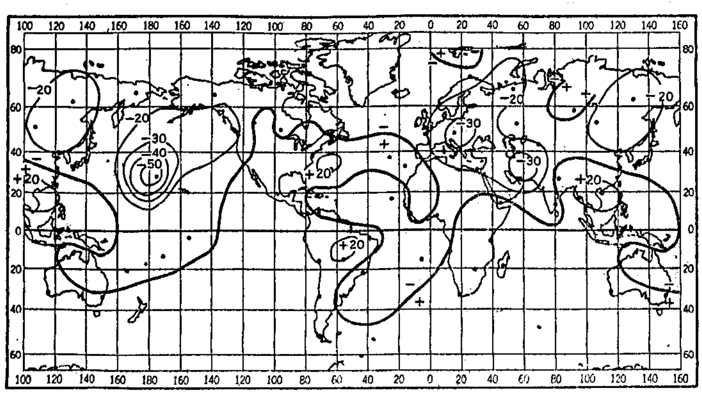

Chart 17. Correlations between district No. 2 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

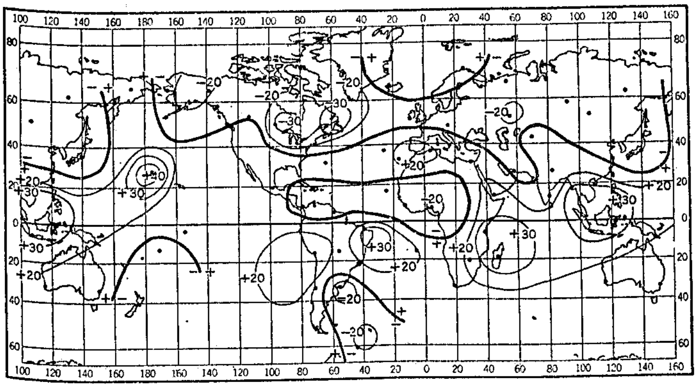

Chart 18. Correlations between district No. 2 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

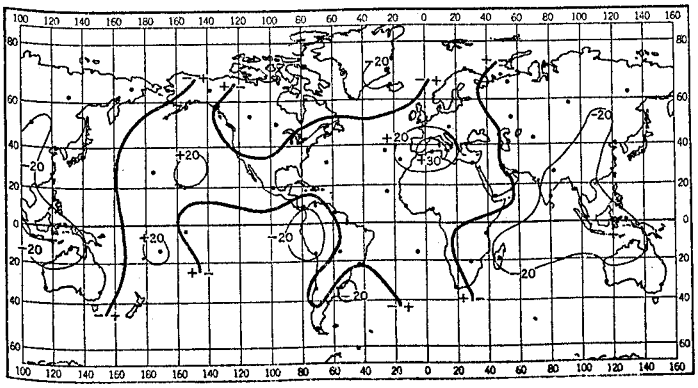

Chart 19. Correlations between district No. 2 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

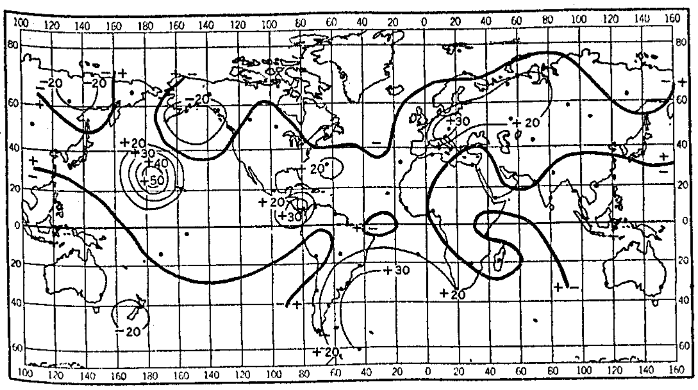

Chart 20. Correlations between district No. 2 U. S. spring temperatures and SON foreign pressures (2 quarters before).

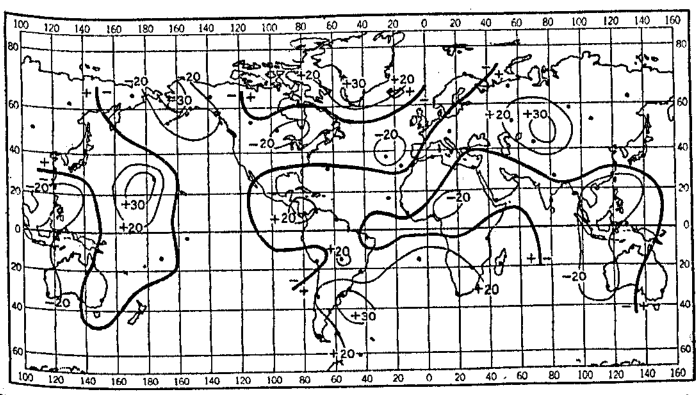

Chart 21. Correlations between district No. 2 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

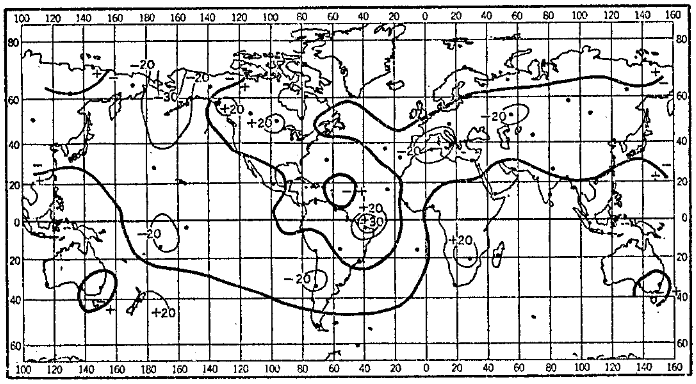

Chart 22. Correlations between district No. 2 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

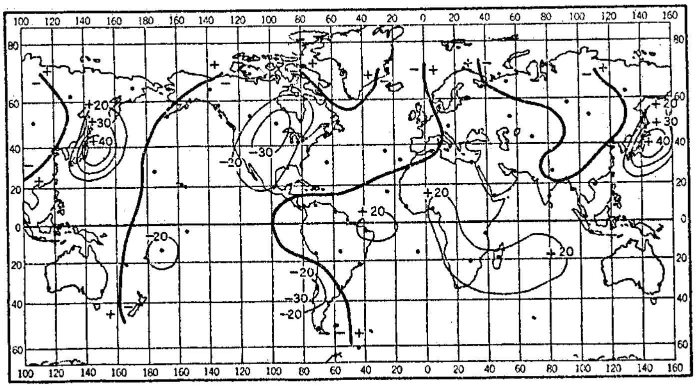

Chart 23. Correlations between district No. 2 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

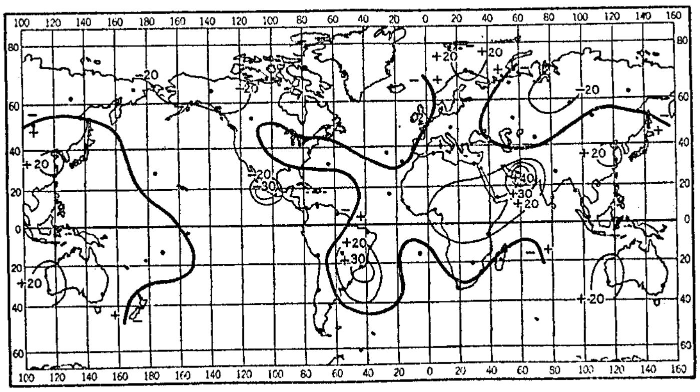

Chart 24. Correlations between district No. 2 U. S. summer temperatures and SON foreign pressures (3 quarters before).

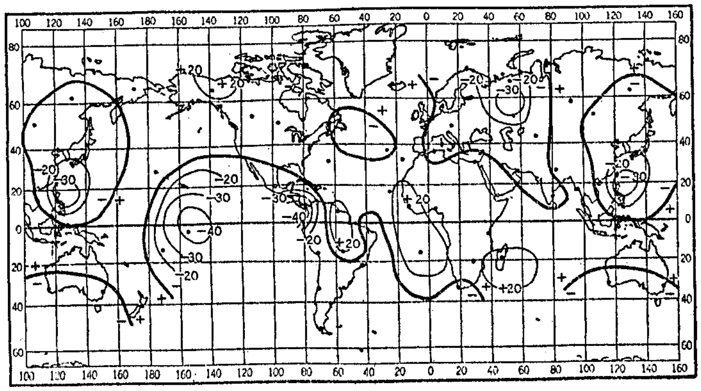

Chart 25. Correlations between district No. 2 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

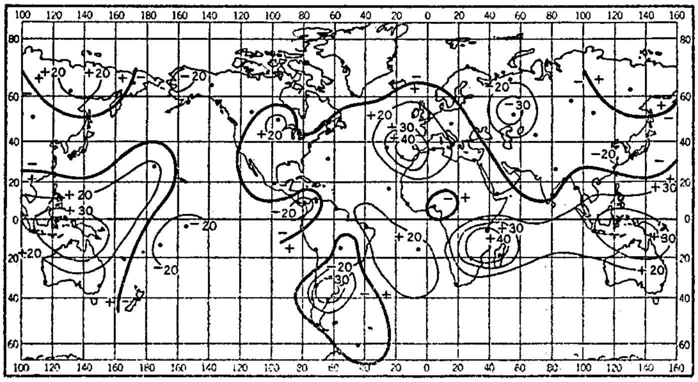

Chart 26. Correlations between district No. 2 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

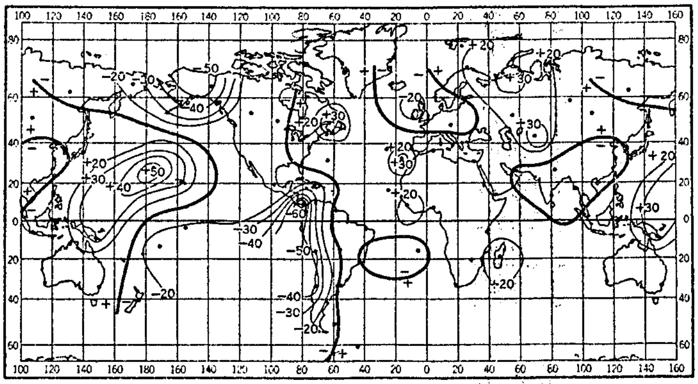

Chart 27. Correlations between district No. 2 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

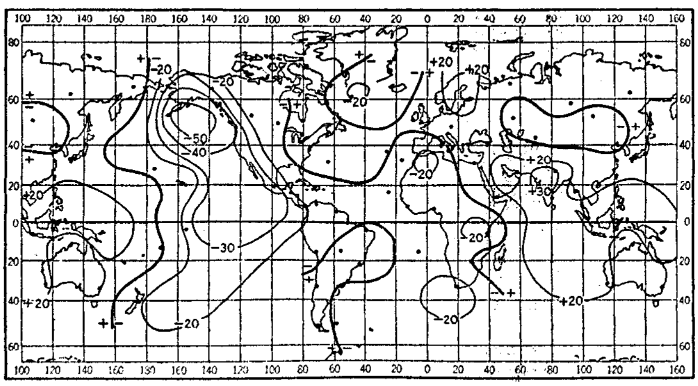

Chart 28. Correlations between district No. 3 U. S. winter temperatures and SON foreign pressures (1 quarter before).

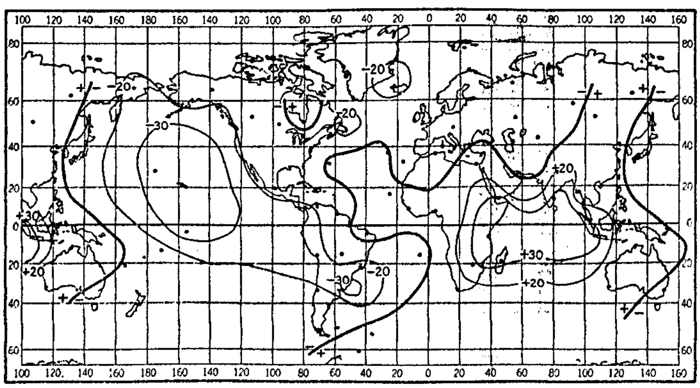

Chart 29. Correlations between district No. 3 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

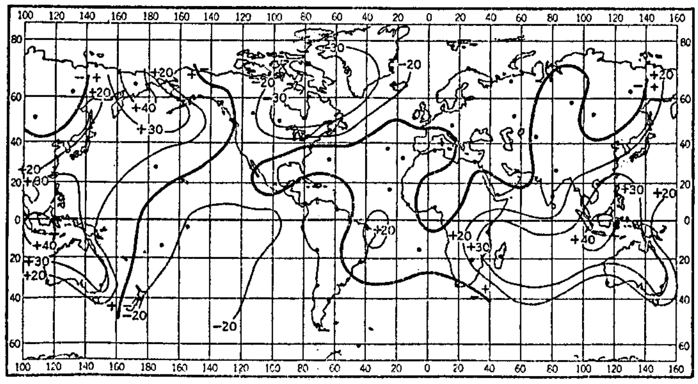

Chart 30. Correlations between district No. 3 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

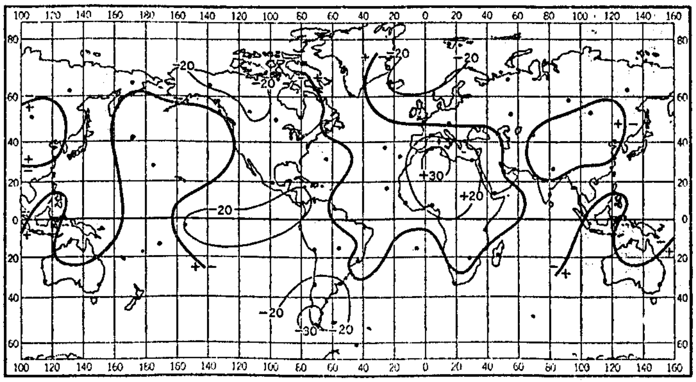

Chart 31. Correlations between District No. 3 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

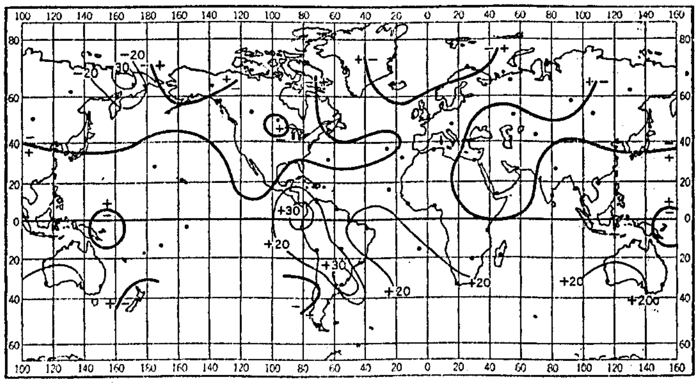

Chart 32. Correlations between District No. 3 U. S. spring temperatures and SON foreign pressures (2 quarters before).

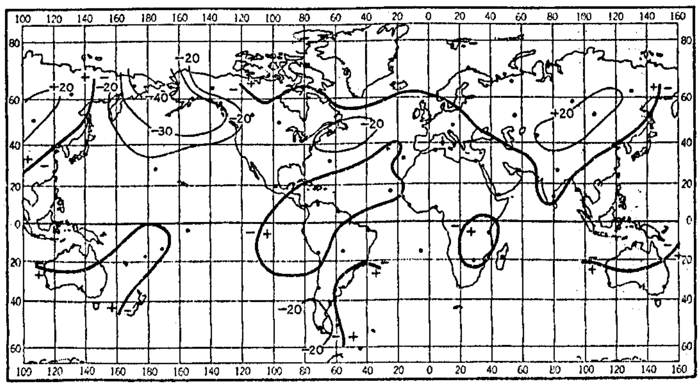

Chart 33. Correlations between district No. 3 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

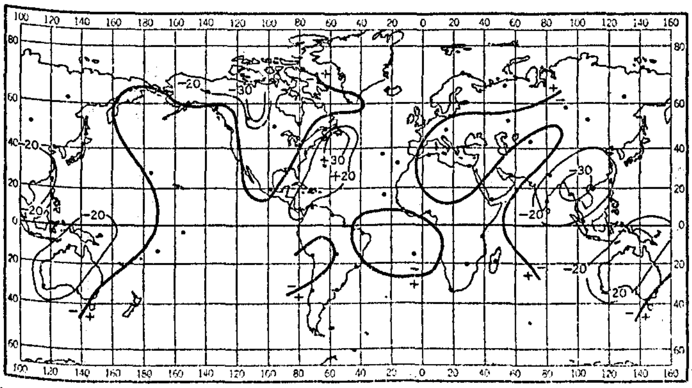

Chart 34. Correlations between district No. 3 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

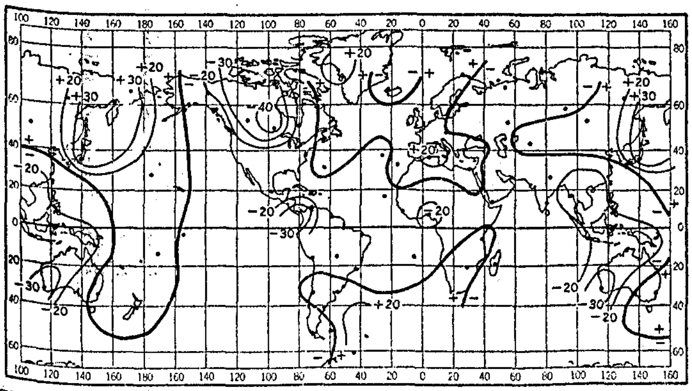

Chart 35. Correlations between District No. 3 U. S. summer temperatures and *DJF* foreign pressures (2 quarters before).

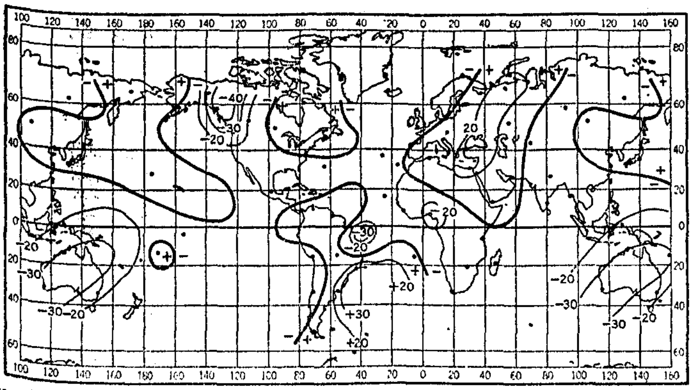

Chart 36. Correlations between District No. 3 U. S. summer temperatures and SON foreign pressures (3 quarters before).

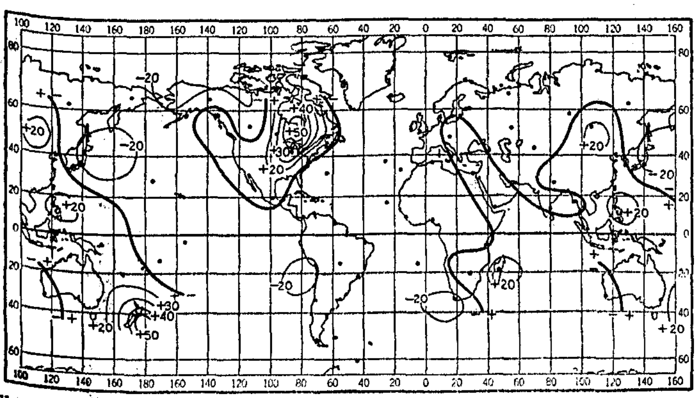

Chart 37. Correlations between District No. 3 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

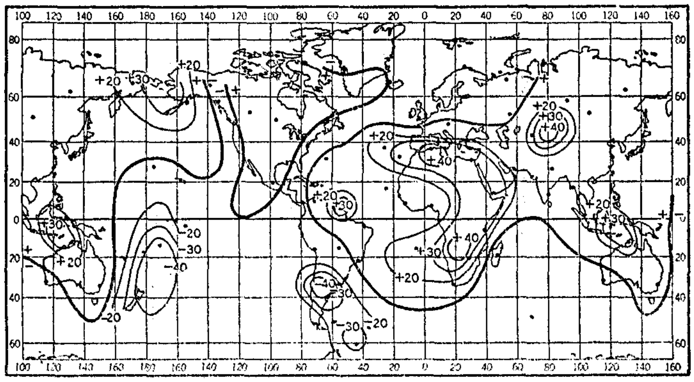

Chart 38. Correlations between District No. 3 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

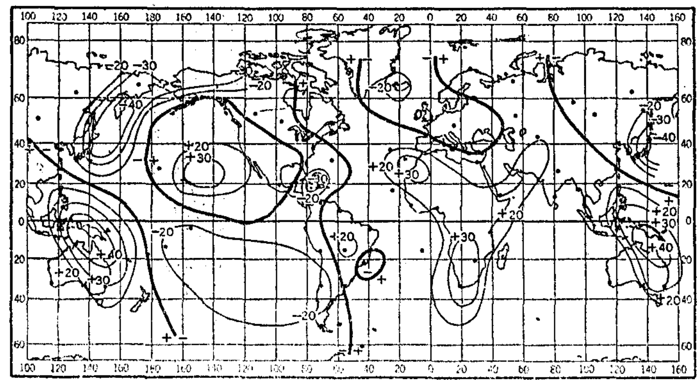

Chart 39. Correlations between District No. 3 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

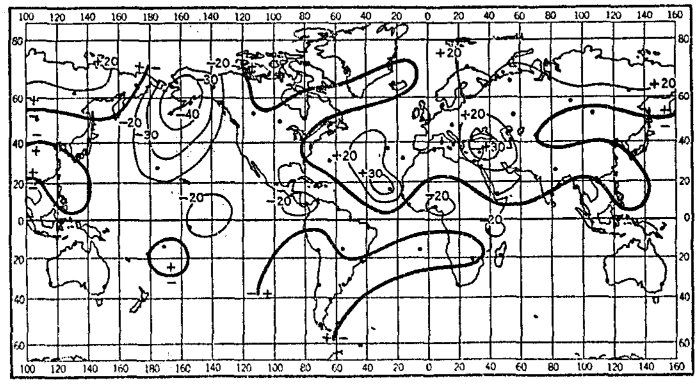

Chart 40. Correlations between District No. 4 U. S. winter temperatures and SON foreign pressures (1 quarter before).

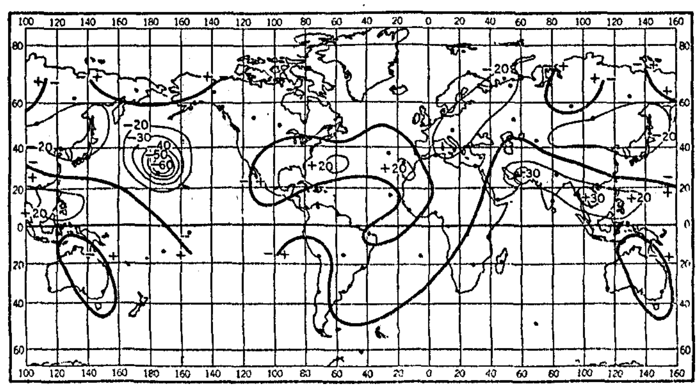

Chart 41. Correlations between District No. 4 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

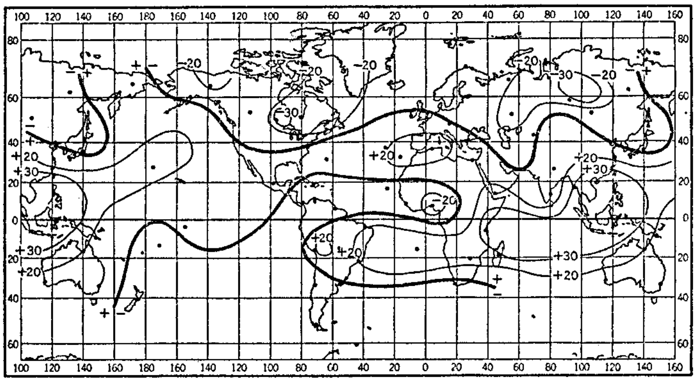

Chart 42. Correlations between District No. 4 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

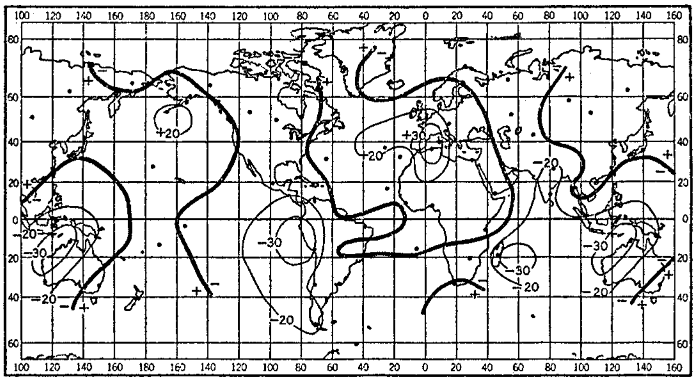

Chart 43. Correlations between District No. 4 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

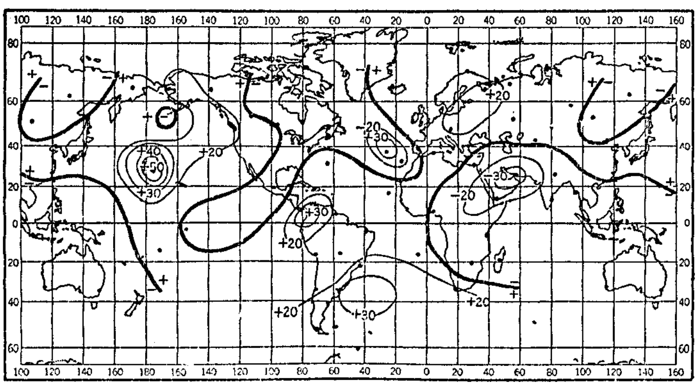

Chart 44. Correlations between District No. 4 U. S. spring temperatures and SON foreign pressures (2 quarters before).

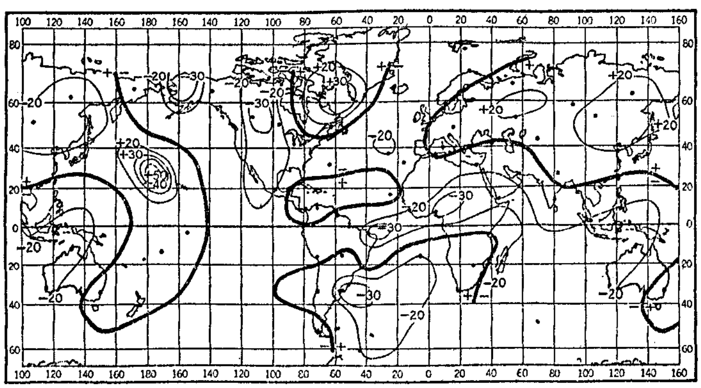

Chart 45. Correlations between District No. 4 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

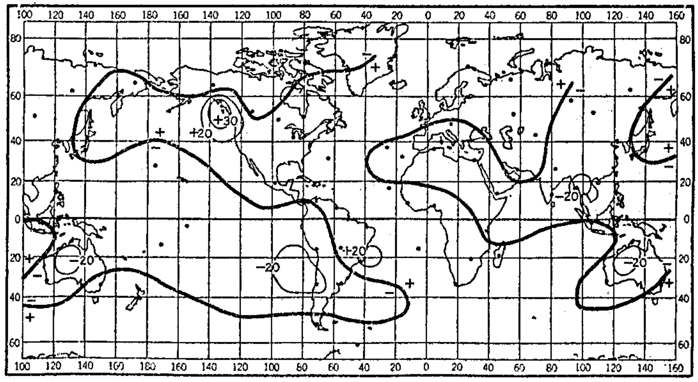

Chart 46. Correlations between District No. 4 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

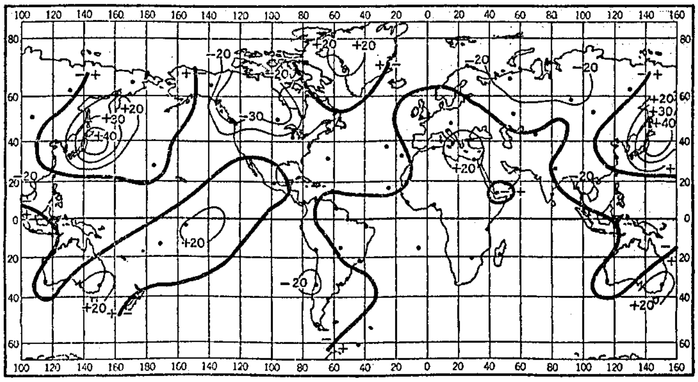

Chart 47. Correlations between District No. 4 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

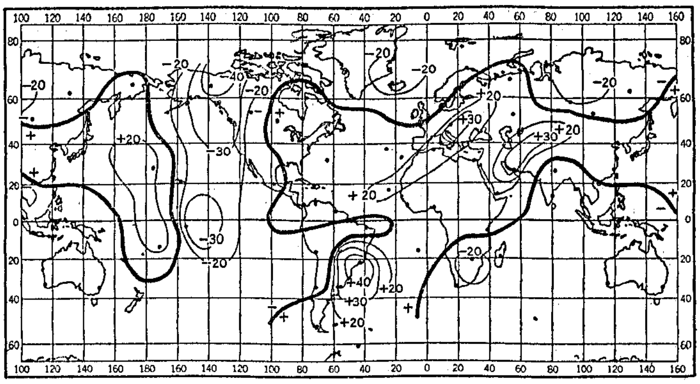

Chart 48. Correlations between District No. 4 U. S. summer temperatures and SON foreign pressures (3 quarters before).

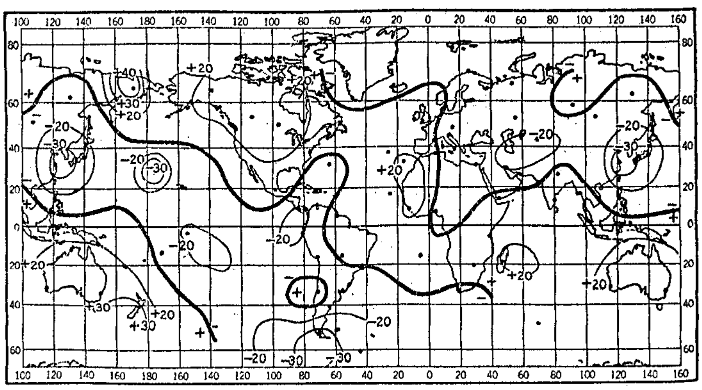

Chart 49. Correlations between District No. 4 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

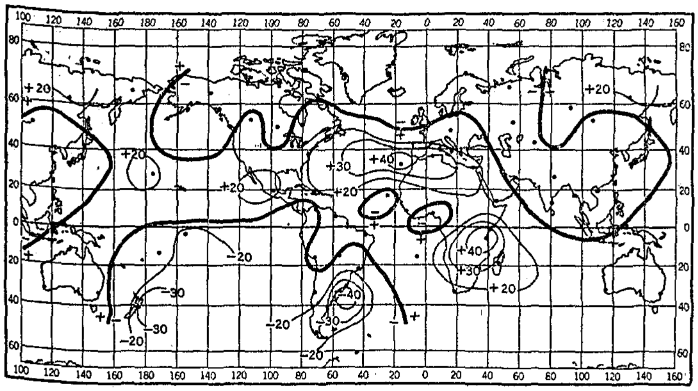

Chart 50. Correlations between District No. 4 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

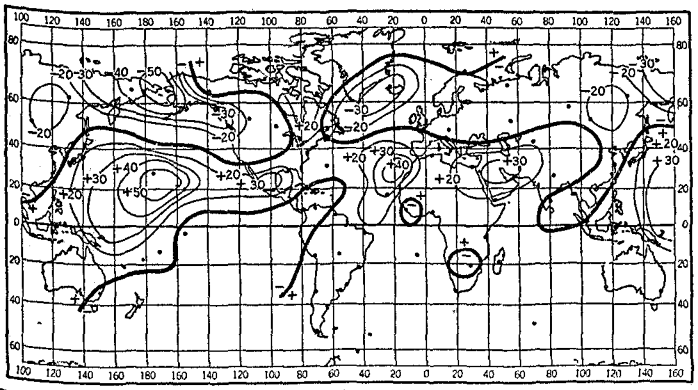

Chart 51. Correlations between District No. 4 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

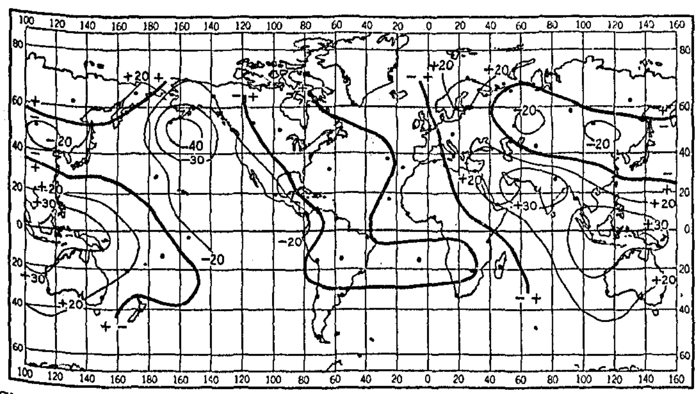

Chart 52. Correlations between District No. 5 U. S. winter temperatures and SON foreign pressures (1 quarter before).

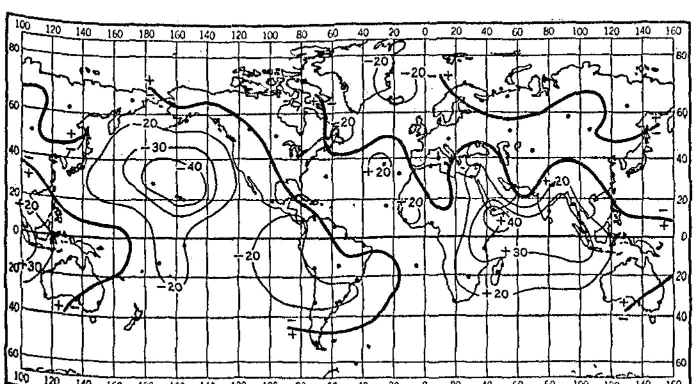

Chart 53. Correlations between District No. 5 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

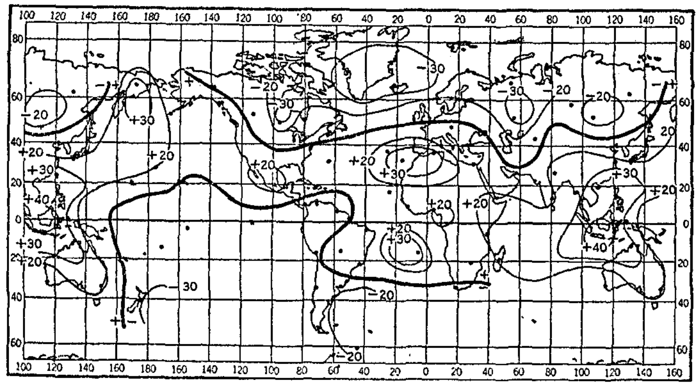

Chart 54. Correlations between District No. 5 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

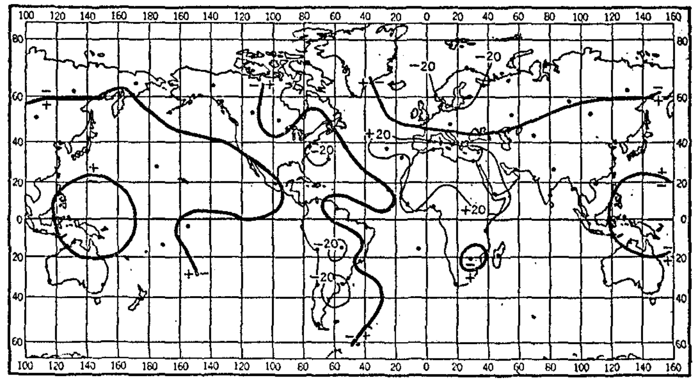

Chart 55. Correlations between District No. 5 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

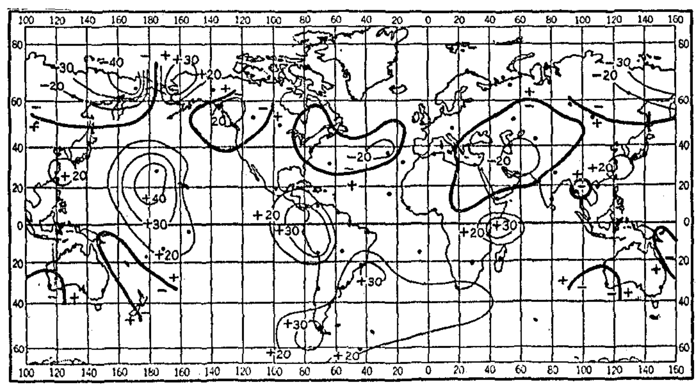

Chart 56. Correlations between District No. 5 U. S. spring temperatures and SON foreign pressures (2 quarters before).

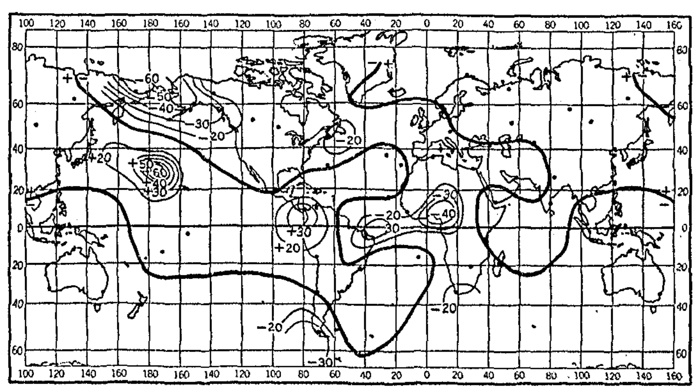

Chart 57. Correlations between District No. 5 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

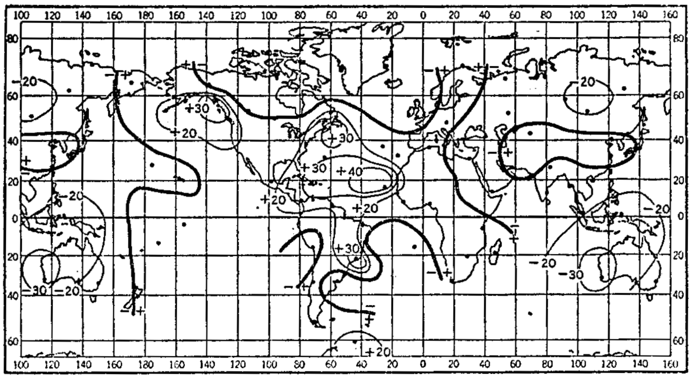

Chart 58. Correlations between District No. 5 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

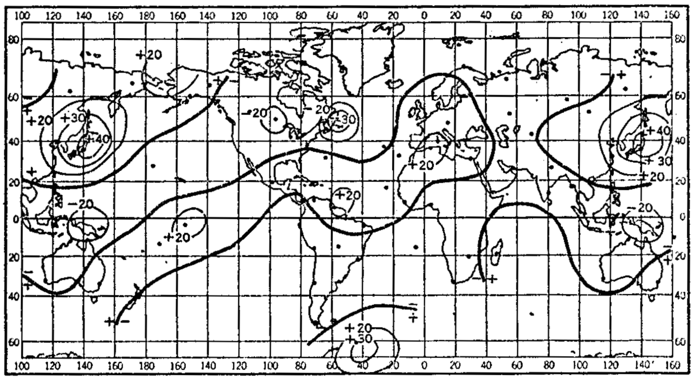

Chart 59. Correlations between District No. 5 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

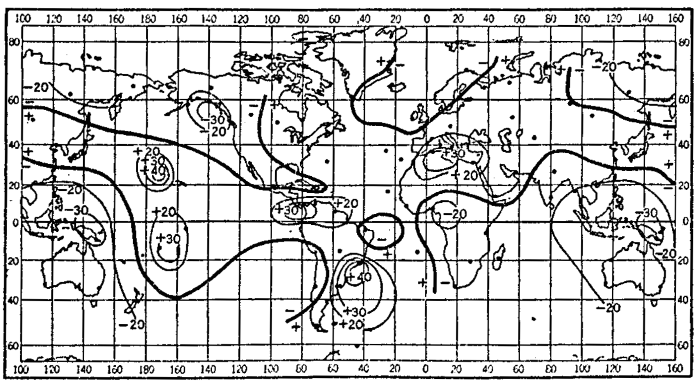

Chart 60. Correlations between District No. 5 U. S. summer temperatures and SON foreign pressures (3 quarters before).

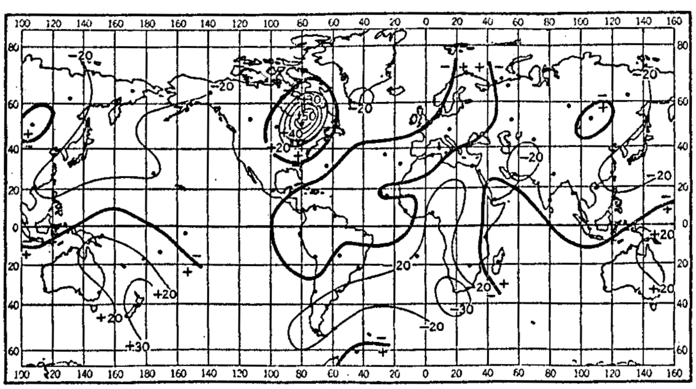

Chart 61. Correlations between District No. 5 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

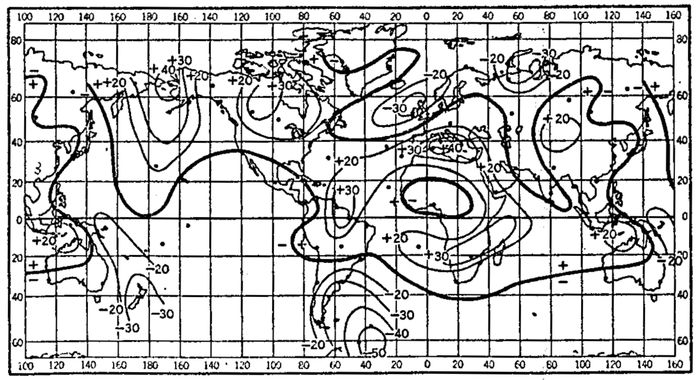

Chart 62. Correlations between District No. 5 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

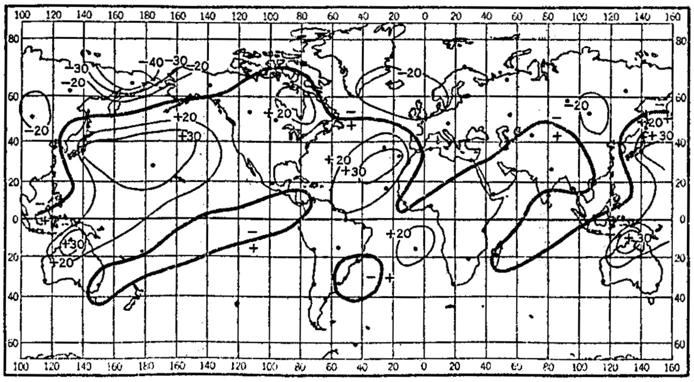

Chart 63. Correlations between District No. 5 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

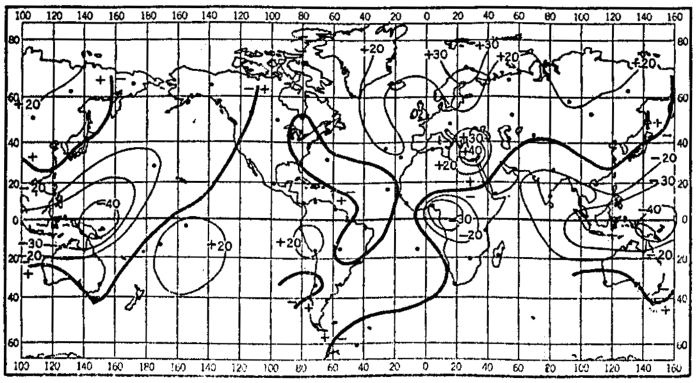

Chart 64. Correlations between District No. 6 U. S. winter temperatures and SON foreign pressures (1 quarter before).

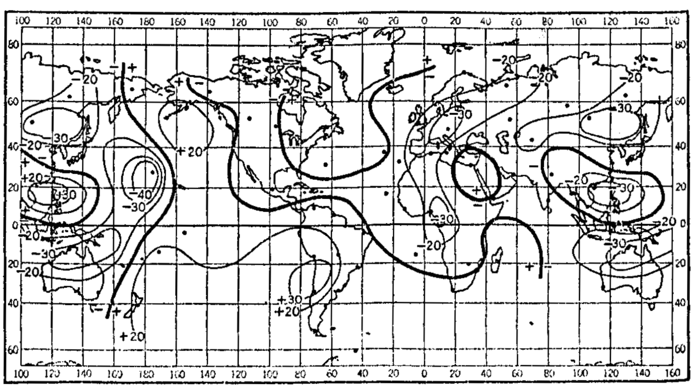

Chart 65. Correlations between District No. 6 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

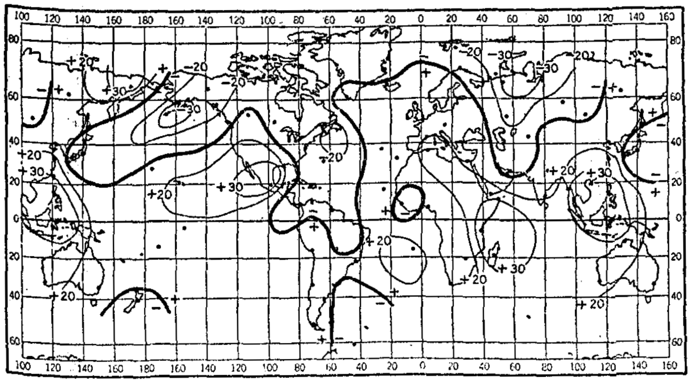

Chart 66. Correlations between District No. 6 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

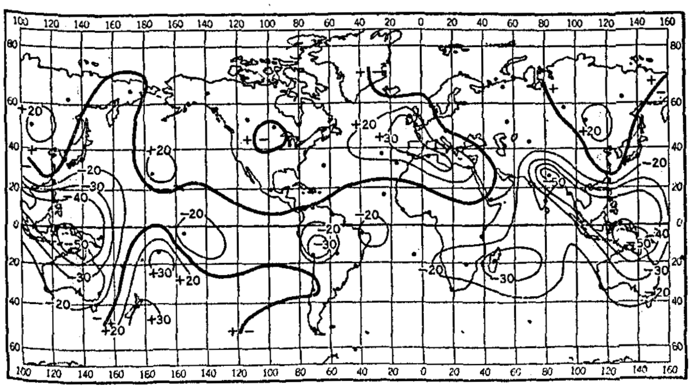

Chart 67. Correlations between District No. 6 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

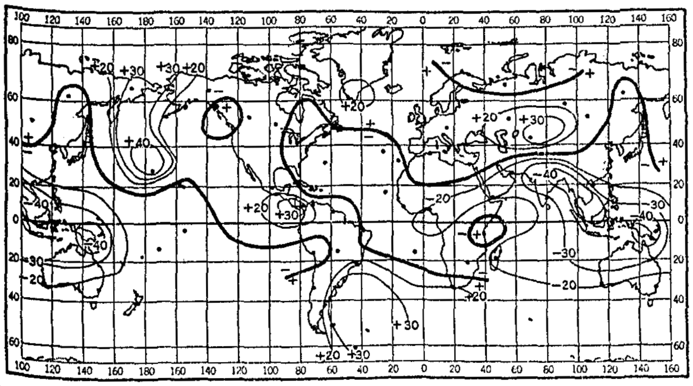

Chart 68. Correlations between District No. 6 U. S. spring temperatures and SON foreign pressures (2 quarters before).

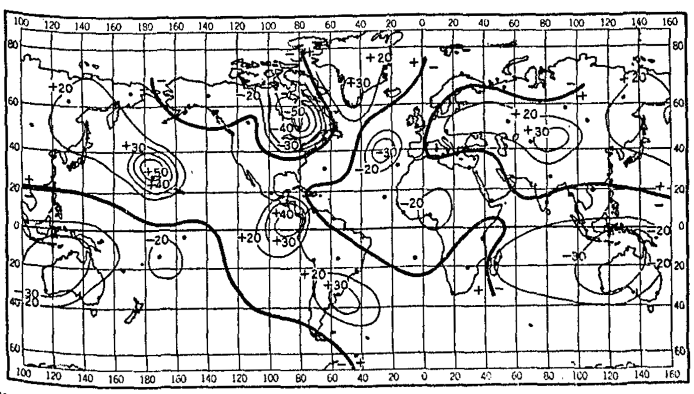

Chart 69. Correlations between District No. 6 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

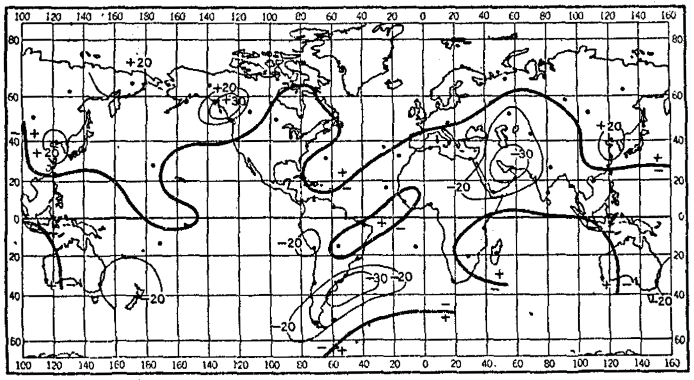

Chart 70. Correlations between District No. 6 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

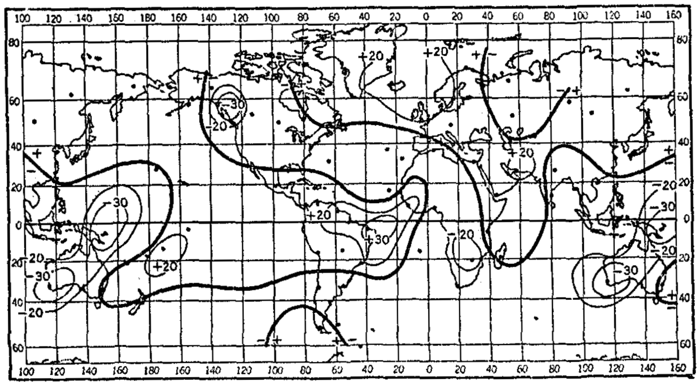

Chart 71. Correlations between District No. 6 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

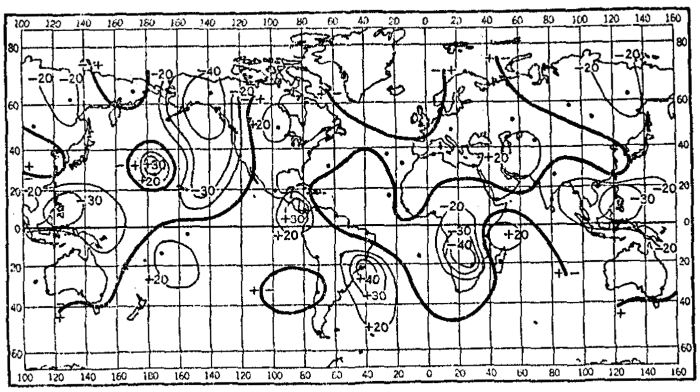

Chart 72. Correlations between District No. 6 U. S. summer temperatures and SON foreign pressures (3 quarters before).

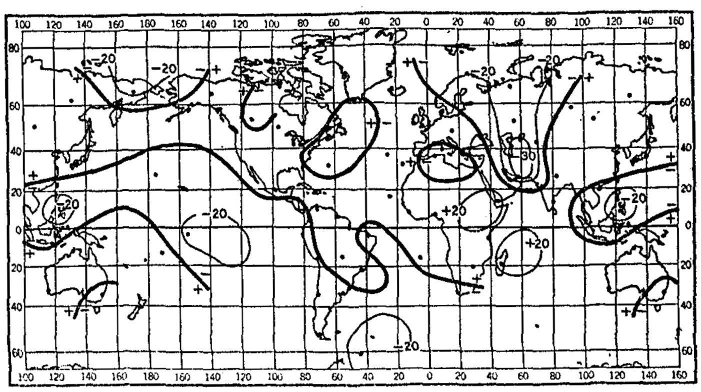

Chart 73. Correlations between District No. 6 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

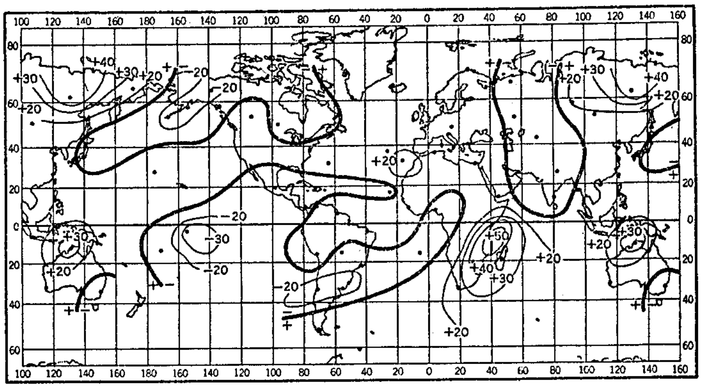

Chart 74. Correlations between District No. 6 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

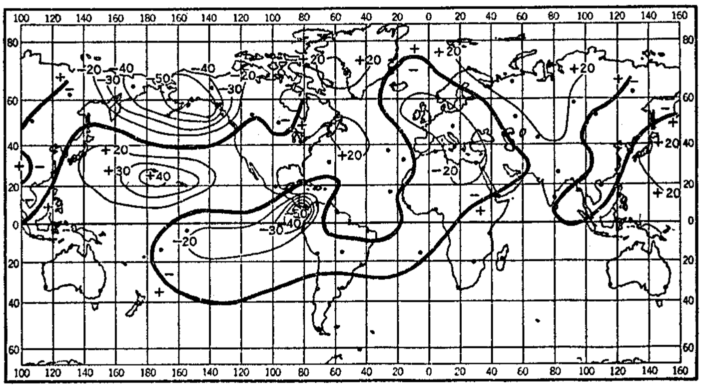

Chart 75. Correlations between District No. 6 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

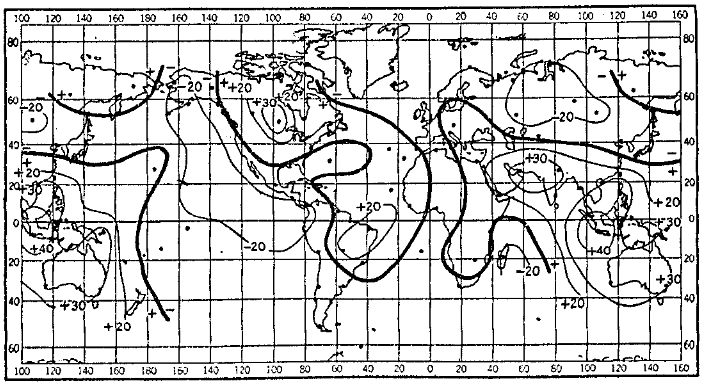

Chart 76. Correlations between District No. 7 U. S. winter temperatures and SON foreign pressures (1 quarter before).

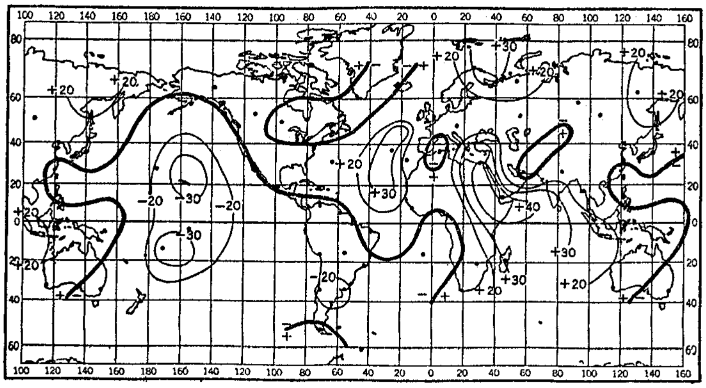

Chart 77. Correlations between District No. 7 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

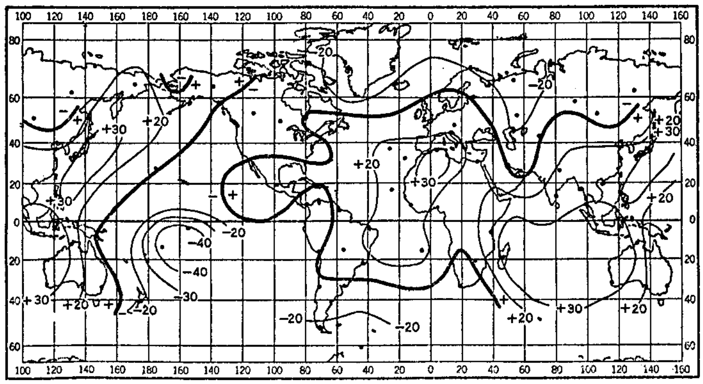

Chart 78. Correlations between District No. 7 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

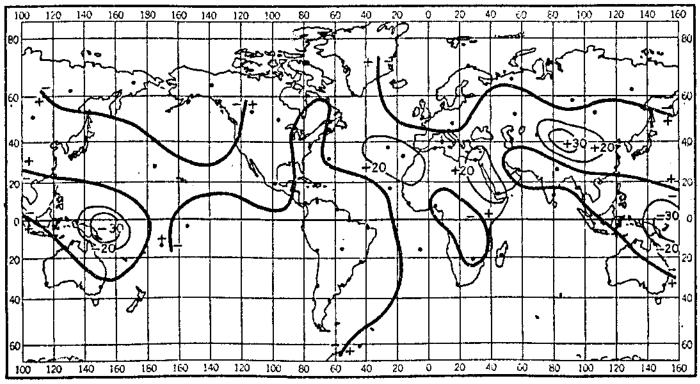

Chart 79. Correlations between District No. 7 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

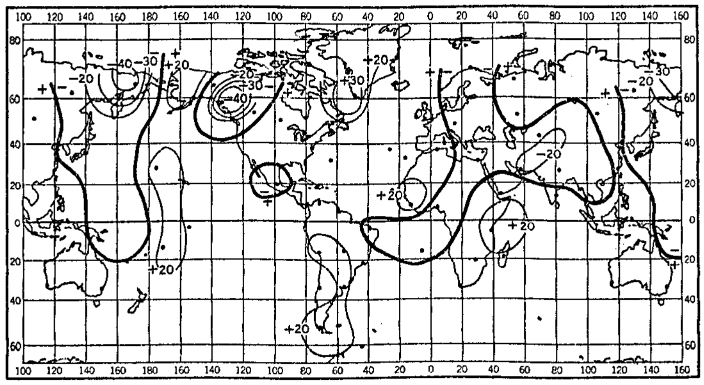

Chart 80. Correlations between District No. 7 U. S. spring temperatures and SON foreign pressures (2 quarters before).

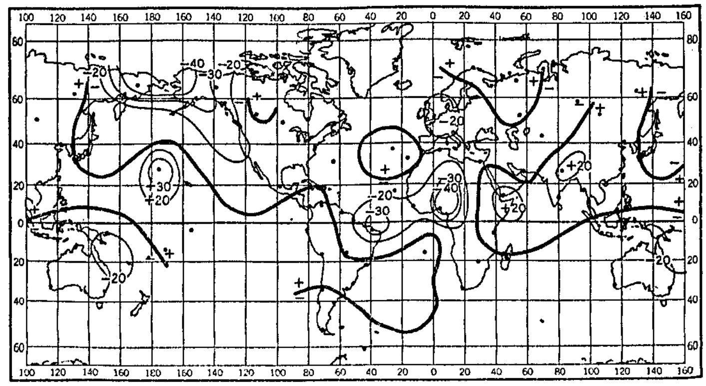

Chart 81. Correlations between District No. 7 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

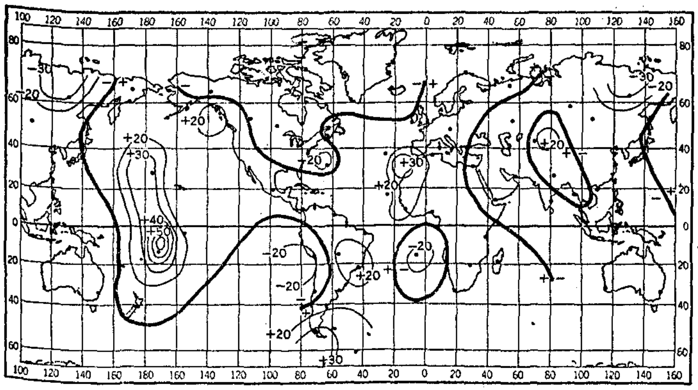

Chart 82. Correlations between District No. 7 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

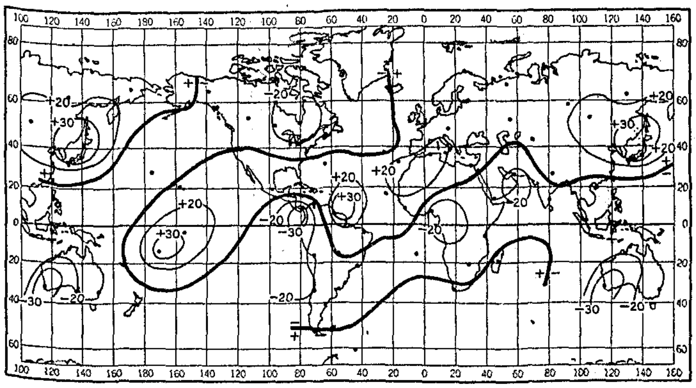

Chart 83. Correlations between District No. 7 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

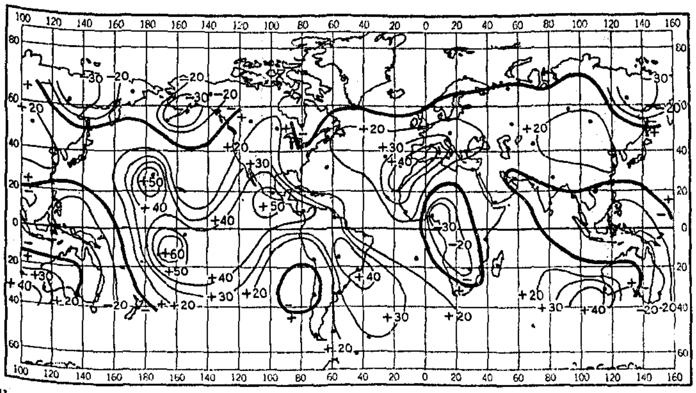

Chart 84. Correlations between District No. 7 U. S. summer temperatures and SON foreign pressures (3 quarters before).

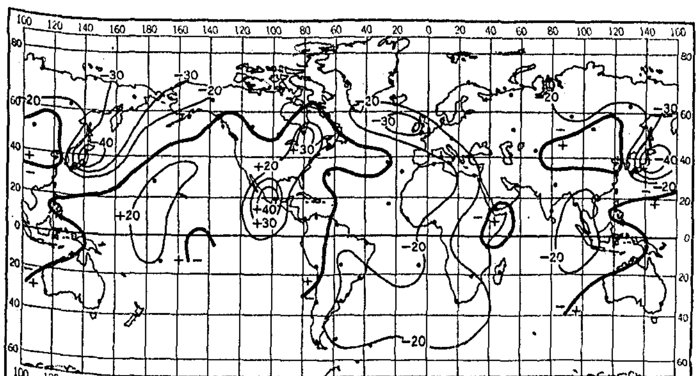

Chart 85. Correlations between District No. 7 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

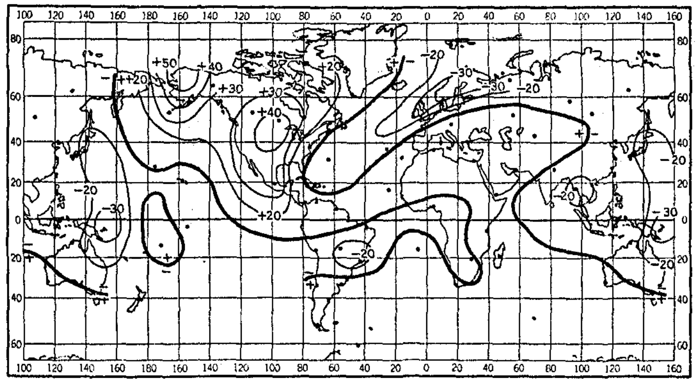

Chart 86. Correlations between District No. 7 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

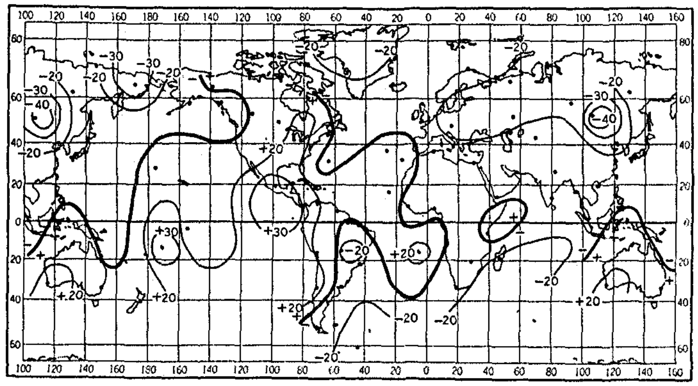

Chart 87. Correlations between District No. 7 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

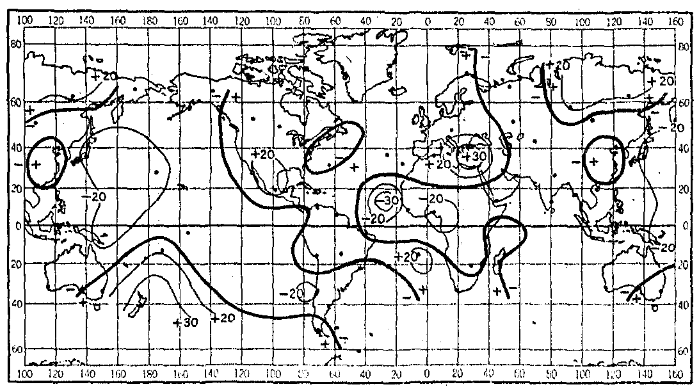

Chart 88. Correlations between District No. 8 U. S. winter temperatures and SON foreign pressures (1 quarter before).

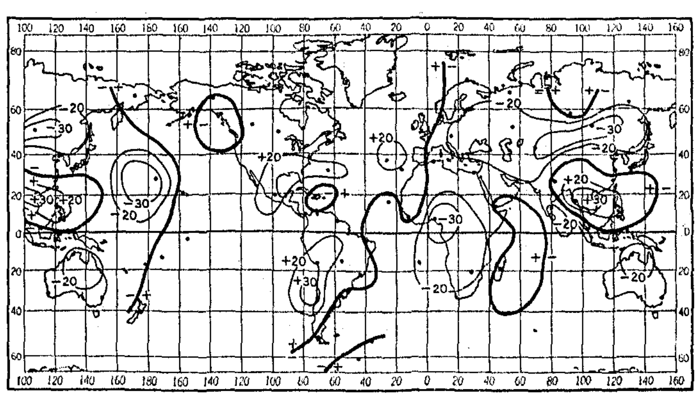

Chart 89. Correlations between District No. 8 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

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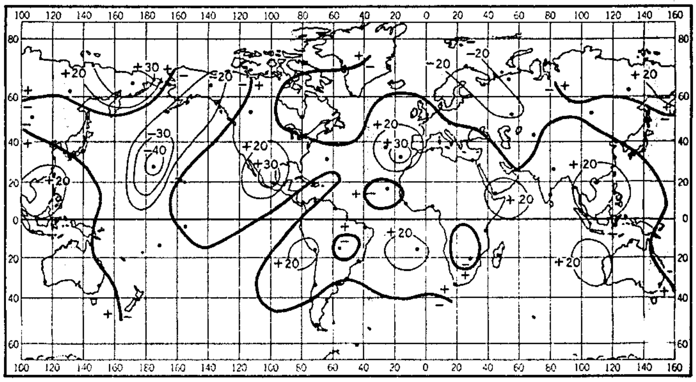

Chart 90. Correlations between District No. 8 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

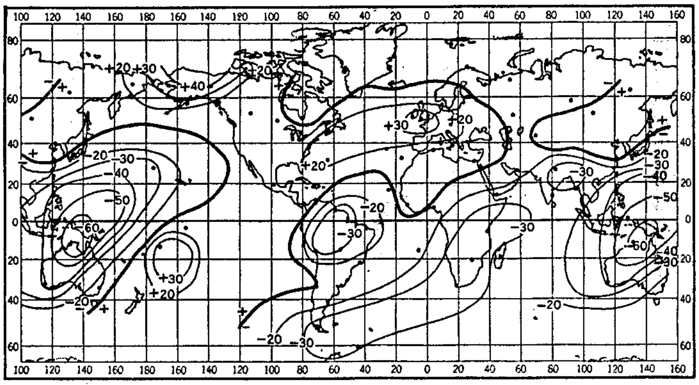

Chart 91. Correlations between District No. 8 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

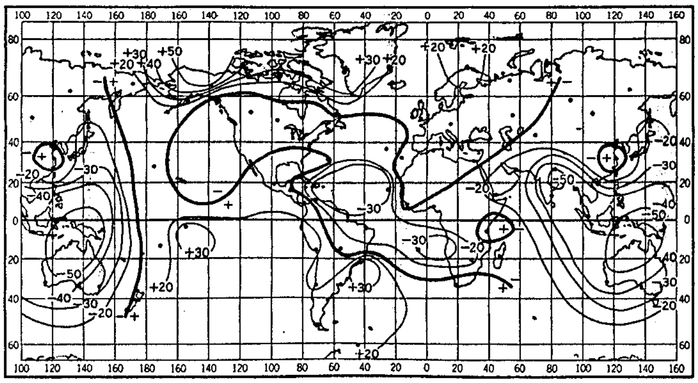

Chart 92. Correlations between District No. 8 U. S. spring temperatures and SON foreign pressures (2 quarters before).

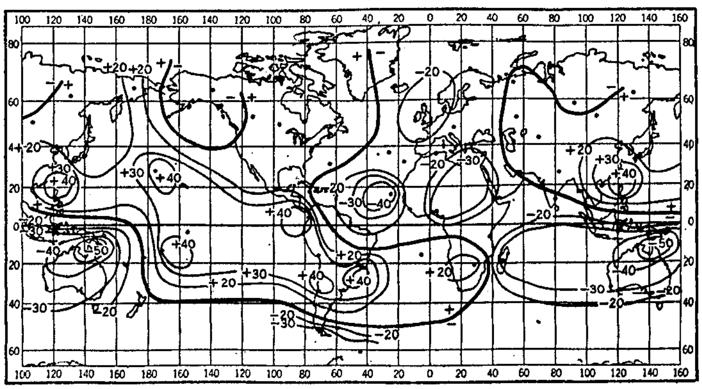

Chart 93. Correlations between District No. 8 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

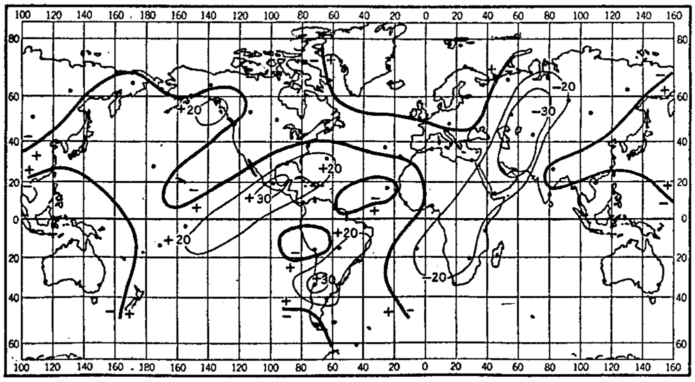

Chart 94. Correlations between District No. 8 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

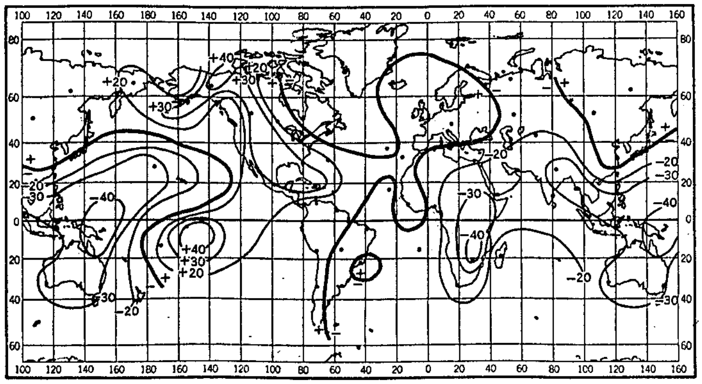

Chart 95. Correlations between District No. 8 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

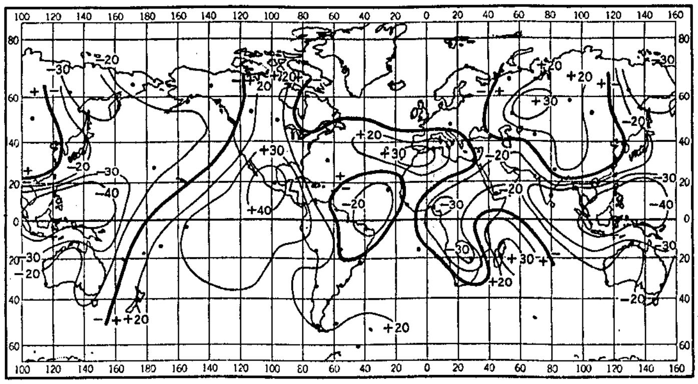

Chart 96. Correlations between District No. 8 U. S. summer temperatures and SON foreign pressures (3 quarters before).

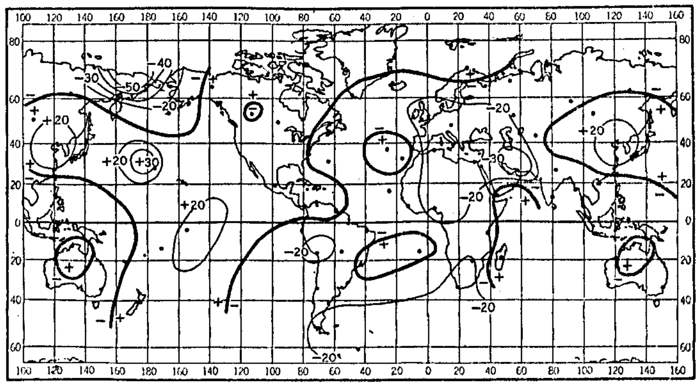

Chart 97. Correlations between District No. 8 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

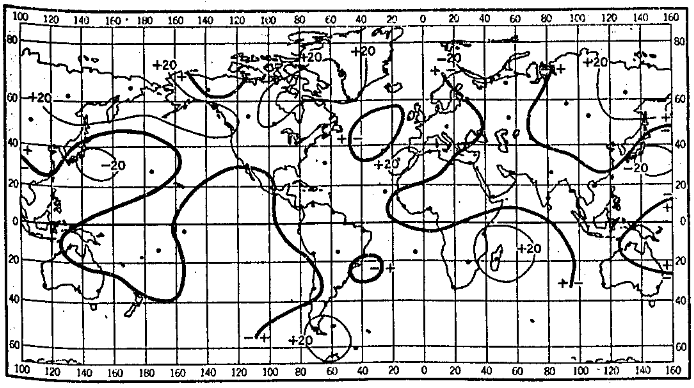

Chart 98. Correlations between District No. 8 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

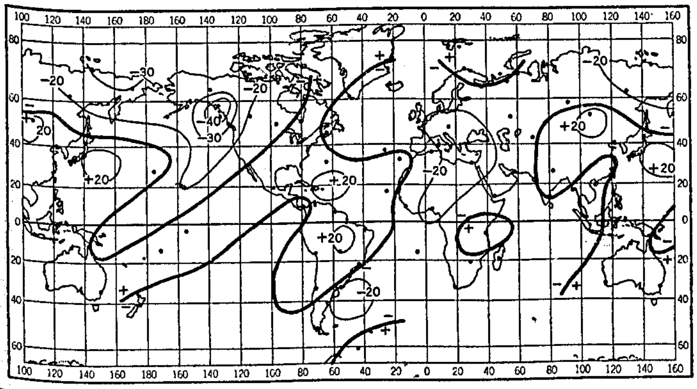

Chart 99. Correlations between District No. 8 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

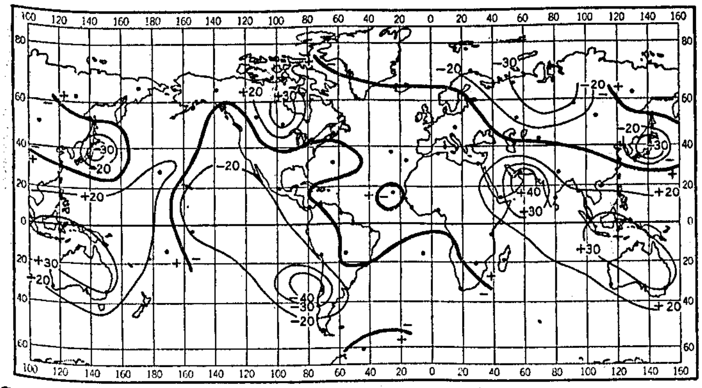

Chart 100. Correlations between District No. 9 U. S. winter temperatures and SON foreign pressures (1 quarter before).

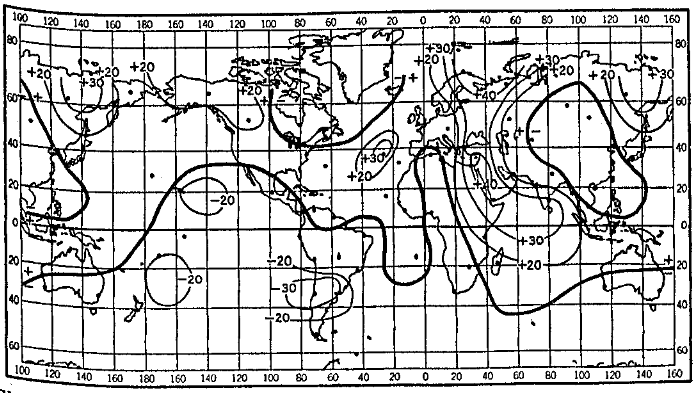

Chart 101. Correlations between District No. 9 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

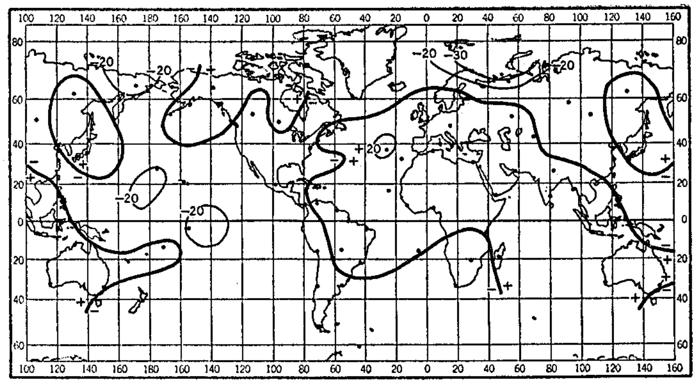

Chart 102. Correlations between District No. 9 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

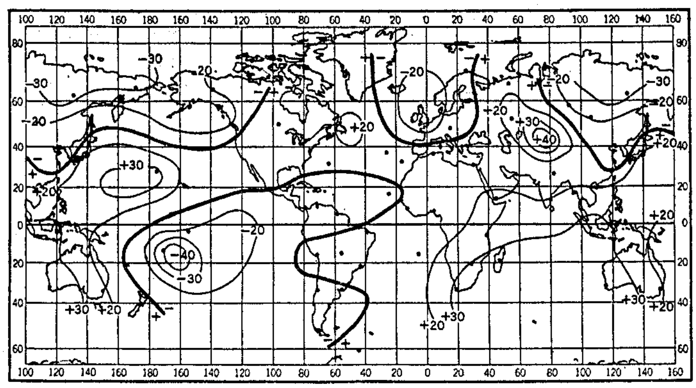

Chart 103. Correlations between District No. 9 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

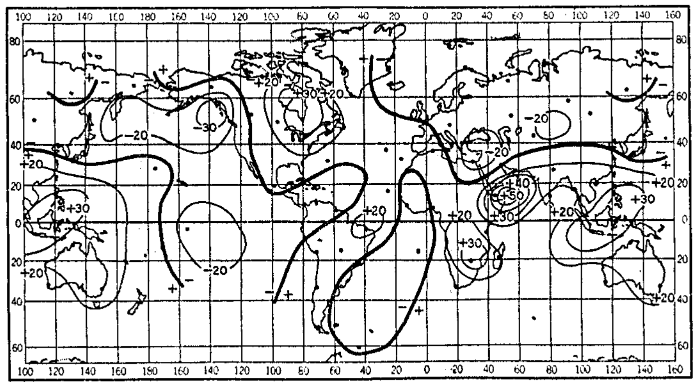

Chart 104. Correlations between District No. 9 U. S. spring temperatures and SON foreign pressures (2 quarters before).

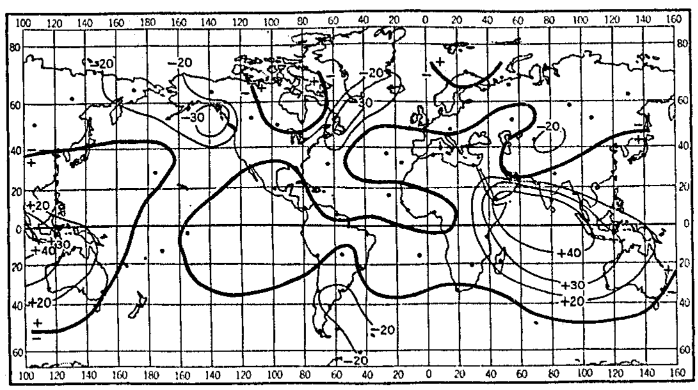

Chart 105. Correlations between District No. 9 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

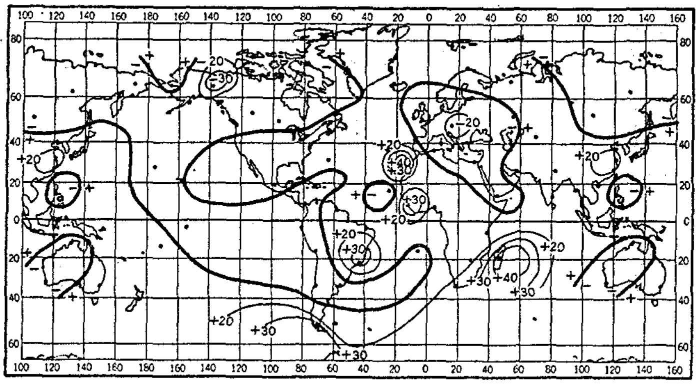

Chart 106. Correlations between District No. 9 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

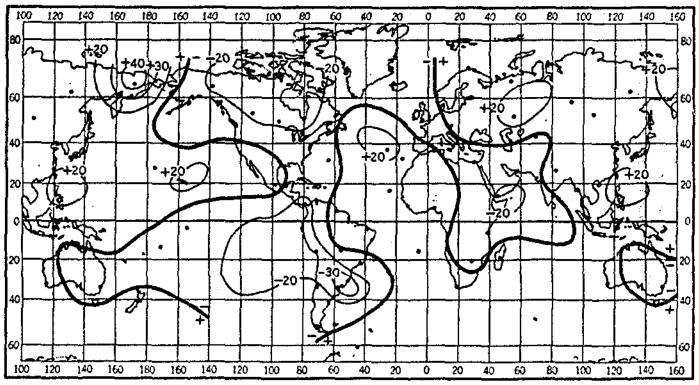

Chart 107. Correlations between District No. 9 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

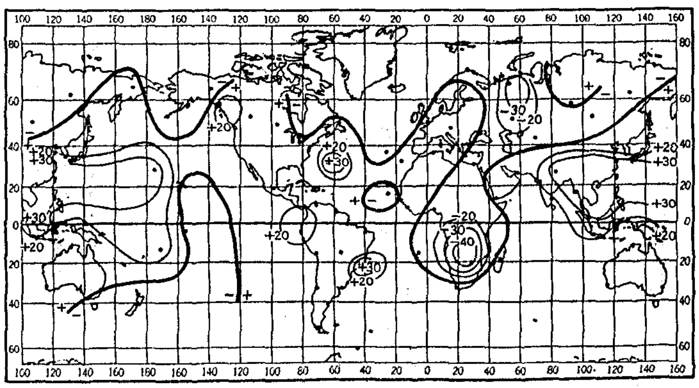

Chart 108. Correlations between District No. 9 U. S. summer temperatures and SON foreign pressures (3 quarters before).

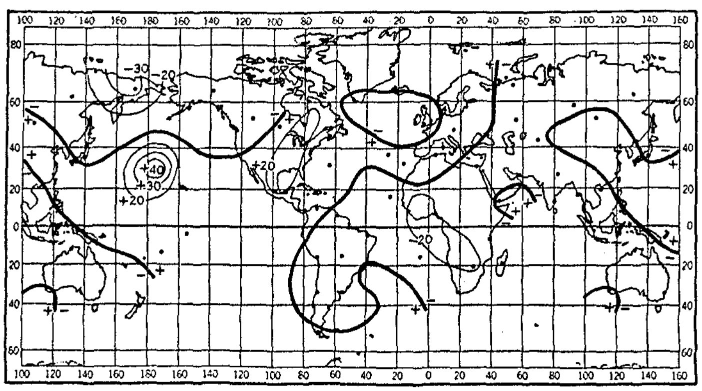

Chart 109. Correlations between District No. 9 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

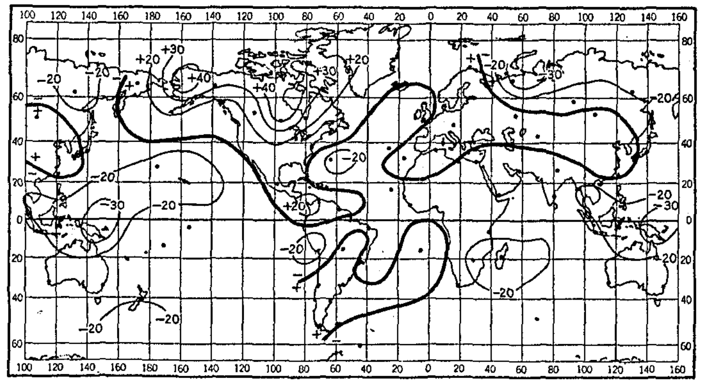

Chart 110. Correlations between District No. 9 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

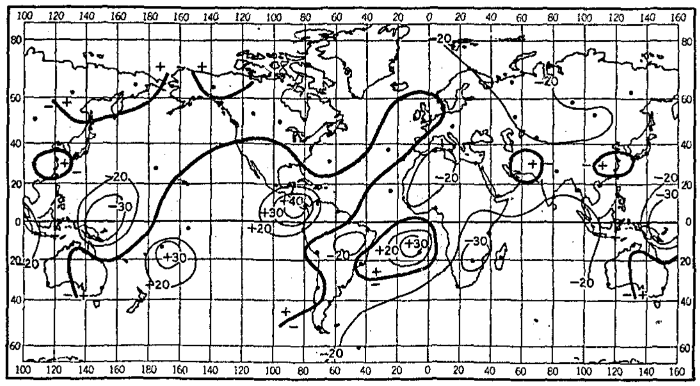

Chart 111. Correlations between District No. 9 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

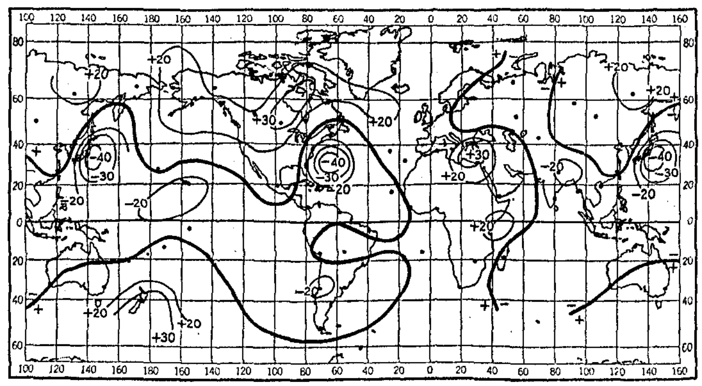

Chart 112. Correlations between District No. 10 U. S. winter temperatures and SON foreign pressures (1 quarter before).

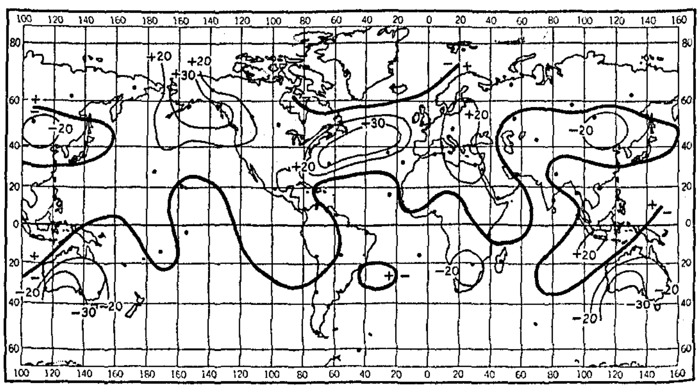

Chart 113. Correlations between District No. 10 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

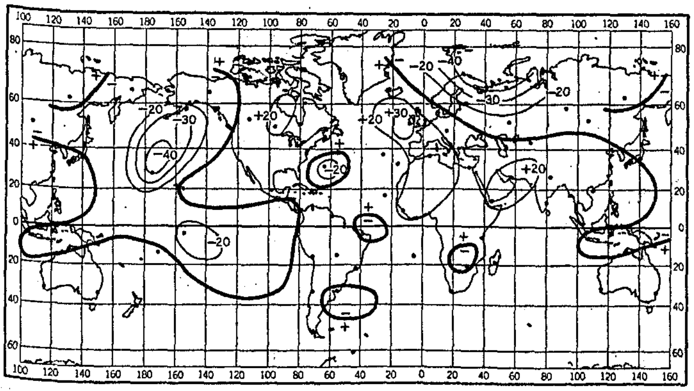

Chart 114. Correlations between District No. 10 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

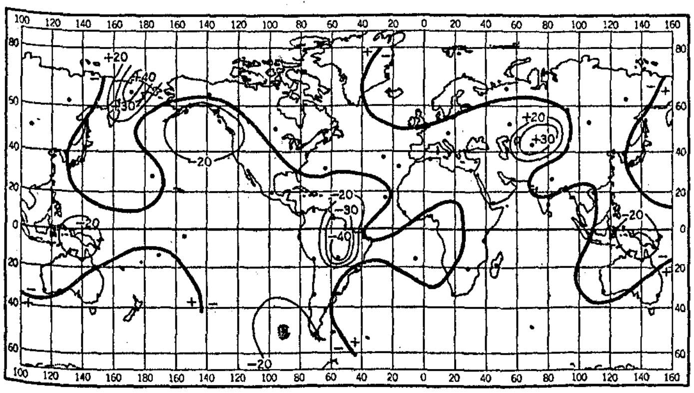

Chart 115. Correlations between District No. 10 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

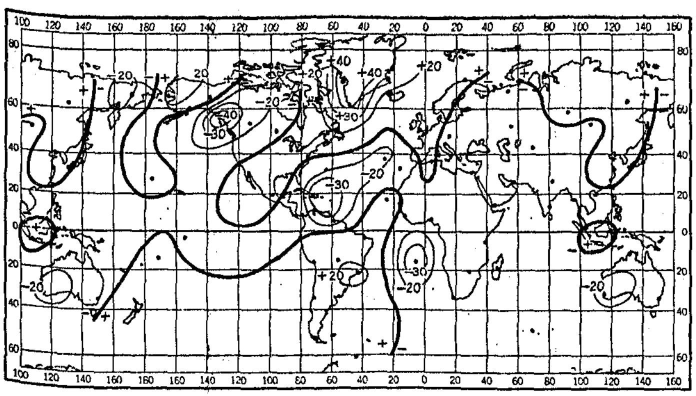

Chart 116. Correlations between District No. 10 U. S. spring temperatures and SON foreign pressures (2 quarters before).

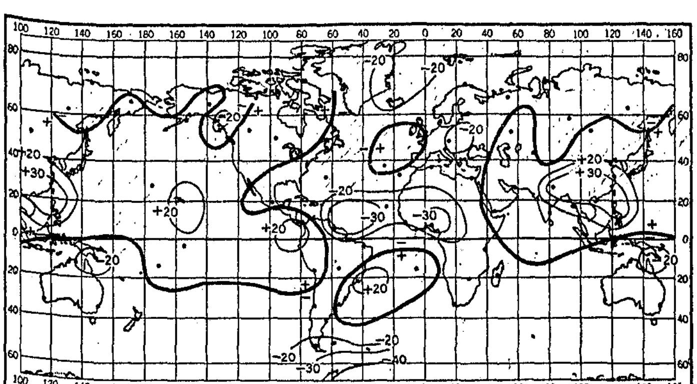

Chart 117. Correlations between District No. 10 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

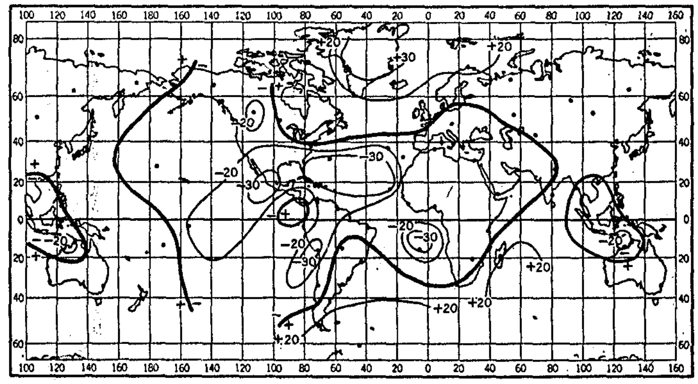

Chart 118. Correlations between District No. 10 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

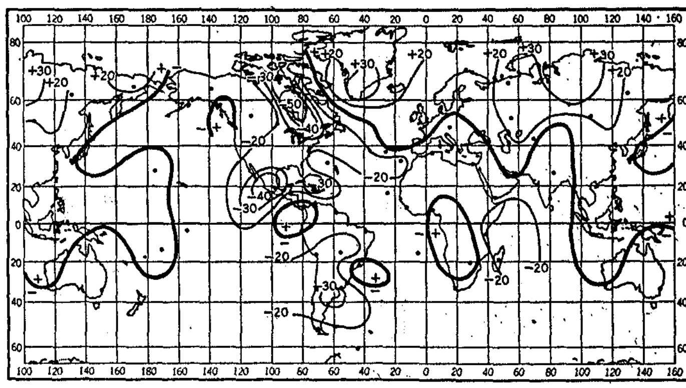

Chart 119. Correlations between District No. 10 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

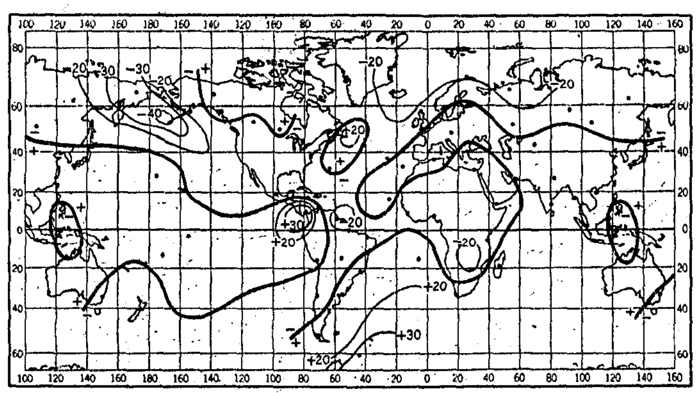

Chart 120. Correlations between District No. 10 U. S. summer temperatures and SON foreign pressures (3 quarters before).

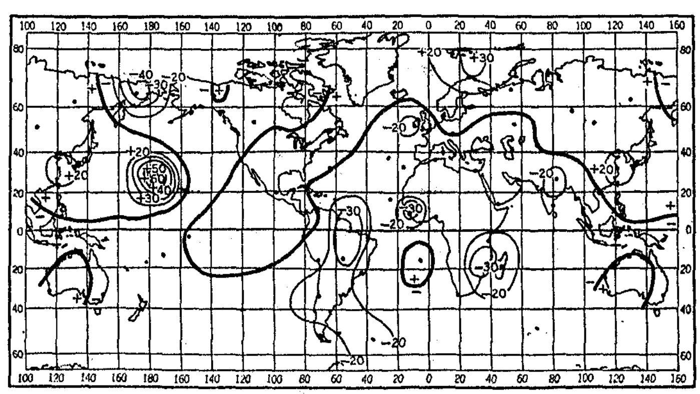

Chart 121. Correlations between District No. 10 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

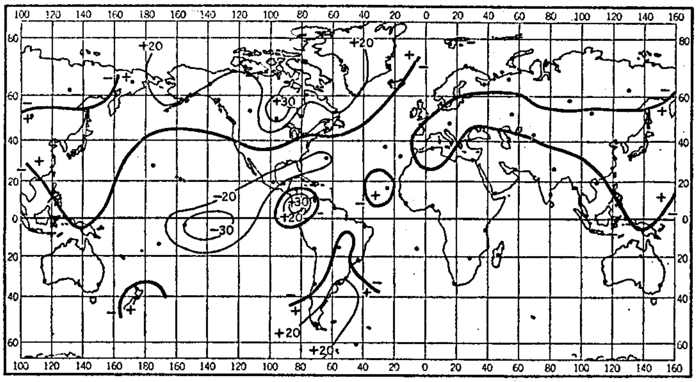

Chart 122. Correlations between District No. 10 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

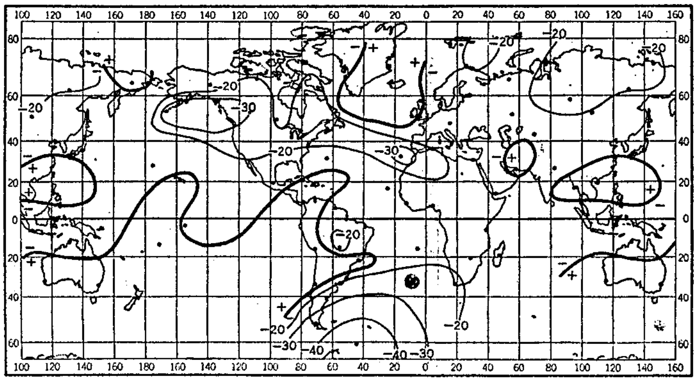

Chart 123. Correlations between District No. 10 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

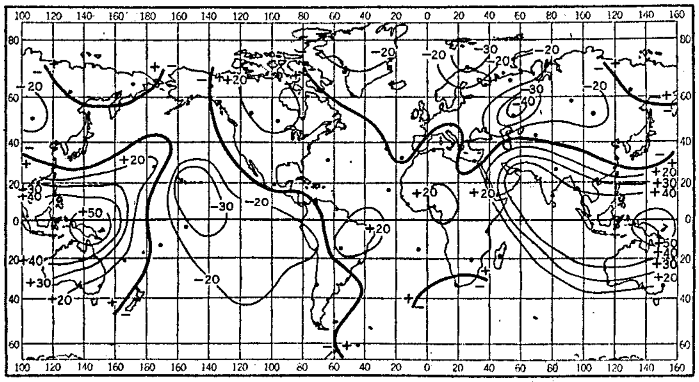

Chart 124. Correlations between District No. 11 U. S. winter temperatures and SON foreign pressures (1 quarter before).

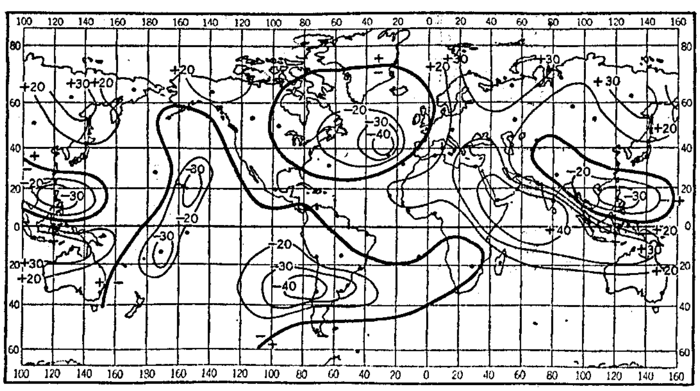

Chart 125. Correlations between District No. 11 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

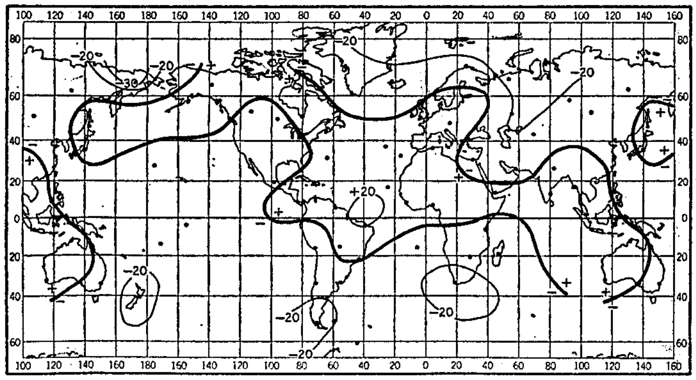

Chart 126. Correlations between District No. 11 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

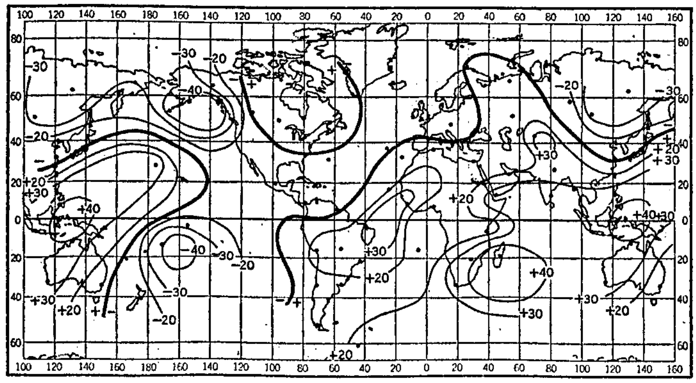

Chart 127. Correlations between District No. 11 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

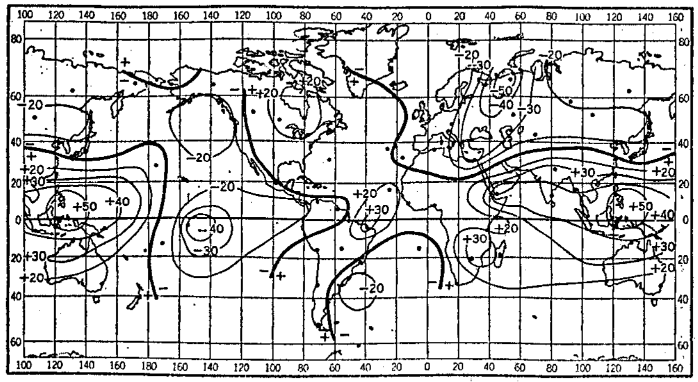

Chart 128. Correlations between District No. 11 U. S. spring temperatures and SON foreign pressures (2 quarters before).

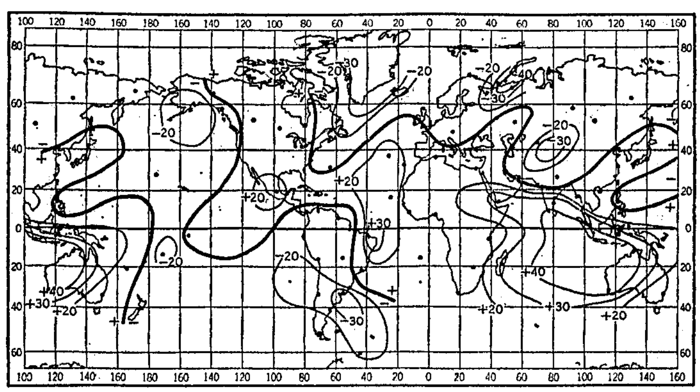

Chart 129. Correlations between District No. 11 U. S. spring temperatures and JJA foreign pressures (3 quarters before).

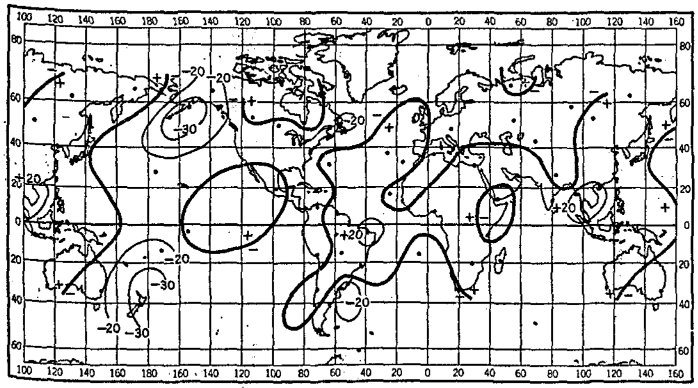

Chart 130. Correlations between District No. 11 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

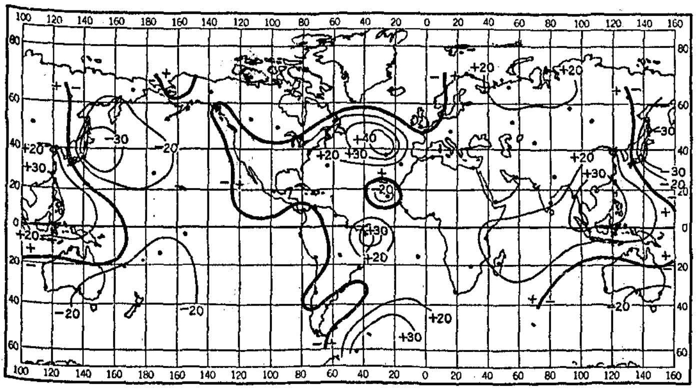

Chart 131. Correlations between District No. 11 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

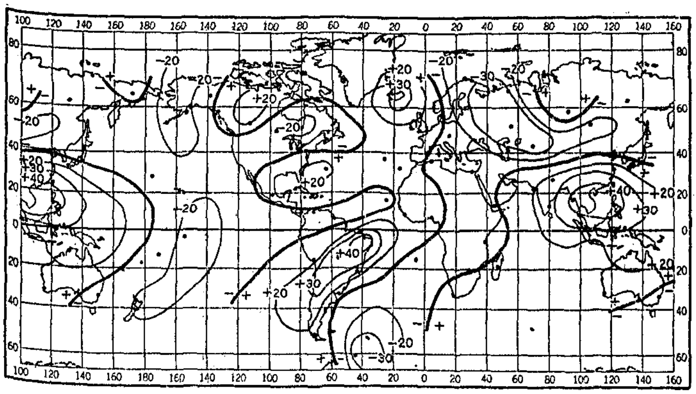

Chart 132. Correlations between District No. 11 U. S. summer temperatures and SON foreign pressures (3 quarters before).

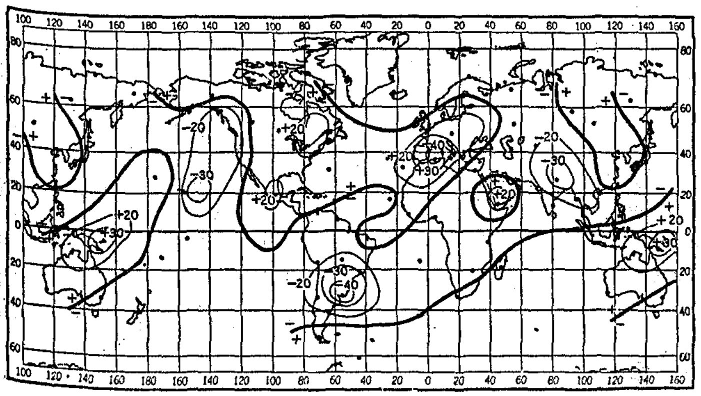

Chart 133. Correlations between District No. 11 U. S. utumn temperatures and JJA foreign pressures (1 quarter before).

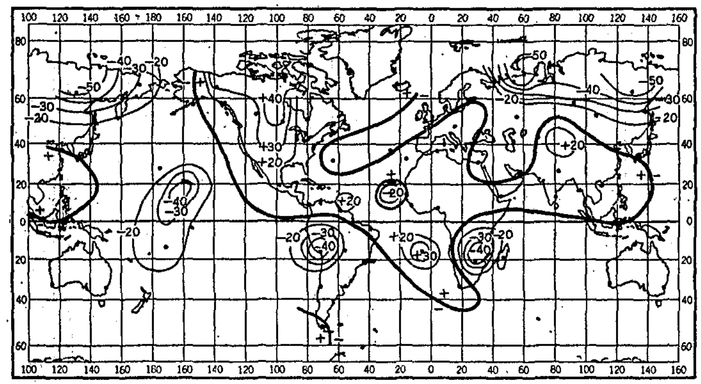

Chart 134. Correlations between District No. 11 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

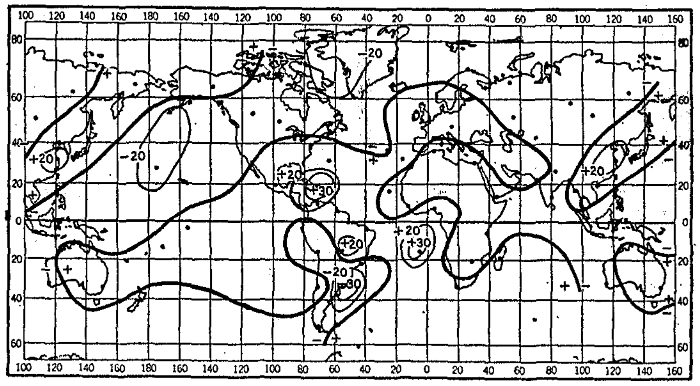

Chart 135. Correlations between District No. 11 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

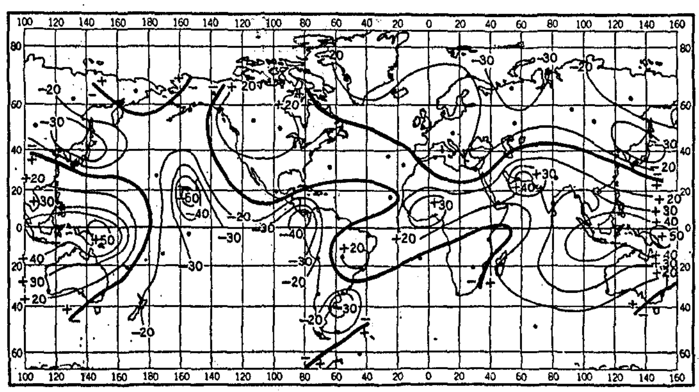

Chart 136. Correlations between District No. 12 U. S. winter temperatures and SON foreign pressures (1 quarter before).

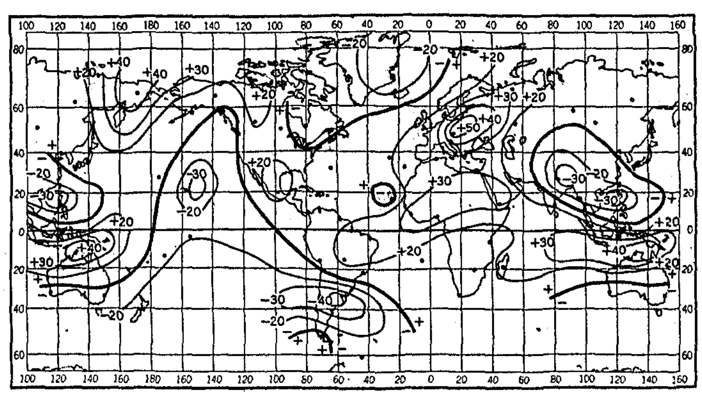

Chart 137. Correlations between District No. 12 U. S. winter temperatures and JJA foreign pressures (2 quarters before).

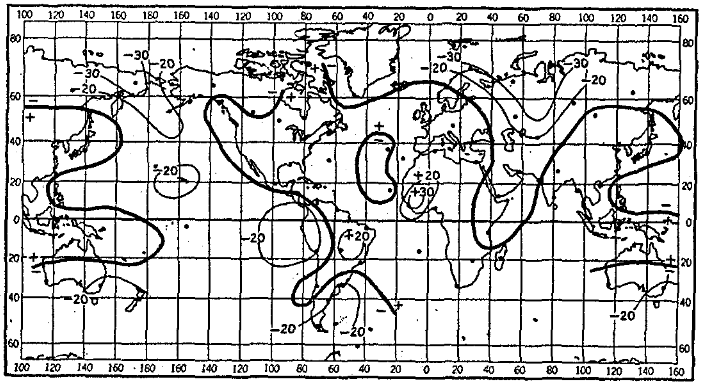

Chart 138. Correlations between District No. 12 U. S. winter temperatures and MAM foreign pressures (3 quarters before).

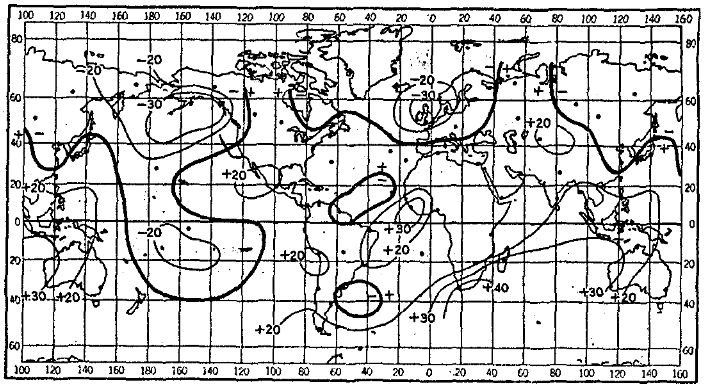

Chart 139. Correlations between District No. 12 U. S. spring temperatures and DJF foreign pressures (1 quarter before).

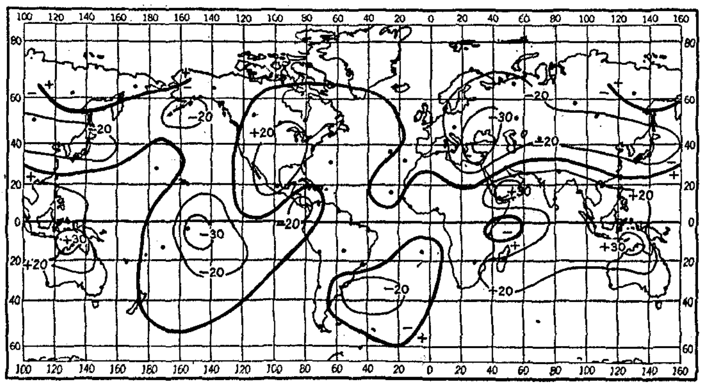

Chart 140. Correlations between District No. 12 U. S. spring temperatures and SON foreign pressures (2 quarters before).

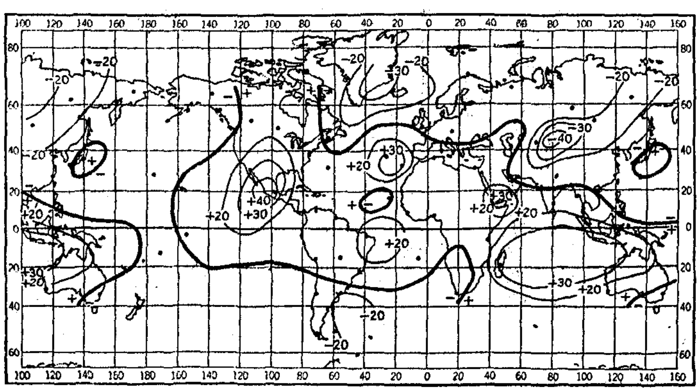

Chart 141. Correlations between District No. 12 U. S. spring temperature and JJA foreign pressures (3 quarters before).

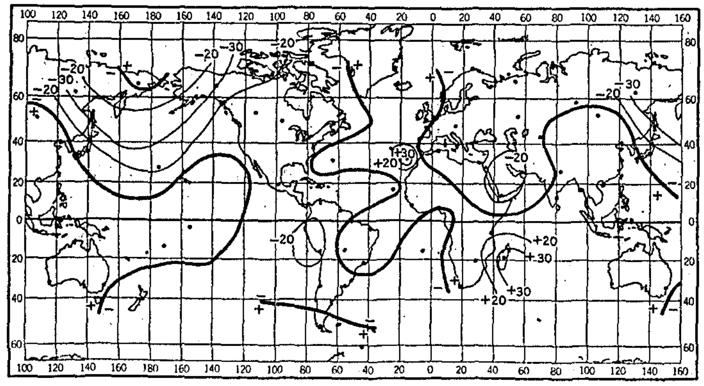

Chart 142. Correlations between District No. 12 U. S. summer temperatures and MAM foreign pressures (1 quarter before).

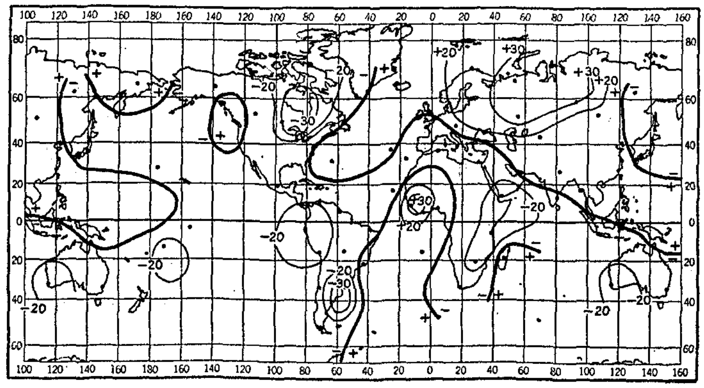

Chart 143. Correlations between District No. 12 U. S. summer temperatures and DJF foreign pressures (2 quarters before).

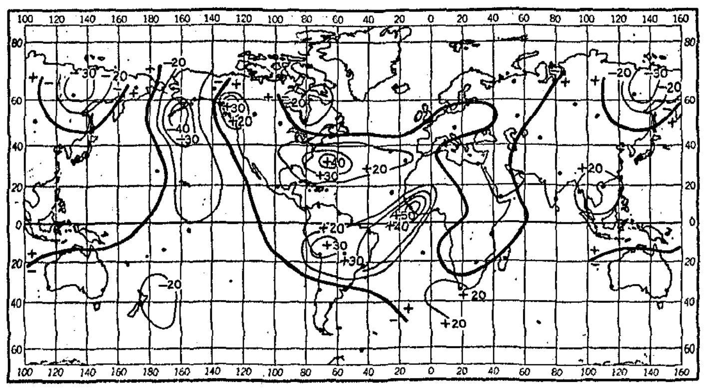

Chart 144. Correlations between District No. 12 U. S. summer temperatures and SON foreign pressures (3 quarters before).

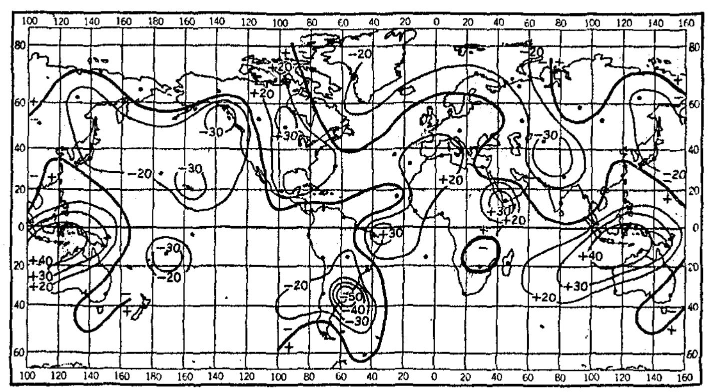

Chart 145. Correlations between District No. 12 U. S. autumn temperatures and JJA foreign pressures (1 quarter before).

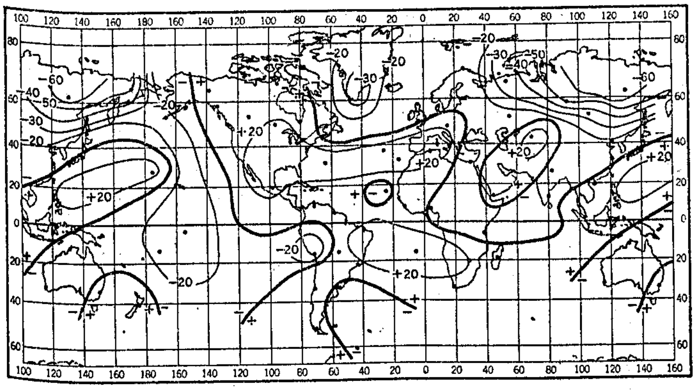

Chart 146. Correlations between District No. 12 U. S. autumn temperatures and MAM foreign pressures (2 quarters before).

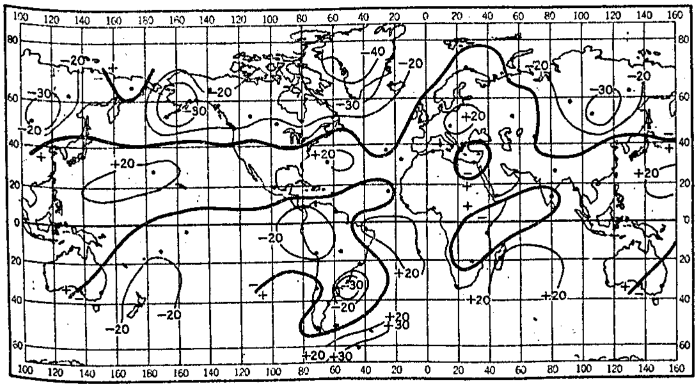

Chart 147. Correlations between District No. 12 U. S. autumn temperatures and DJF foreign pressures (3 quarters before).

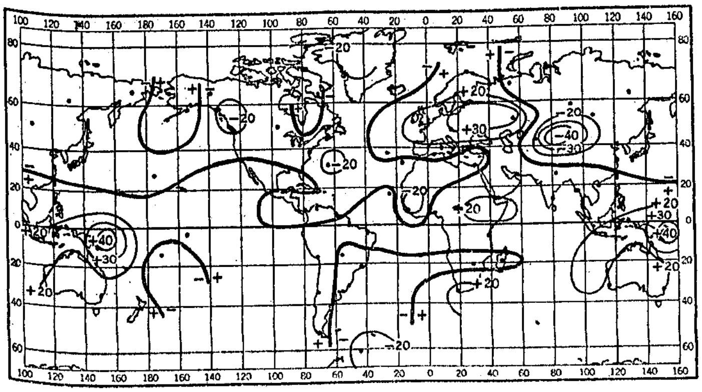

Chart 148. Correlations between District No. 1 U. S. winter precipitation and SON foreign pressures (1 quarter before).

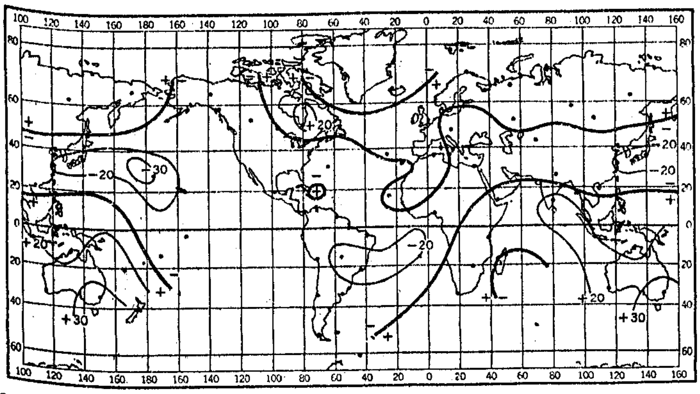

Chart 149. Correlations between District No. 1 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

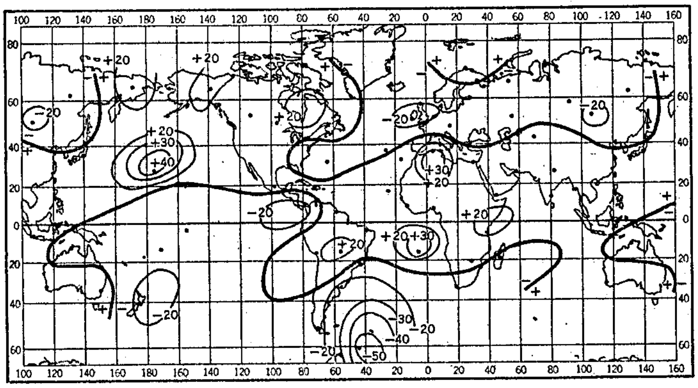

Chart 150. Correlations between District No. 1 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

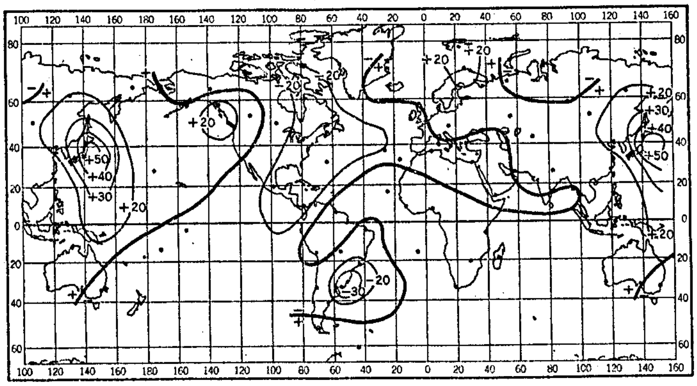

Chart 151. Correlations between District No. 1 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

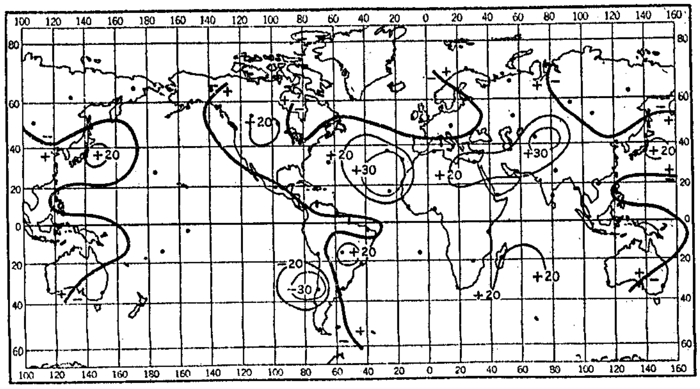

Chart 152. Correlations between District No. 1 U. S. spring precipitation and SON foreign pressures (2 quarters before).

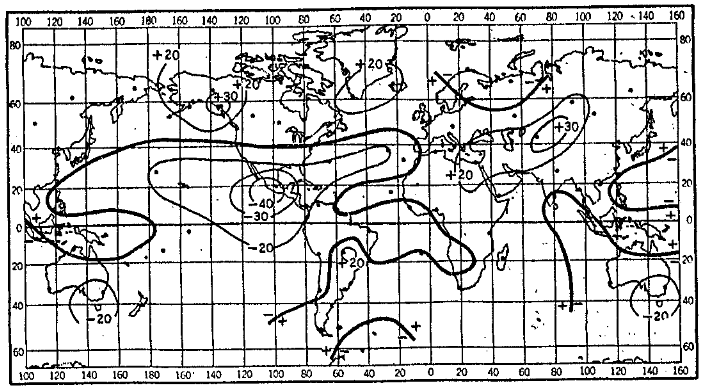

Chart 153. Correlations between District No. 1 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

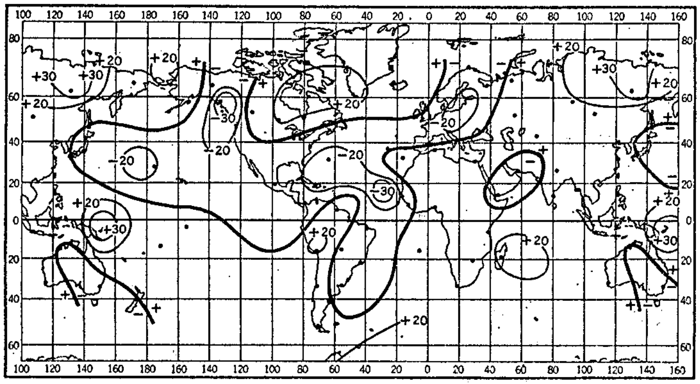

Chart 154. Correlations between District No. 1 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

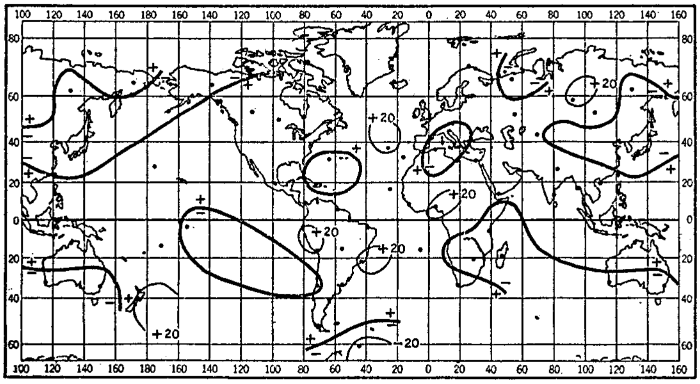

Chart 155. Correlations between District No. 1 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

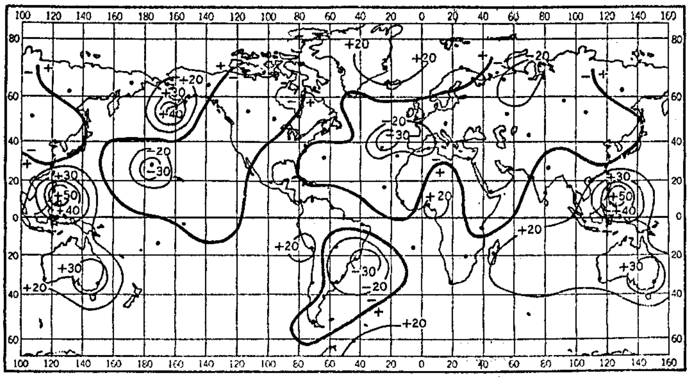

Chart 156. Correlations between District No. 1 U. S. summer precipitation and SON foreign pressures (3 quarters before).

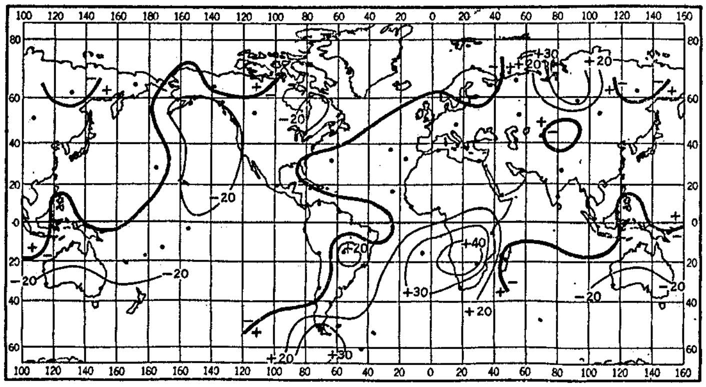

Chart 157. Correlations between District No. 1 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

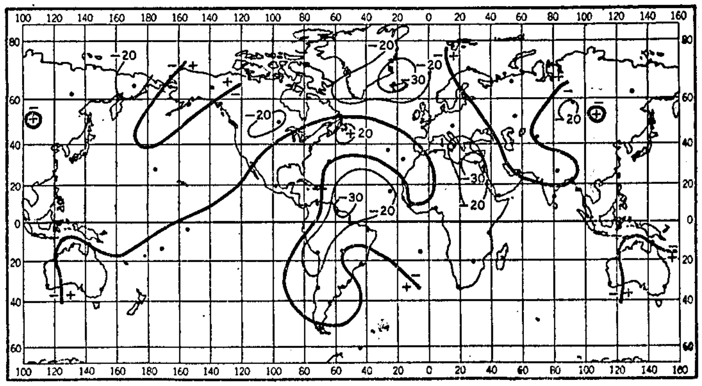

Chart 158. Correlations between District No. 1 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

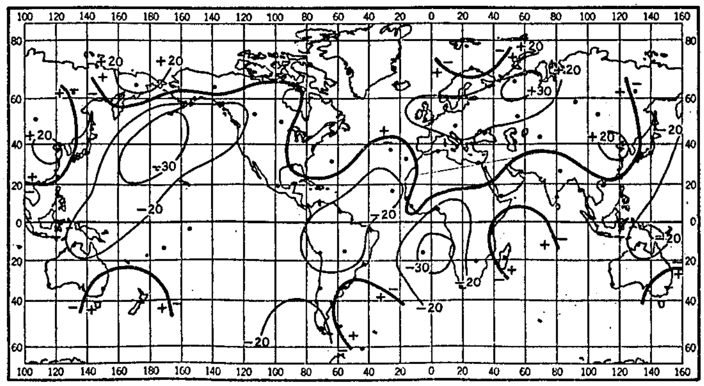

Chart 159. Correlations between District No. 1 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

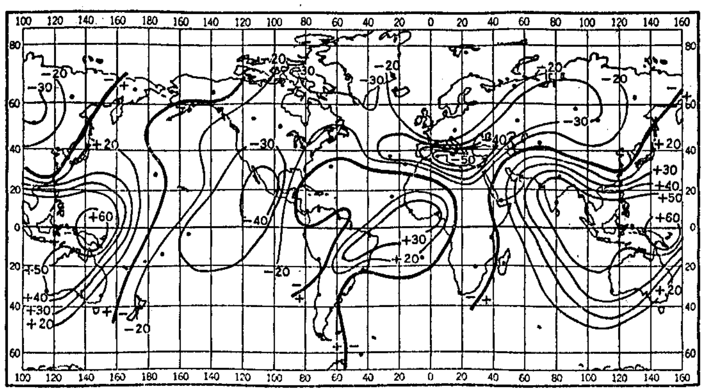

Chart 160. Correlations between District No. 2 U. S. winter precipitation and SON foreign pressures (1 quarter before)

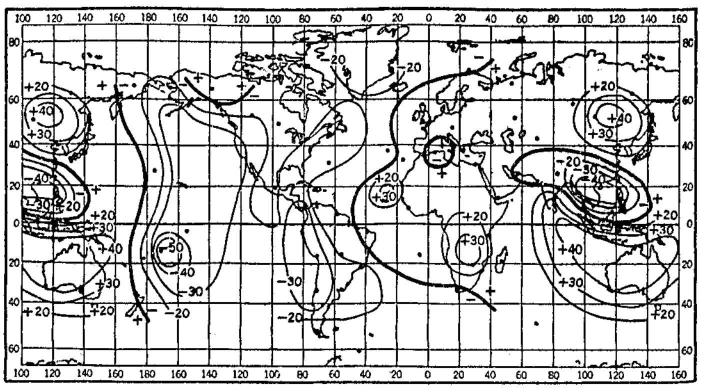

Chart 161. Correlations between District No. 2 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

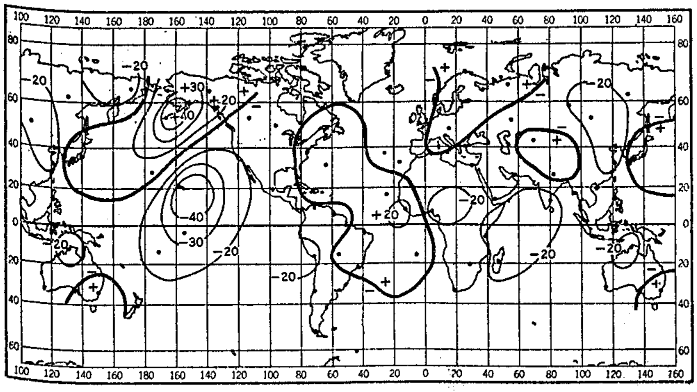

Chart 162. Correlations between District No. 2 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

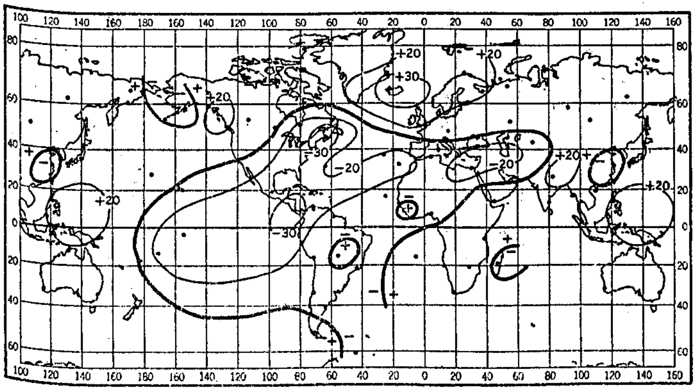

Chart 163. Correlations between District No. 2 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

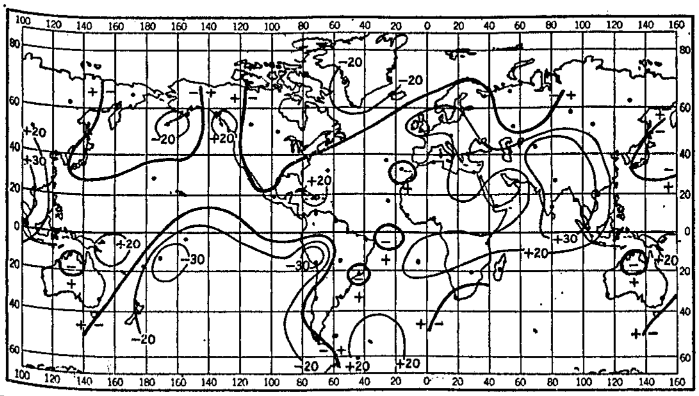

Chart 164. Correlations between District No. 2 U. S. spring precipitation and SON foreign pressures (2 quarters before).

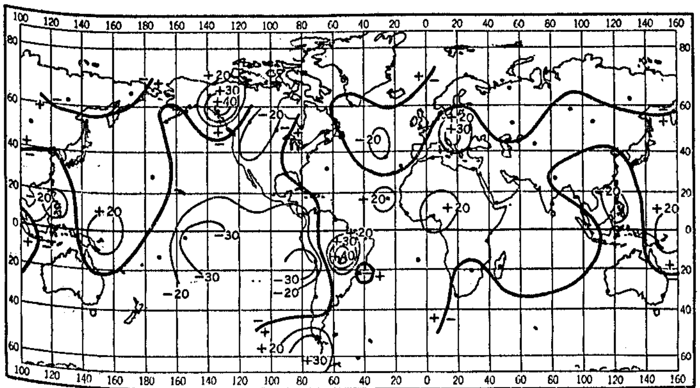

Chart 165. Correlations between District No. 2 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

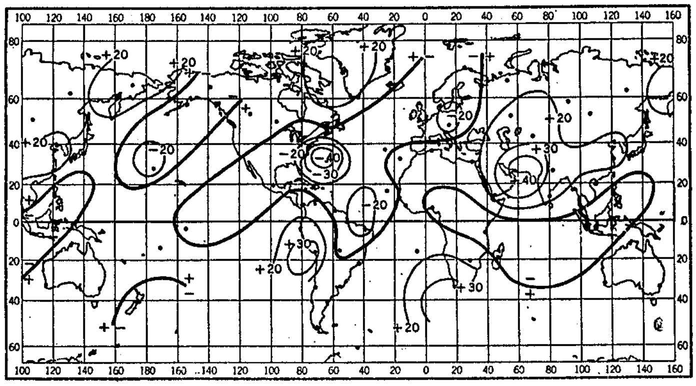

Chart 166. Correlations between District No. 2 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

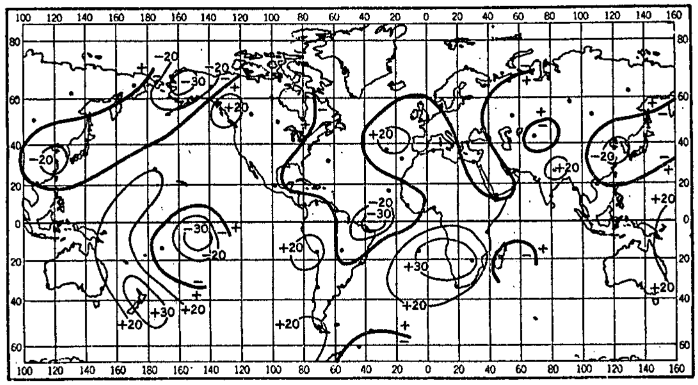

Chart 167. Correlations between District No. 2 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

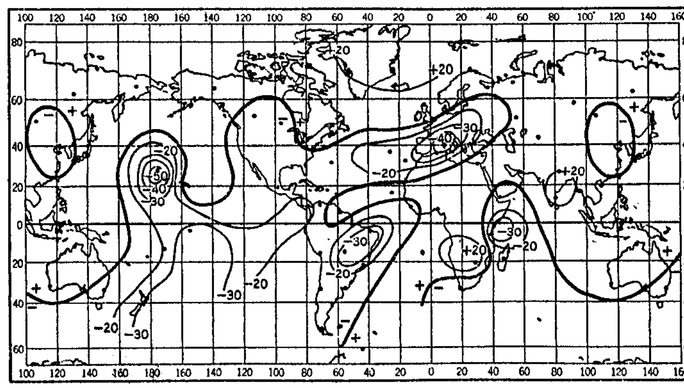

Chart 168. Correlations between District No. 2 U. S. summer precipitation and SON foreign pressures (3 quarters before).

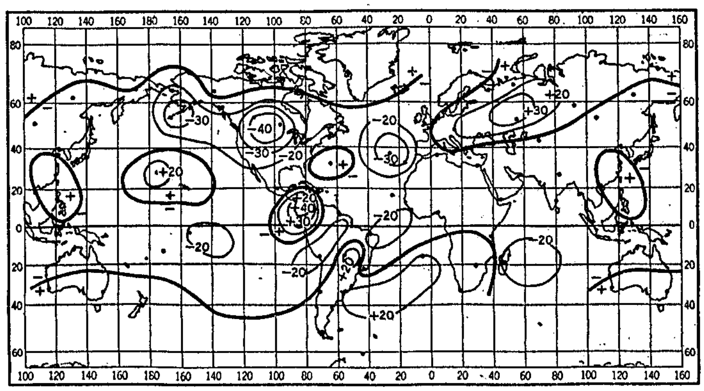

Chart 169. Correlations between District No. 2 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

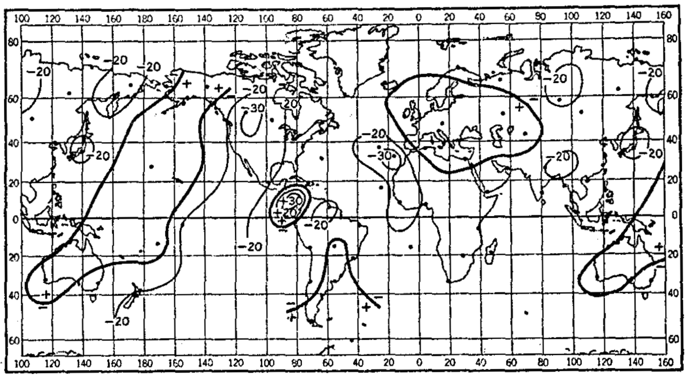

Chart 170. Correlations between District No. 2 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

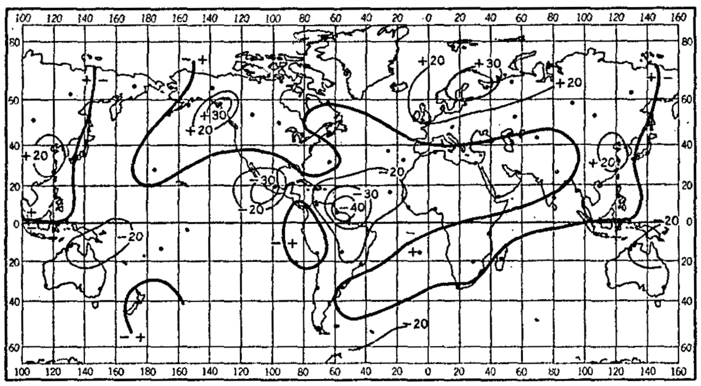

Chart 171. Correlations between District No. 2 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

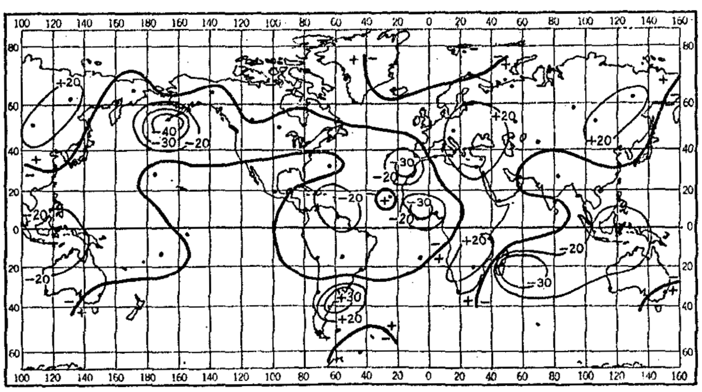

Chart 172. Correlations between District No. 3 U. S. winter precipitation and SON foreign pressures (1 quarter before).

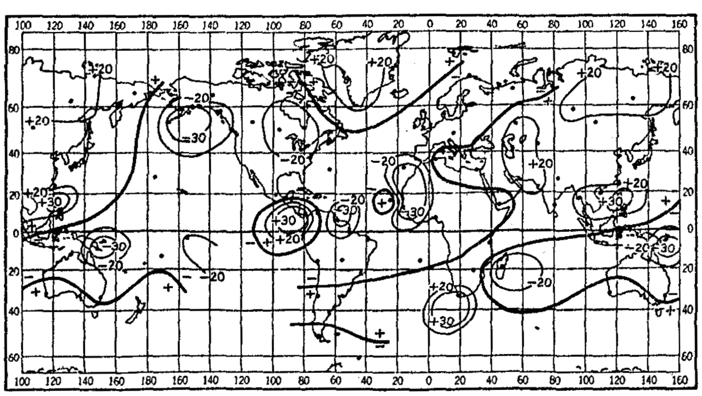

Chart 173. Correlations between District No. 3 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

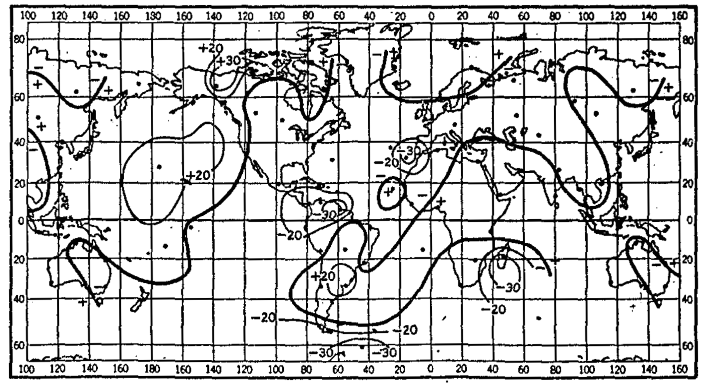

Chart 174. Correlations between District No. 3. U. S. winter precipitation and MAM foreign pressures (3 quarters before).

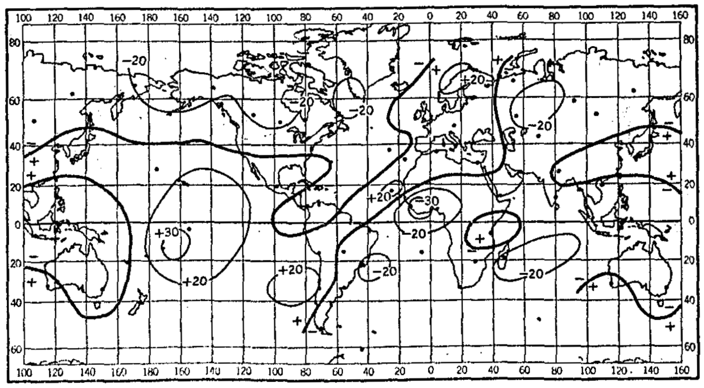

Chart 175. Correlations between District No. 3 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

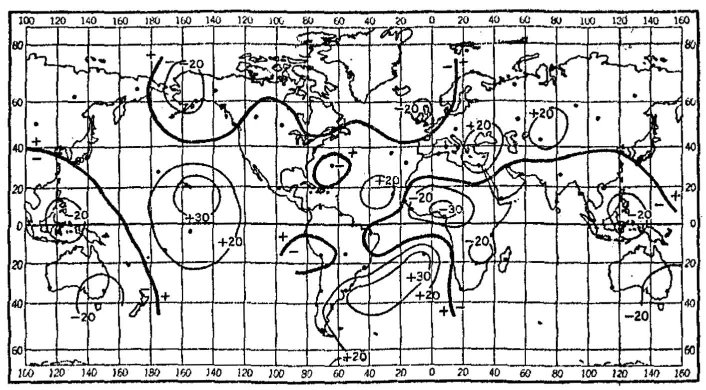

Chart 176. Correlations between District No. 3 U. S. spring precipitation and SON foreign pressures (2 quarters before).

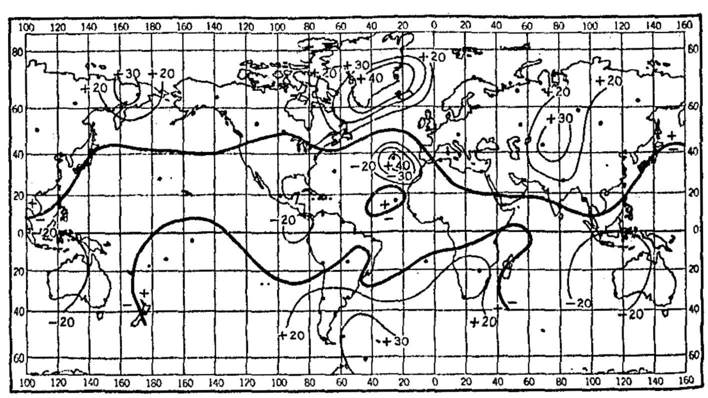

Chart 177. Correlations between District No. 3 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

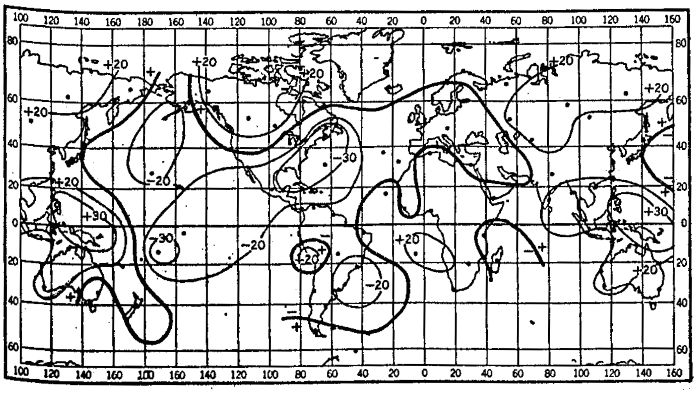

Chart 178. Correlations between District No. 3 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

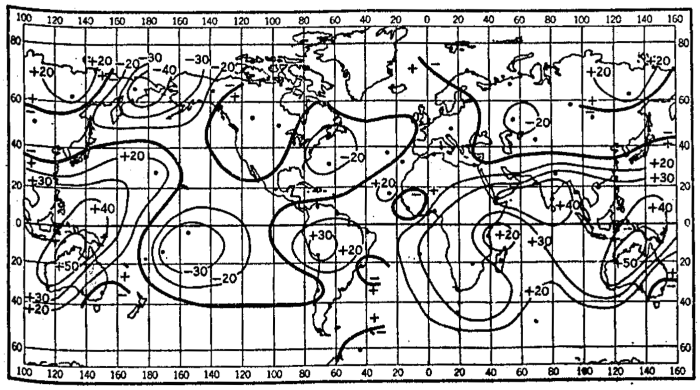

Chart 179. Correlations between District No. 3 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

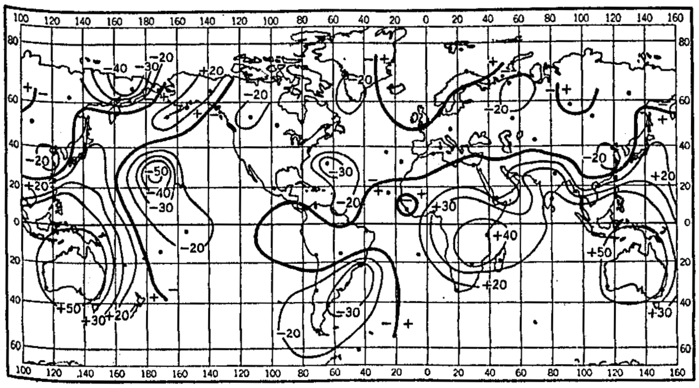

Chart 180. Correlations between District No. 3 U. S. summer precipitation and SON foreign pressures (3 quarters before).

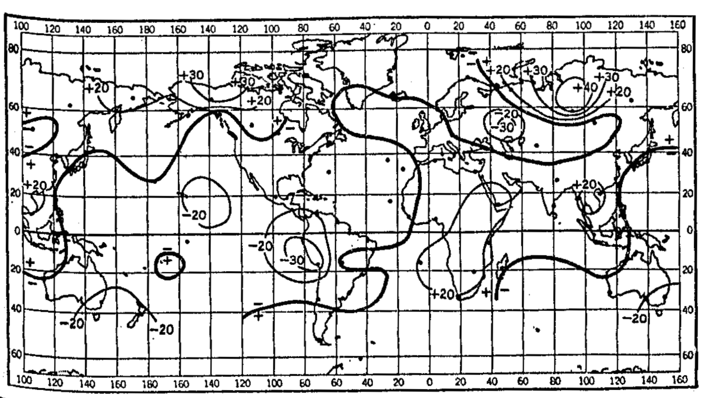

Chart 181. Correlations between District No. 3 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

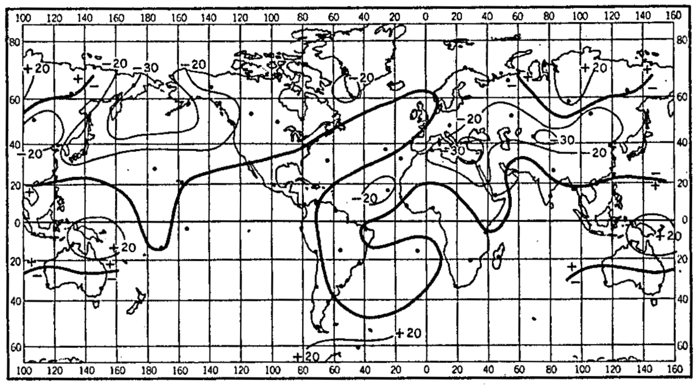

Chart 182. Correlations between District No. 3 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

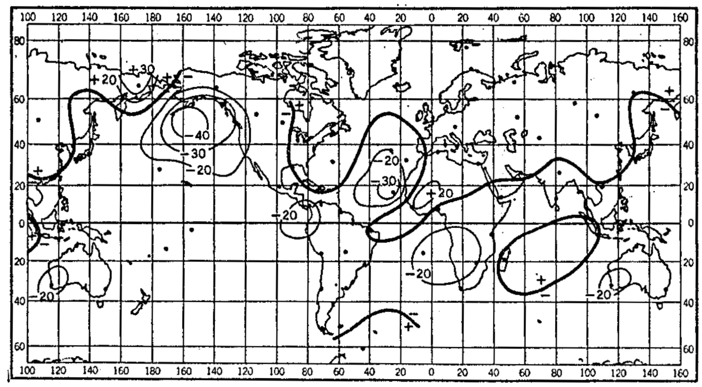

Chart 183. Correlations between District No. 3 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

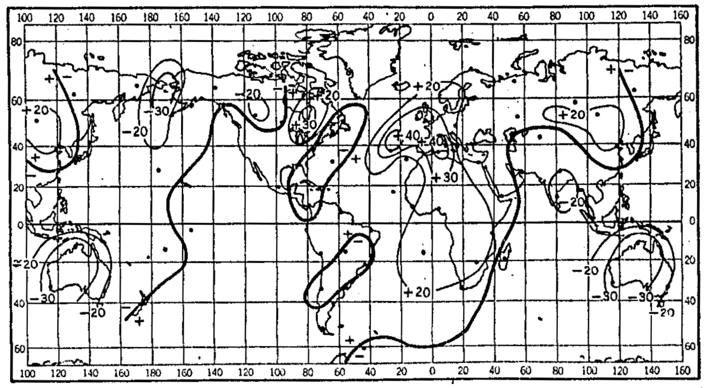

Chart 184. Correlations between District No. 4 U. S. winter precipitation and SON foreign pressures (1 quarter before).

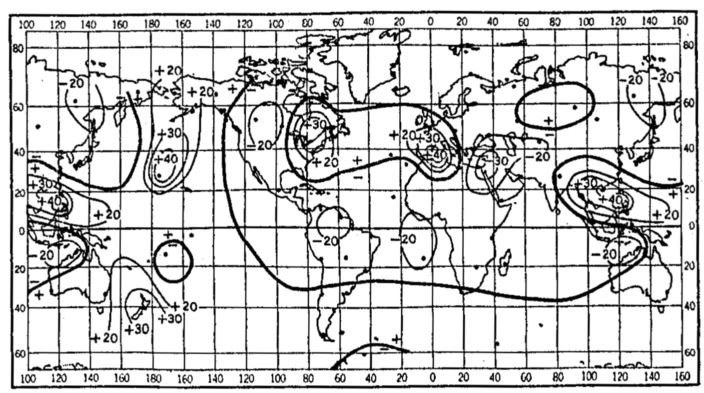

Chart 185. Correlations between District No. 4 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

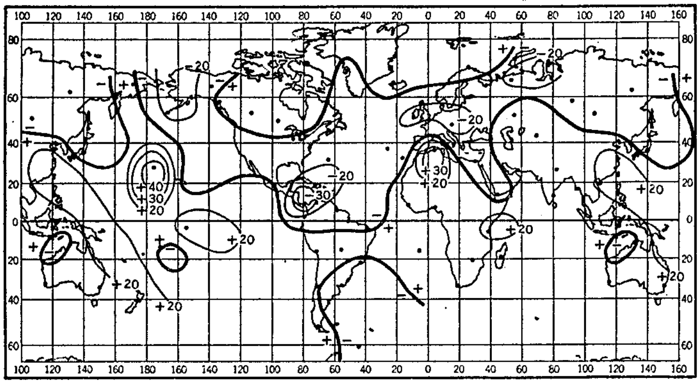

Chart 186. Correlations between District No. 4 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

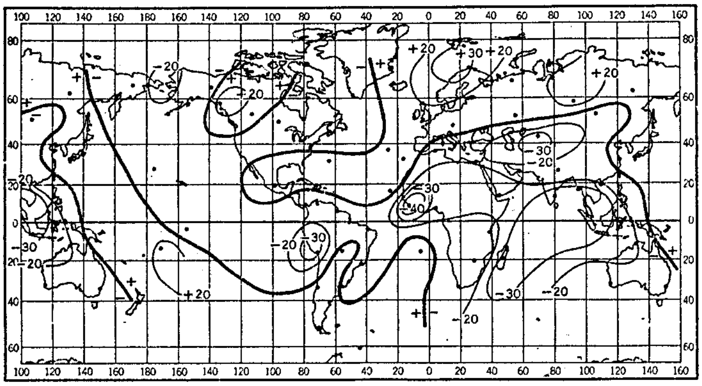

Chart 187. Correlations between District No. 4 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

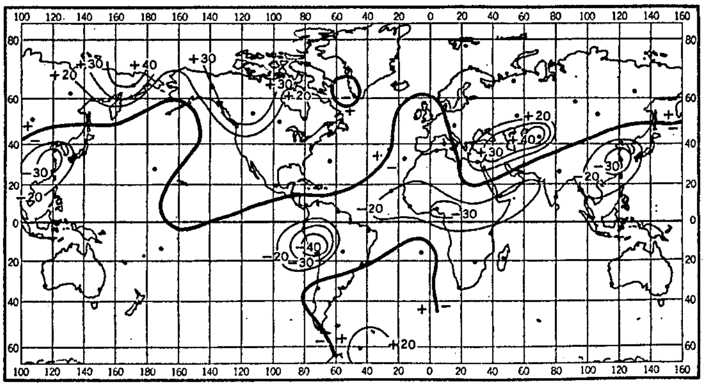

Chart 188. Correlations between District No. 4 U. S. spring precipitation and SON foreign pressures (2 quarters before).

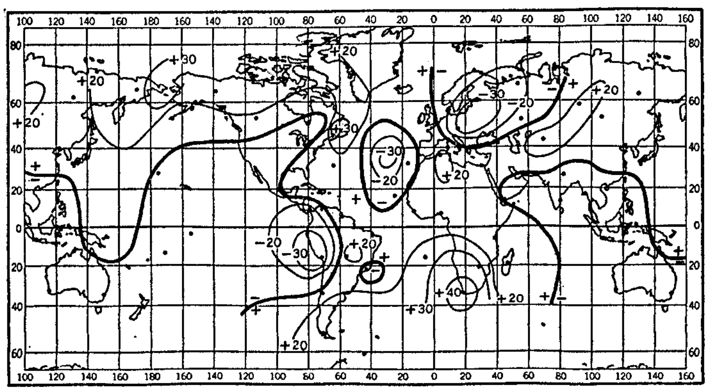

Chart 189. Correlations between District No. 4 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

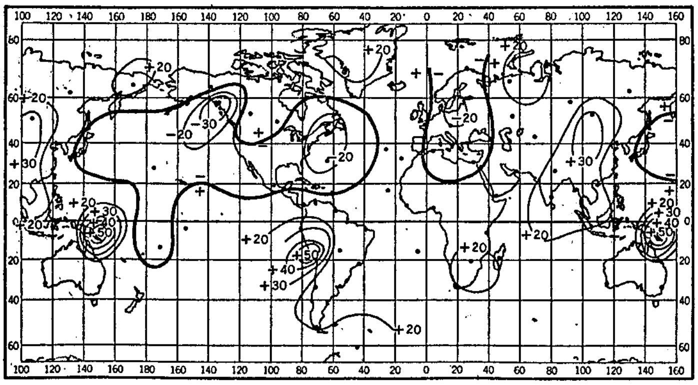

Chart 190. Correlations between District No. 4 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

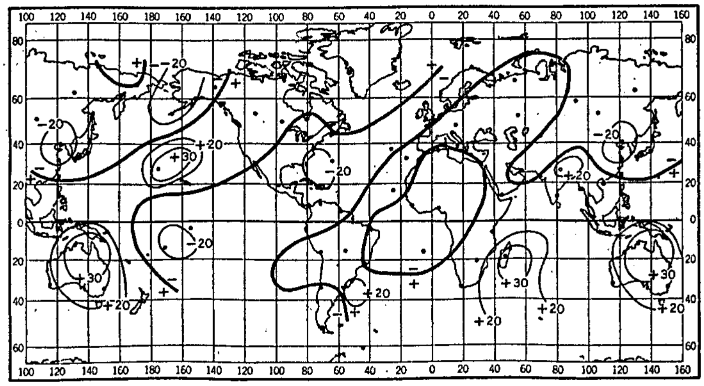

Chart 191. Correlations between District No. 4 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

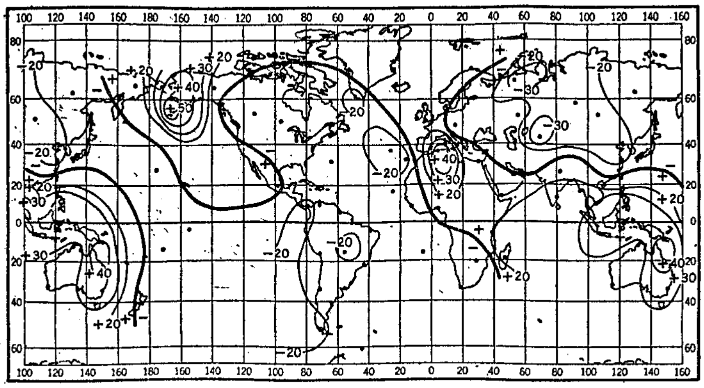

Chart 192. Correlations between District No. 4 U. S. summer precipitation and SON foreign pressures (3 quarters before).

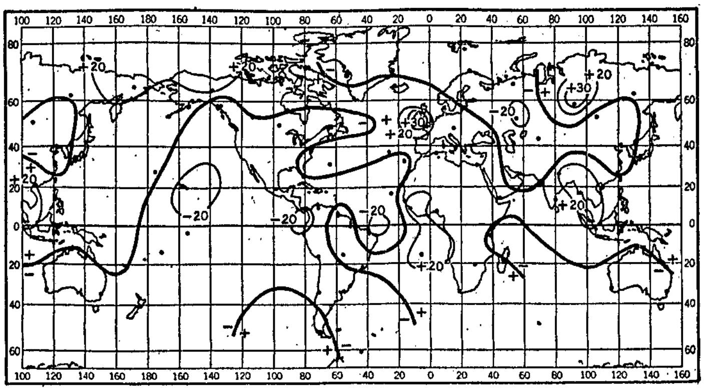

Chart 193. Correlations between District No. 4 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

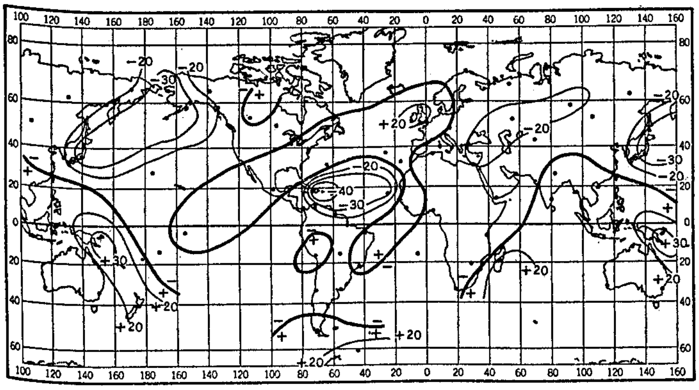

Chart 194. Correlations between District No. 4 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

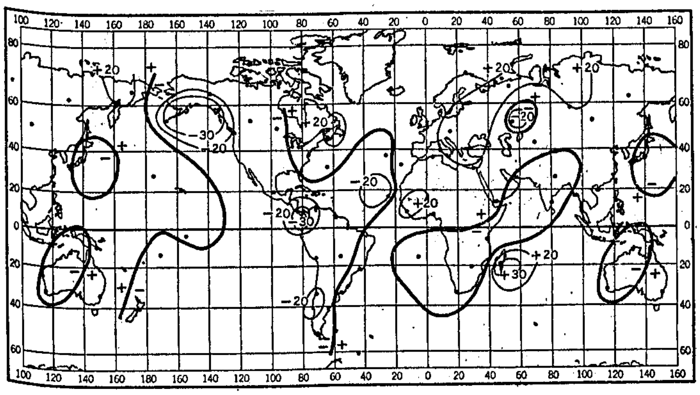

Chart 195. Correlations between District No. 4 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

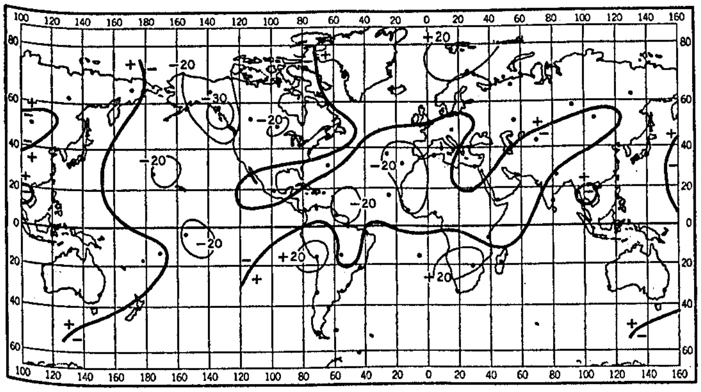

Chart 196. Correlations between District No. 5 U. S. winter precipitation and SON foreign pressures (1 quarter before).

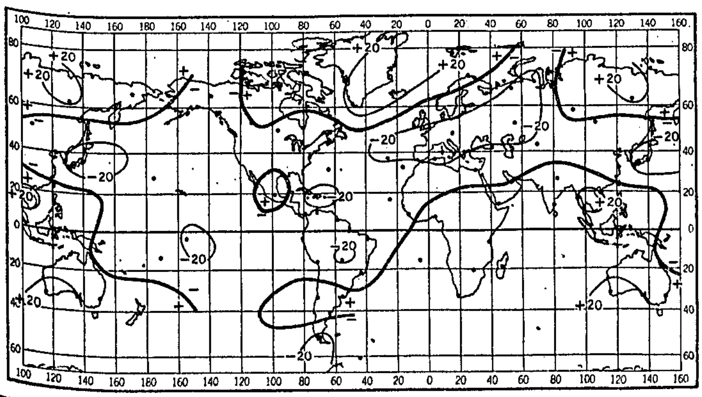

Chart 197. Correlations between District No. 5 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

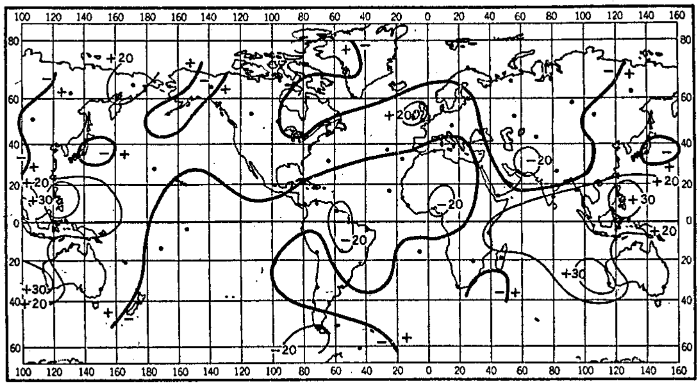

Chart 198. Correlations between District No. 5 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

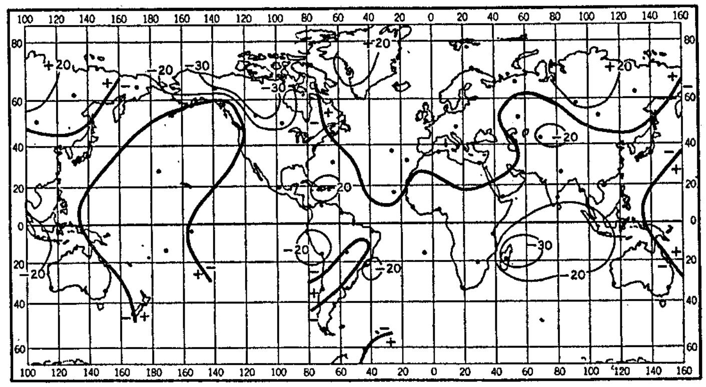

Chart 199. Correlations between District No. 5 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

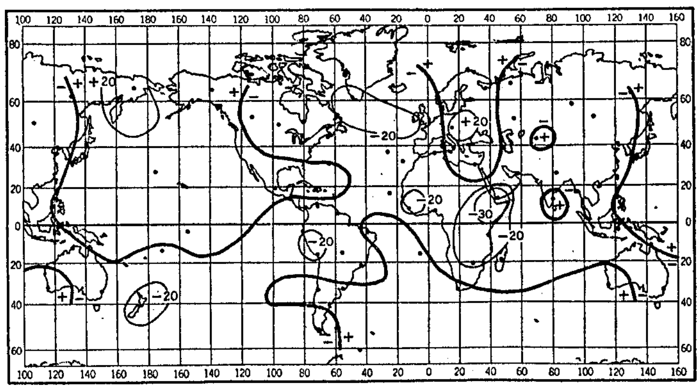

Chart 200. Correlations between District No. 5 U. S. spring precipitation and SON foreign pressures (2 quarters before).

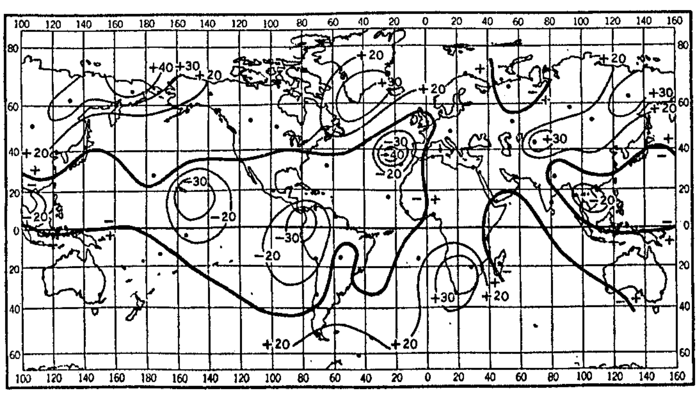

Chart 201. Correlations between District No. 5 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

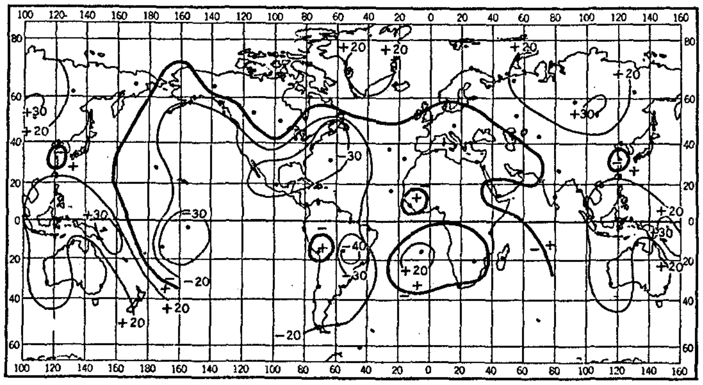

Chart 202. Correlations between District No. 5 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

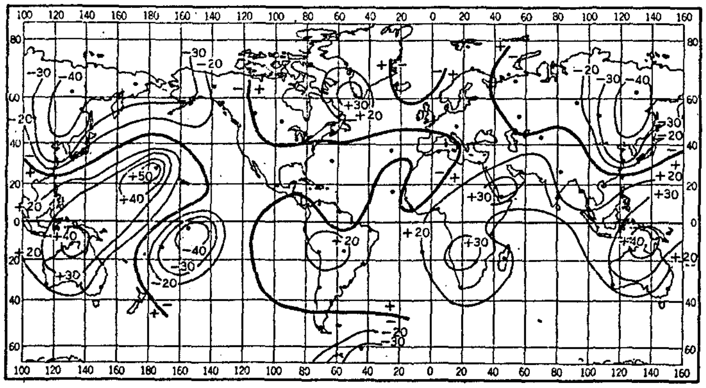

Chart 203. Correlations between District No. 5 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

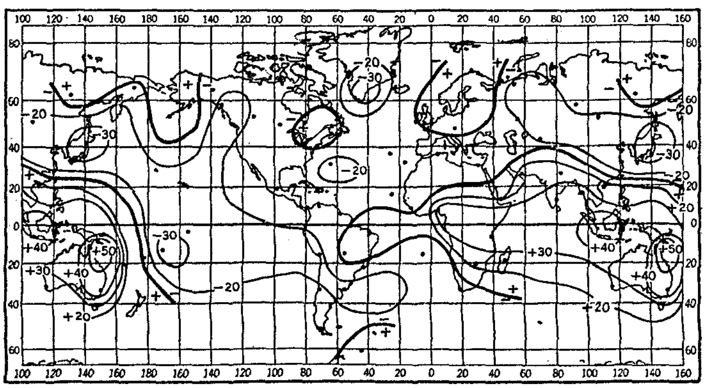

Chart 204. Correlations between District No. 5 U. S. summer precipitation and SON foreign pressures (3 quarters before).

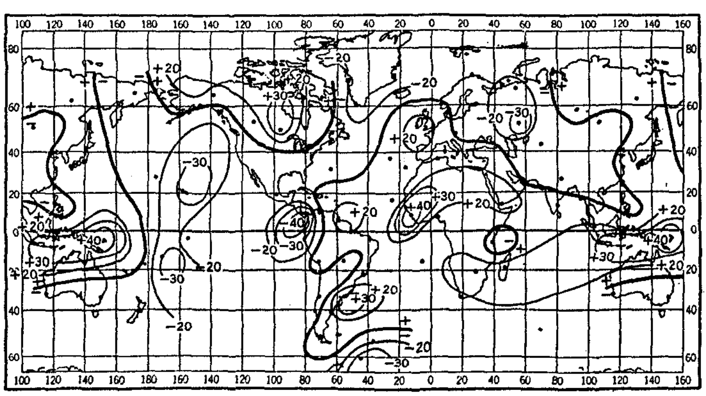

Chart 205. Correlations between District No. 5 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

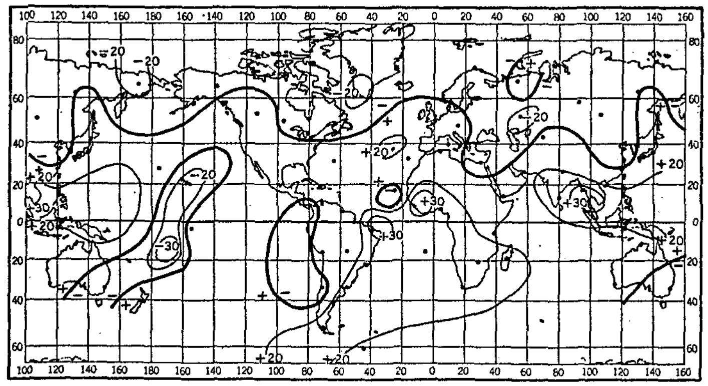

Chart 206. Correlations between District No. 5 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

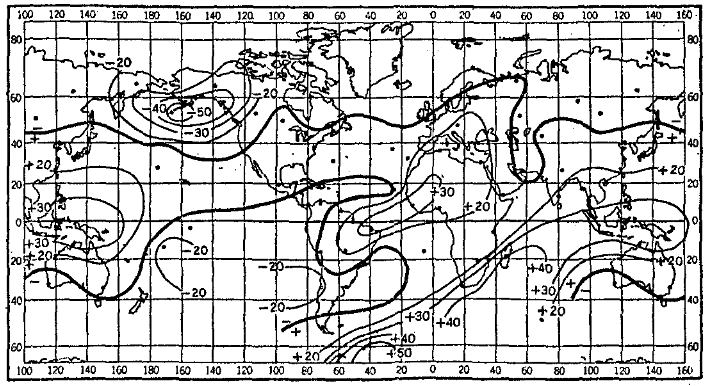

Chart 207. Correlations between District No. 5 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

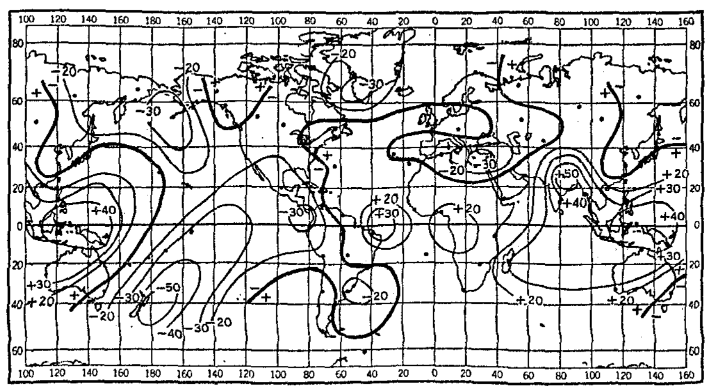

Chart 208. Correlations between District No. 6 U. S. winter precipitation and SON foreign pressures (1 quarter before).

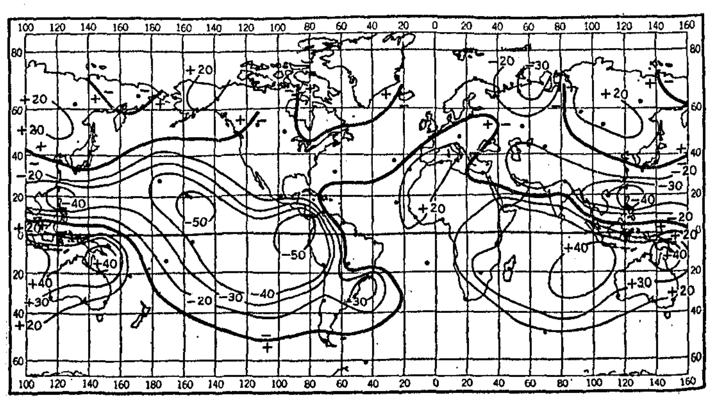

Chart 209. Correlations between District No. 6 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

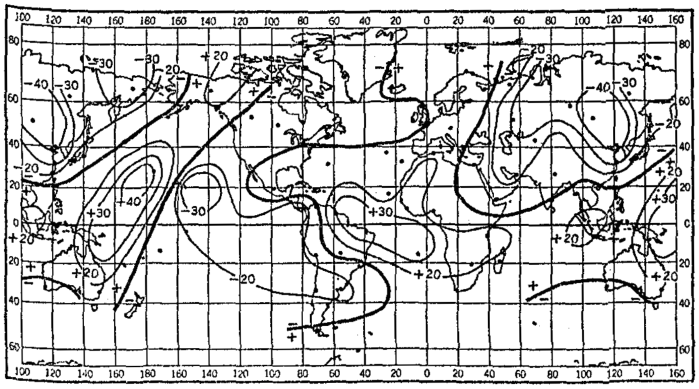

Chart 210. Correlations between District No. 6 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

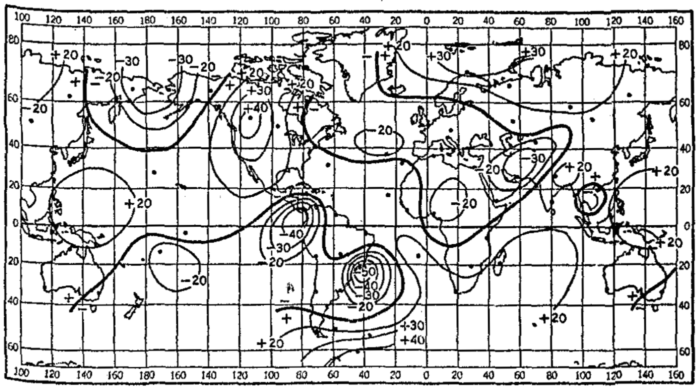

Chart 211. Correlations between District No. 6 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

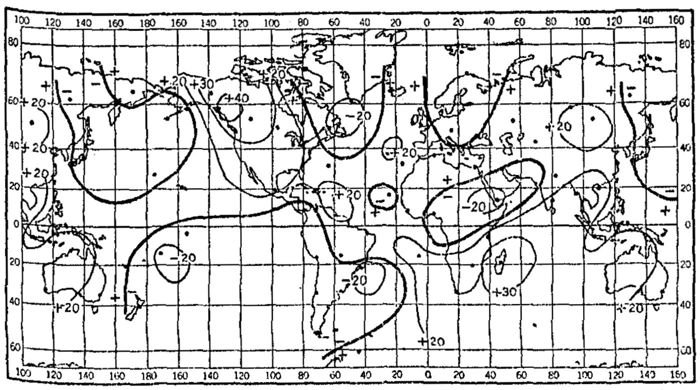

Chart 212. Correlations between District No. 6 U. S. spring precipitation and SON foreign pressures (2 quarters before).

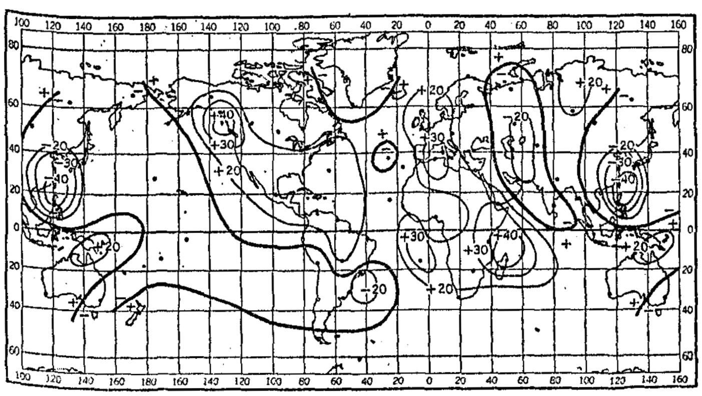

Chart 213. Correlations between District No. 6 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

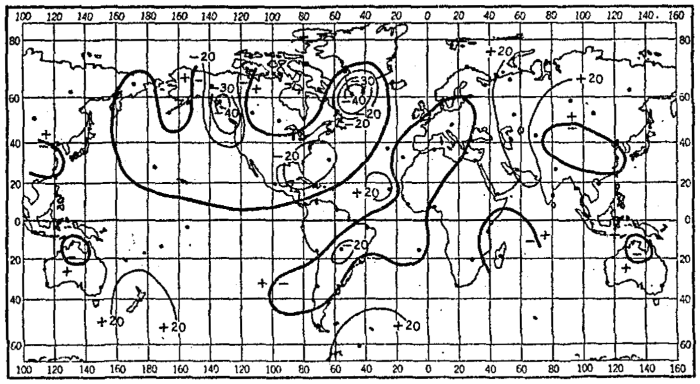

Chart 214. Correlations between District No. 6 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

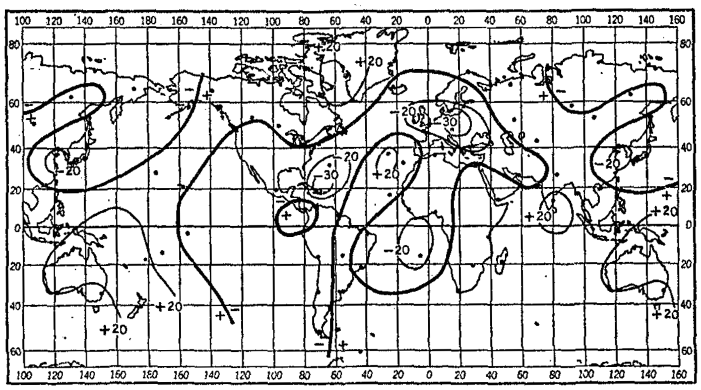

Chart 215. Correlations between District No. 6 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

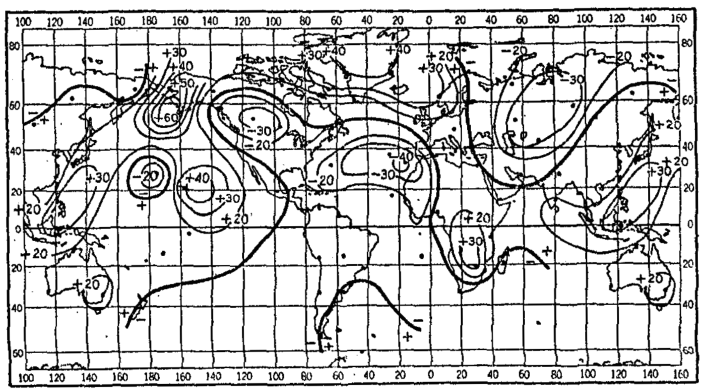

Chart 216. Correlations between District No. 6 U. S. summer precipitation and SON foreign pressures (3 quarters before).

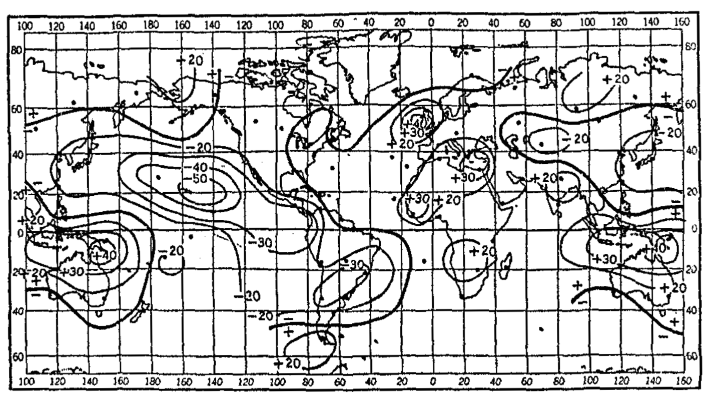

Chart 217. Correlations between District No. 6 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

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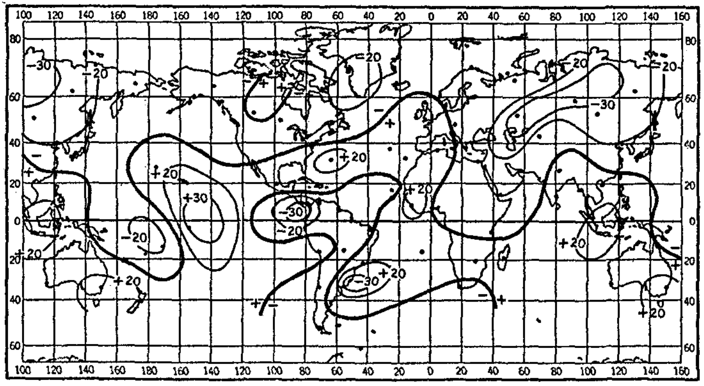

Chart 218. Correlations between District No. 6 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

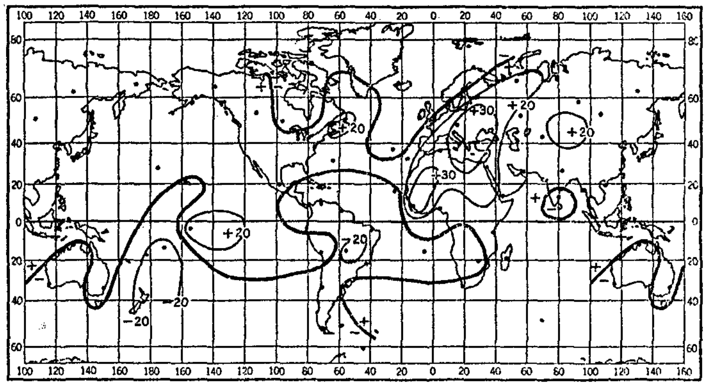

Chart 219. Correlations between District No. 6 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

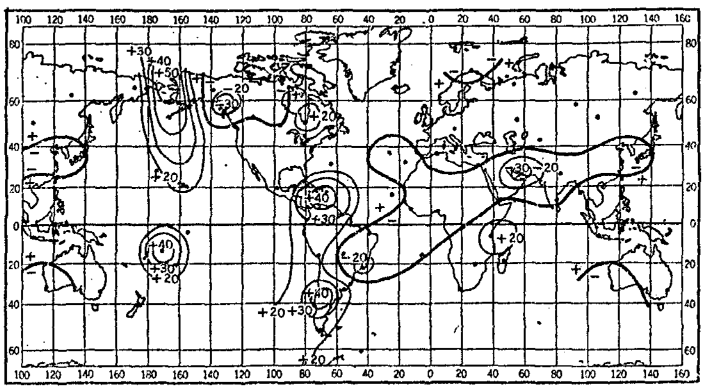

Chart 220. Correlations between District No. 7 U. S. winter precipitation and SON foreign pressures (1 quarter before).

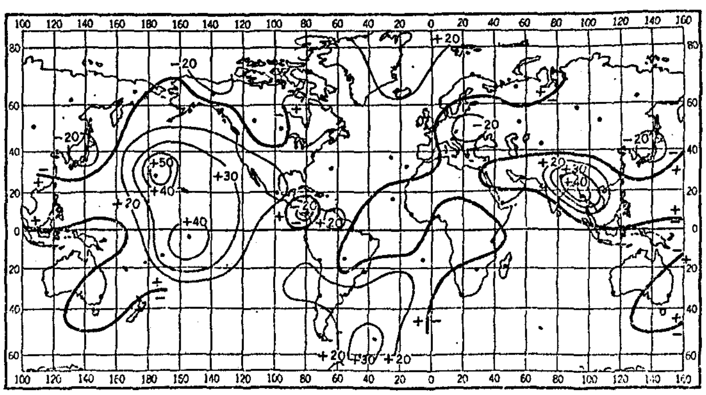

Chart 221. Correlations between District No. 7 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

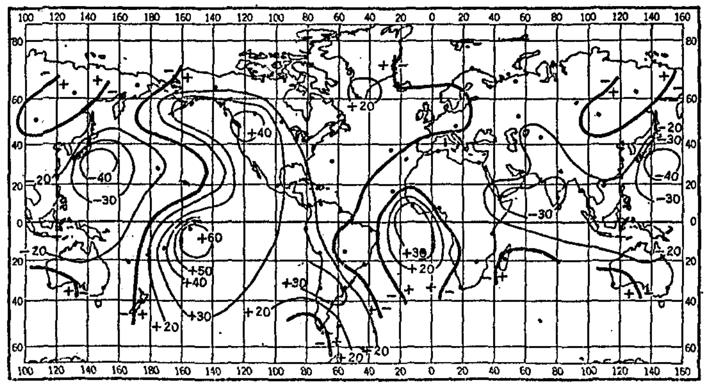

Chart 222. Correlations between District No. 7 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

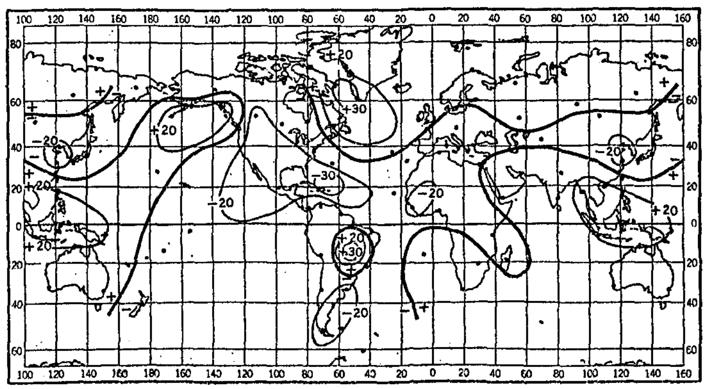

Chart 223. Correlations between District No. 7 U. S. spring precipitation and DJF pressures foreign (1 quarter before).

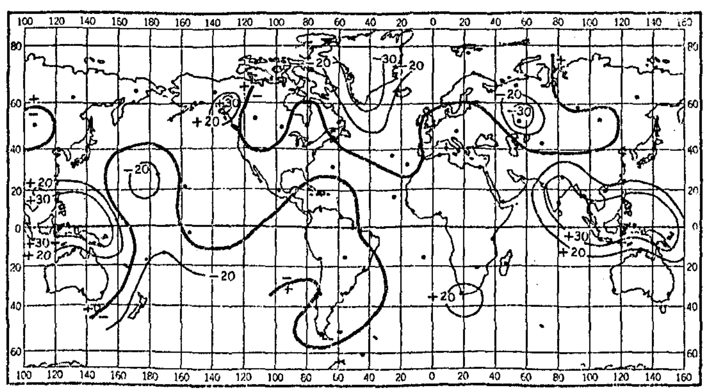

Chart 224. Correlations between District No. 7 U. S. spring precipitation and SON foreign pressures (2 quarters before).

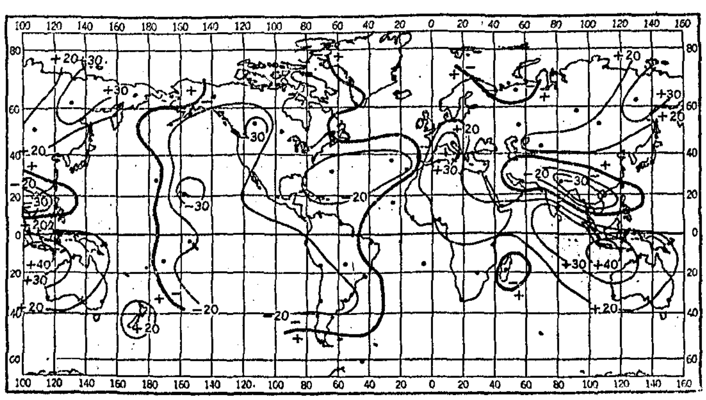

Chart 225. Correlations between District No. 7 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

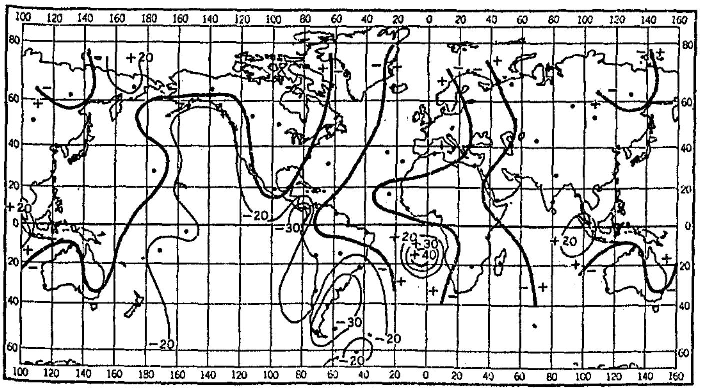

Chart 226. Correlations between District No. 7 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

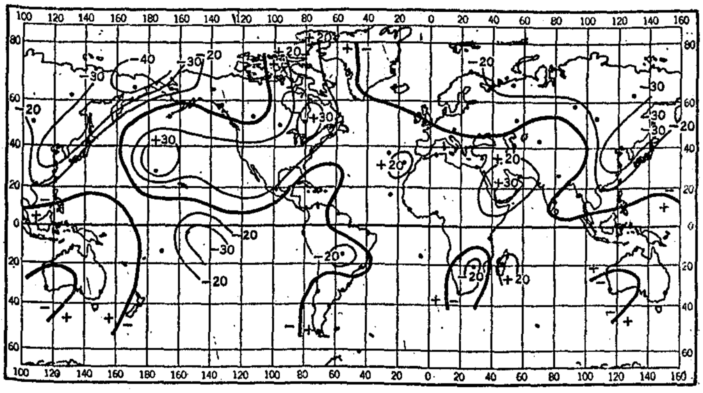

Chart 227. Correlations between District No. 7 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

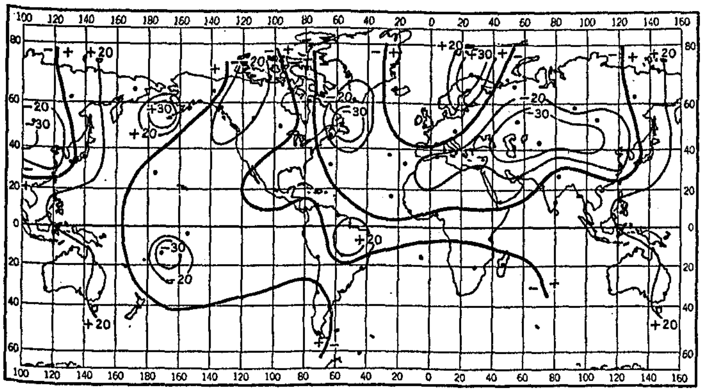

Chart 228. Correlations between District No. 7 U. S. summer precipitation and SON foreign pressures (3 quarters before).

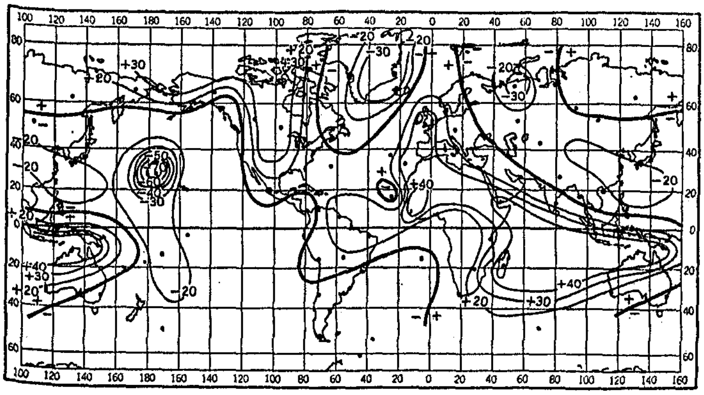

Chart 229. Correlations between District No. 7 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

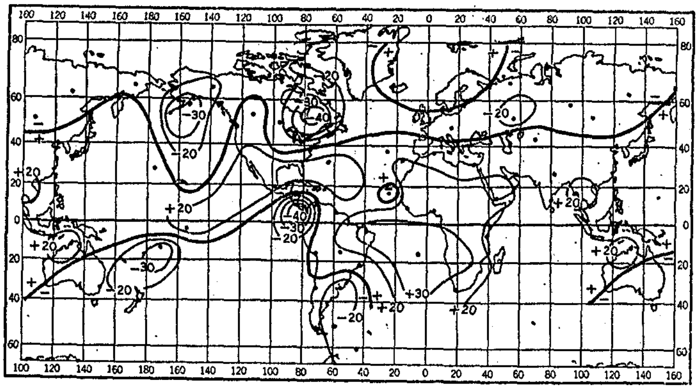

Chart 230. Correlations between District No. 7 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

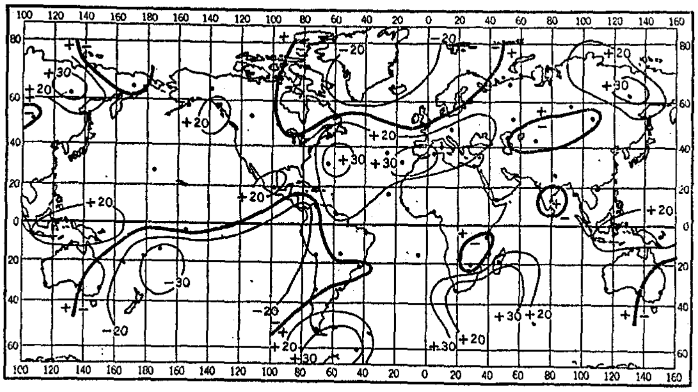

Chart 231. Correlations between District No. 7 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

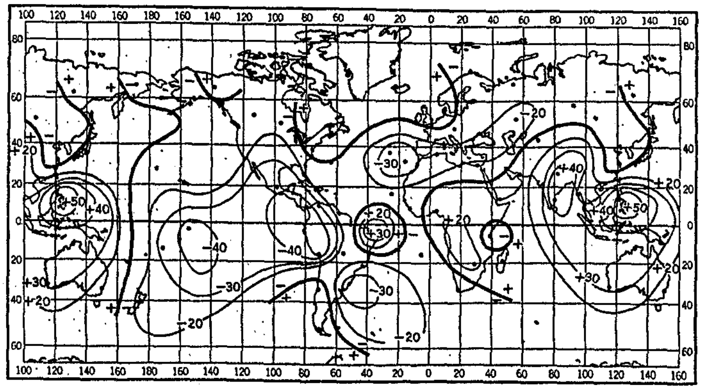

Chart 232. Correlations between District No. 8 U. S. winter precipitation and SON foreign pressures (1 quarter before).

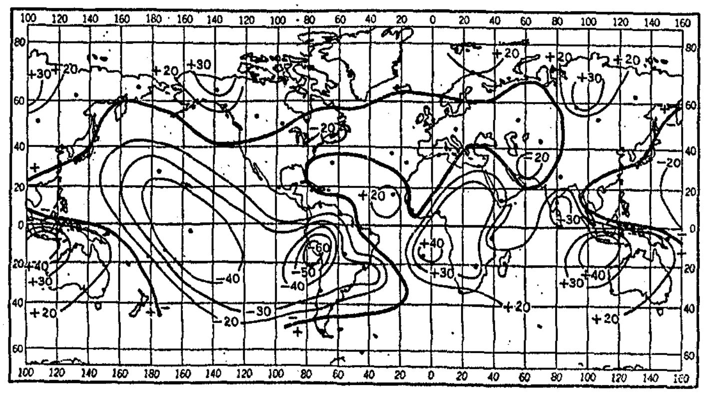

Chart 233. Correlations between District No. 8 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

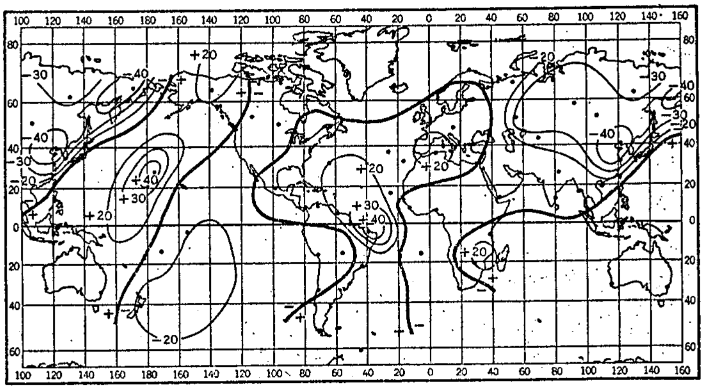

Chart 234. Correlations between District No. 8 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

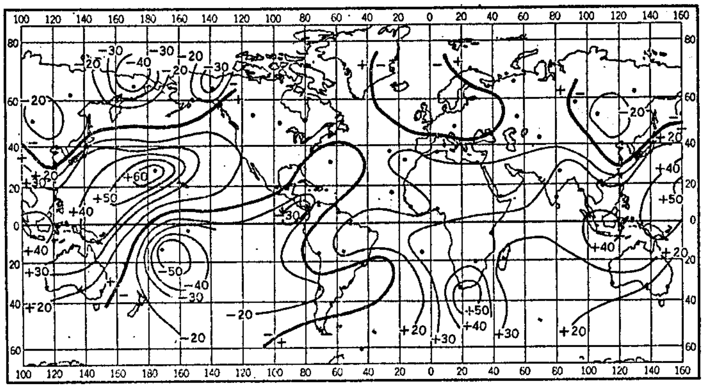

Chart 235. Correlations between District No. 8 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

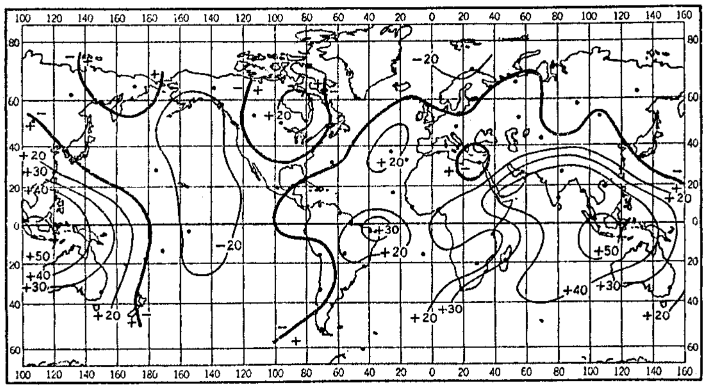

Chart 236. Correlations between District No. 8 U. S. spring precipitation and SON foreign pressures (2 quarters before).

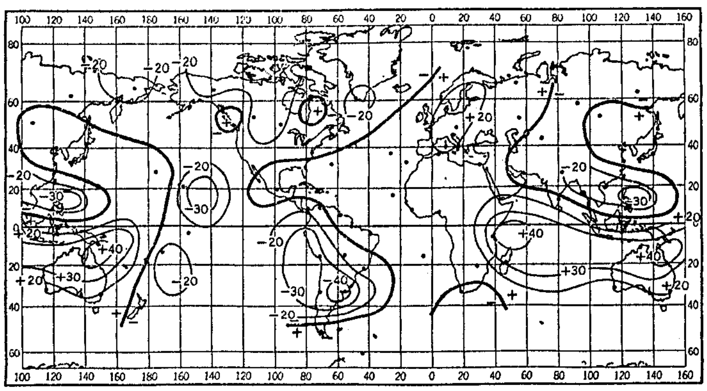

Chart 237. Correlations between District No. 8 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

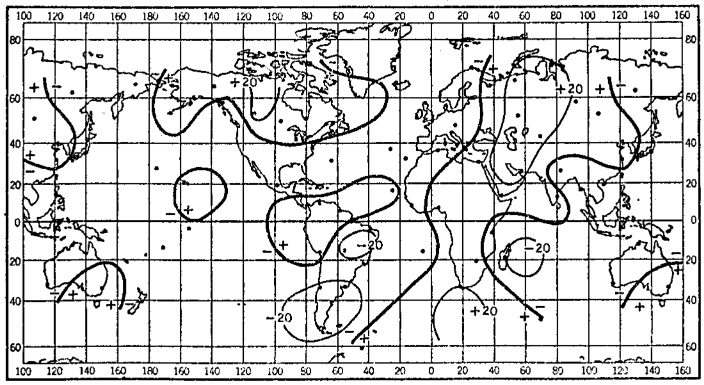

Chart 238. Correlations between District No. 8 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

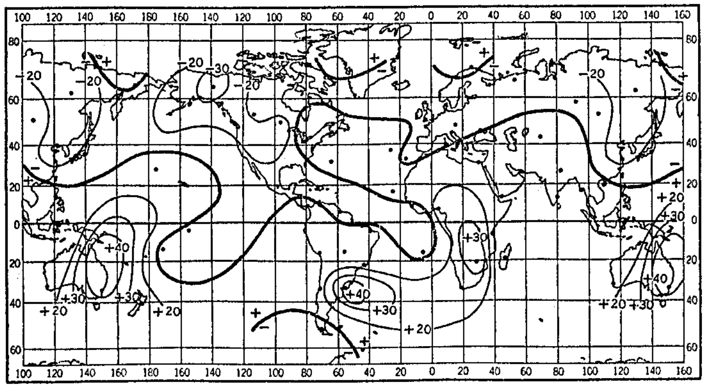

Chart 239. Correlations between District No. 8 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

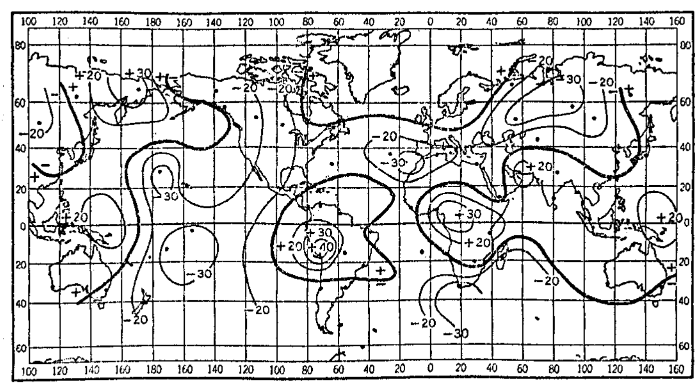

Chart 240. Correlations between District No. 8 U. S. summer precipitation and SON foreign pressures (3 quarters before).

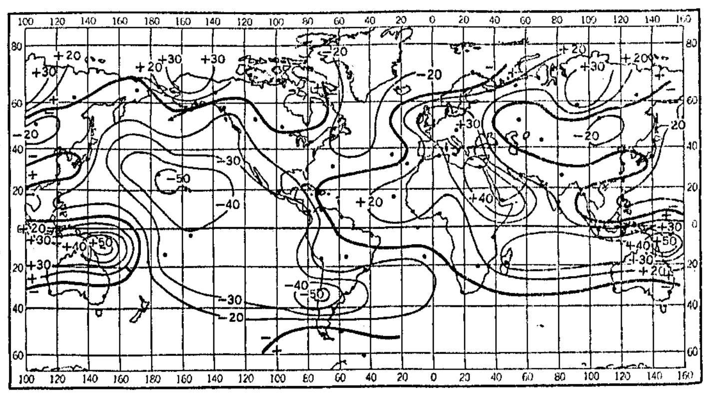

Chart 241. Correlations between District No. 8 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

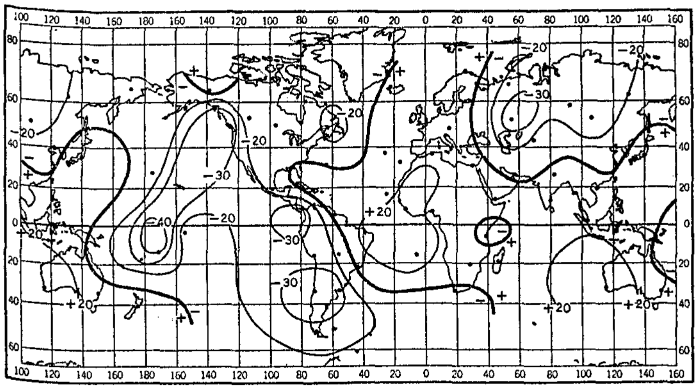

Chart 242. Correlations between District No. 8 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

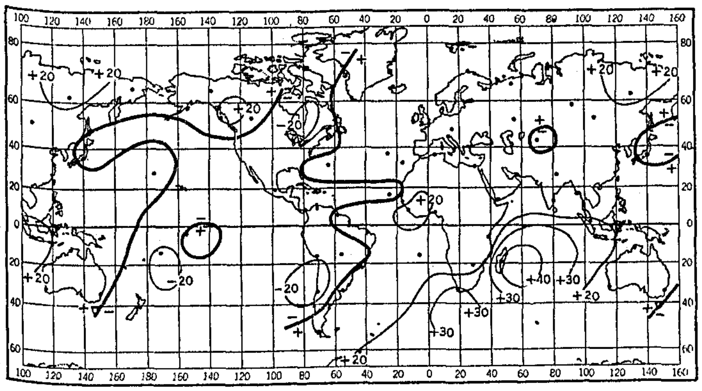

Chart 243. Correlations between District No. 8 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

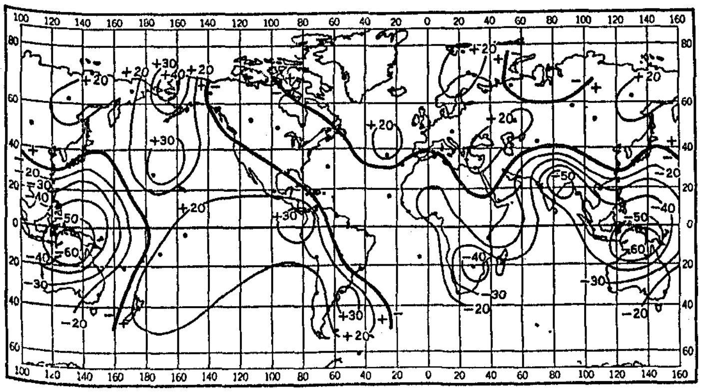

Chart 244. Correlations between District No. 9 U. S. winter precipitation and SON foreign pressures (1 quarter before).

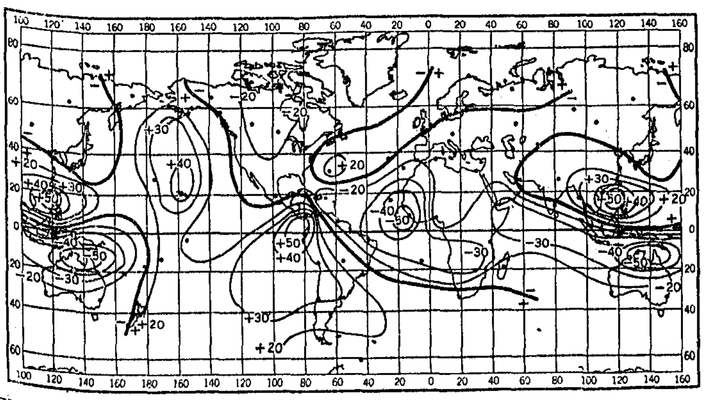

Chart 245. Correlations between District No. 9 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

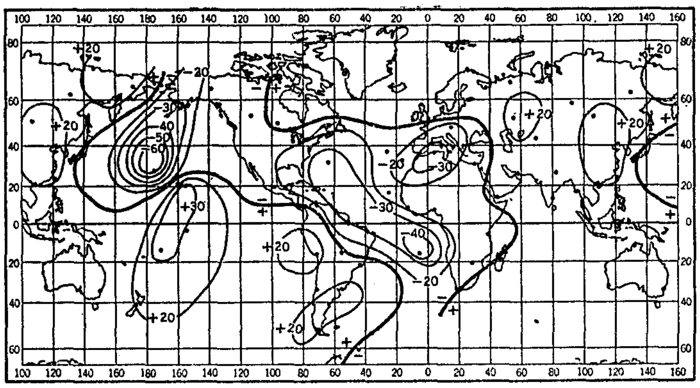

Chart 246. Correlations between District No. 9 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

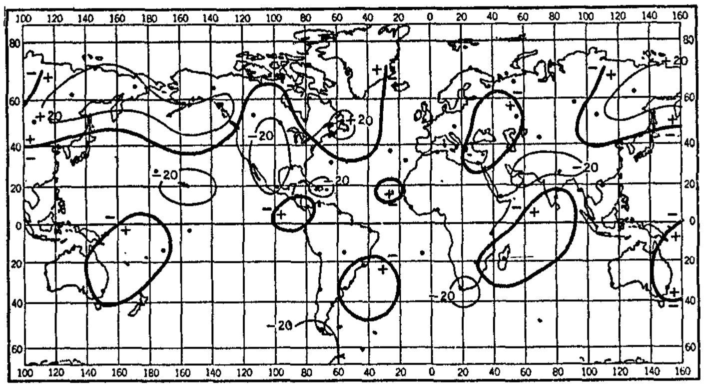

Chart 247. Correlations between District No. 9 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

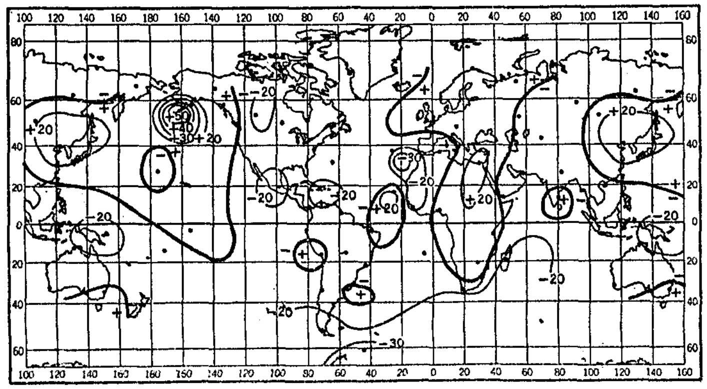

Chart 248. Correlations between District No. 9 U. S. spring precipitation and SON foreign pressures (2 quarters before).

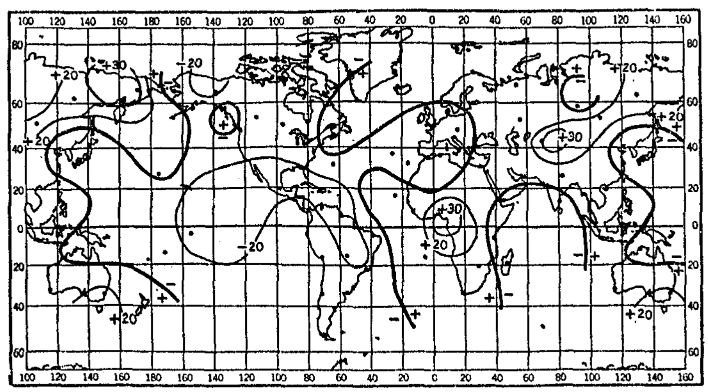

Chart 249. Correlations between District No. 9 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

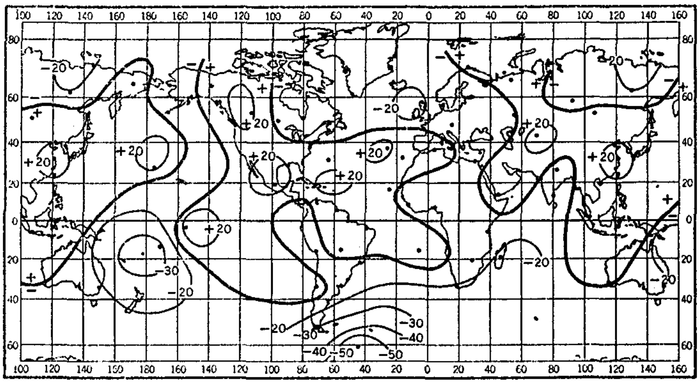

Chart 250. Correlations between District No. 9 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

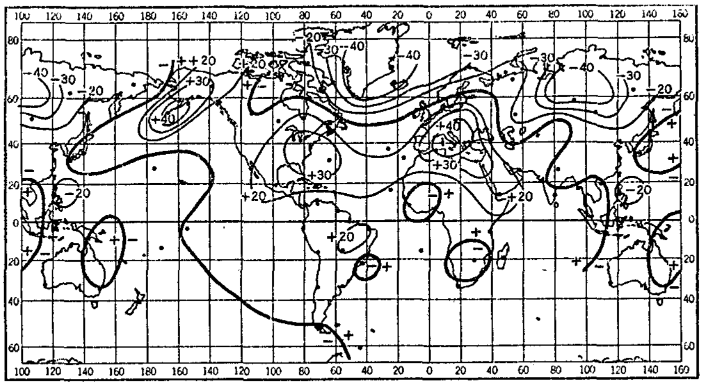

Chart 251. Correlations between District No. 9 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

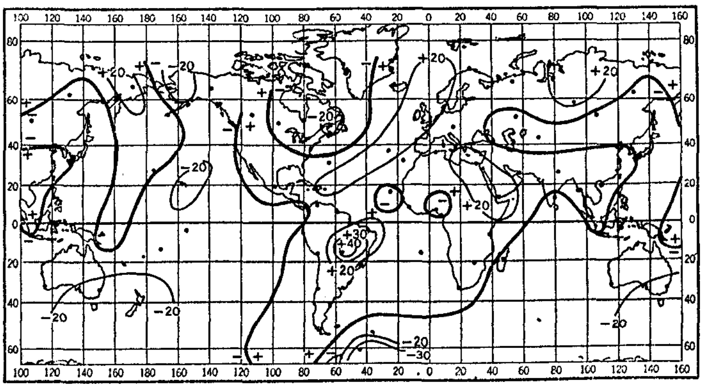

Chart 252. Correlations between District No. 9 U. S. summer precipitation and SON foreign pressures (3 quarters before).

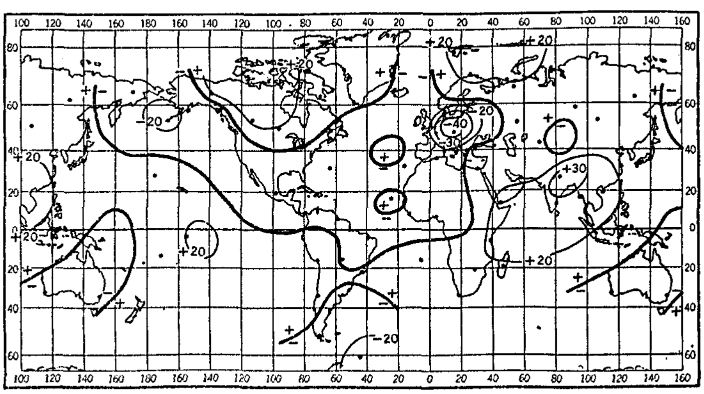

Chart 253. Correlations between District No. 9 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

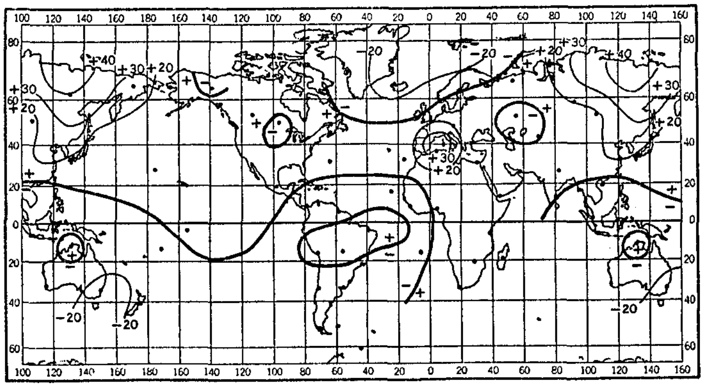

Chart 254. Correlations between District No. 9 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

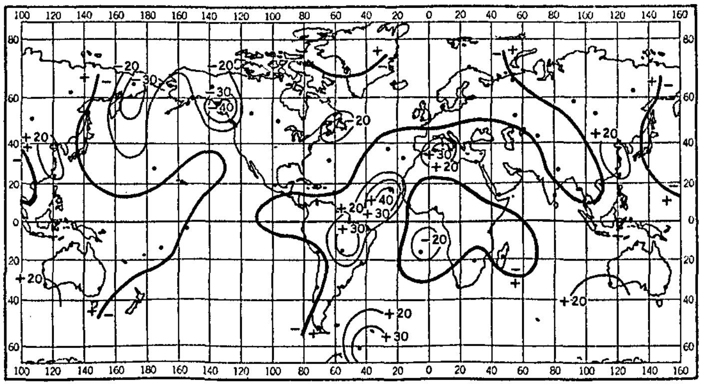

Chart 255. Correlations between District No. 9 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

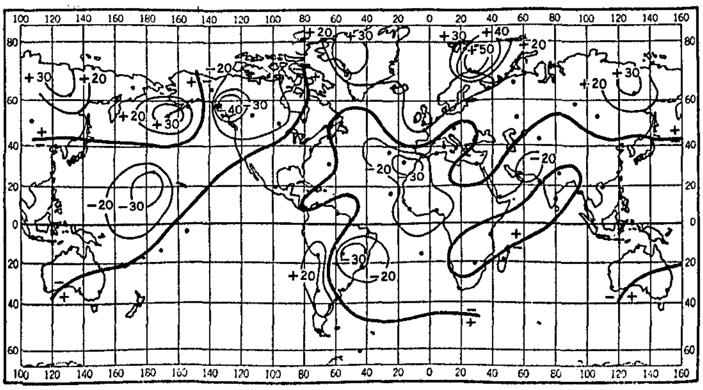

Chart 256. Correlations between District No. 10 U. S. winter precipitation and SON foreign pressures (1 quarter before).

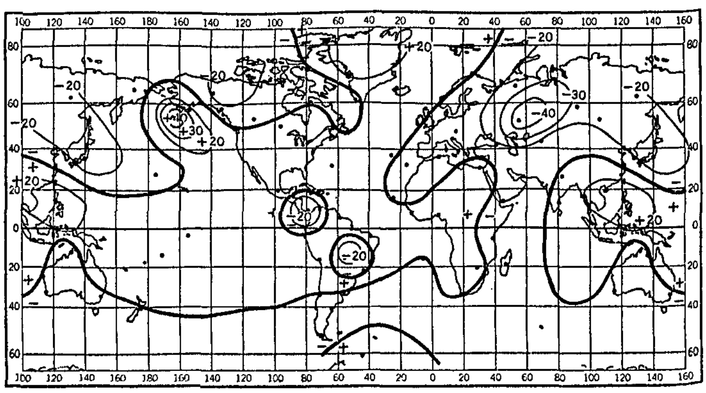

Chart 257. Correlations between District No. 10 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

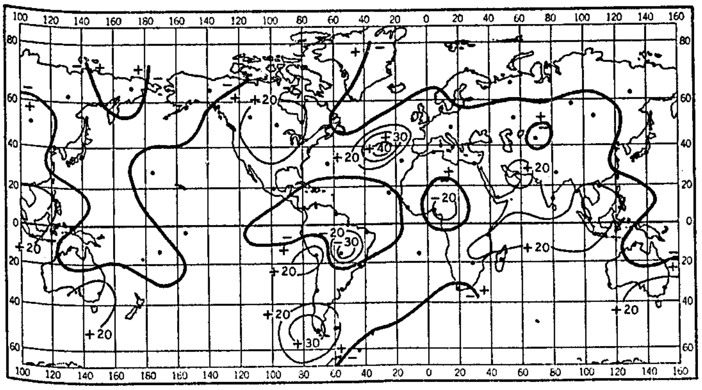

Chart 258. Correlations between District No. 10 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

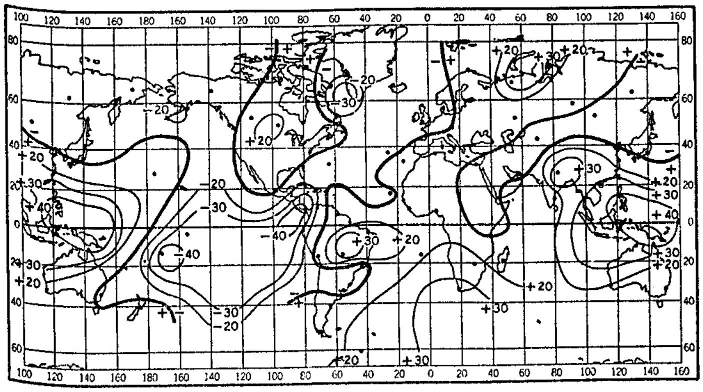

Chart 259. Correlations between District No. 10 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

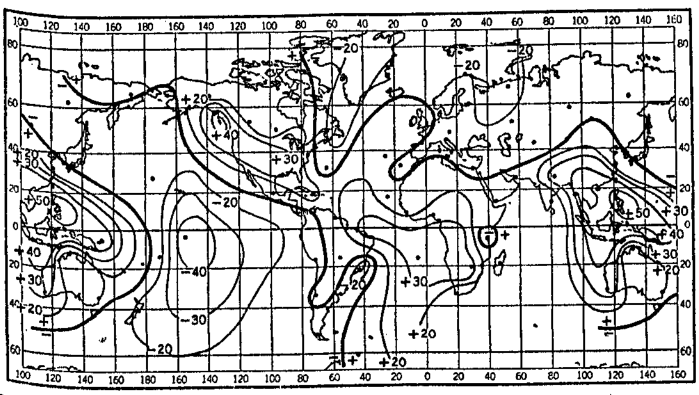

Chart 260. Correlations between District No. 10 U. S. spring precipitation and SON foreign pressures (2 quarters before).

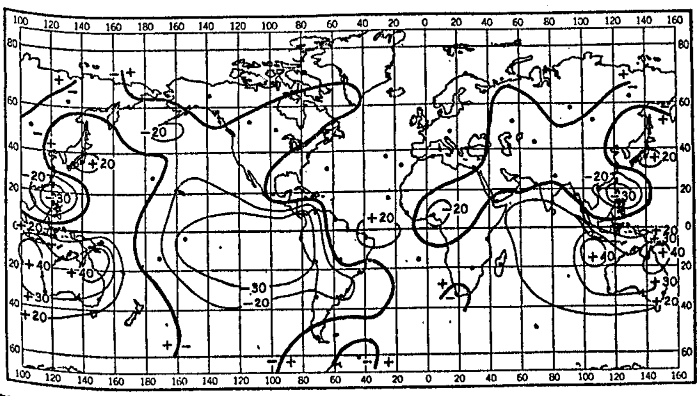

Chart 261. Correlations between District No. 10 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

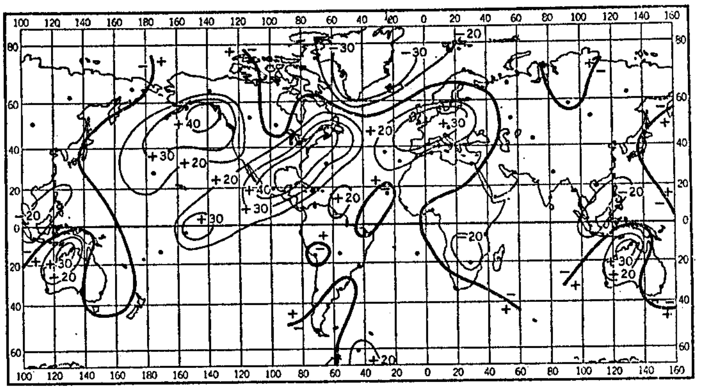

Chart 262. Correlations between District No. 10 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

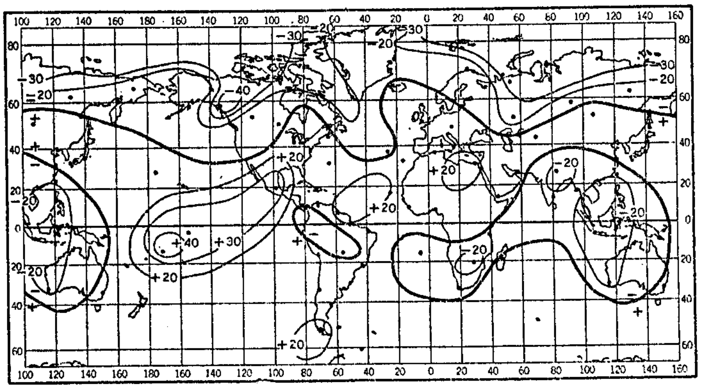

Chart 263. Correlations between District No. 10 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

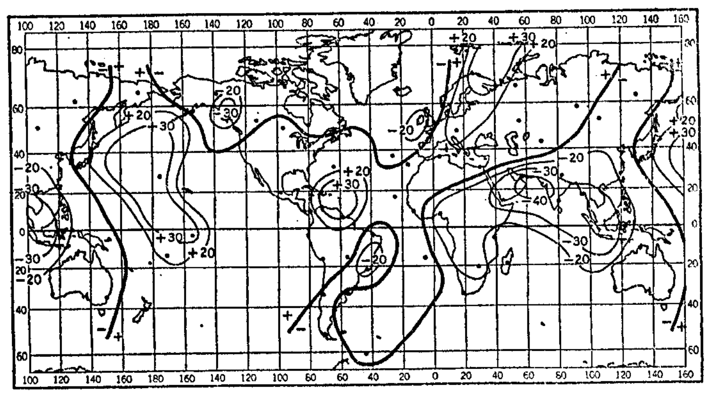

Chart 264. Correlations between District No. 10 U. S. summer precipitation and SON foreign pressures (3 quarters before).

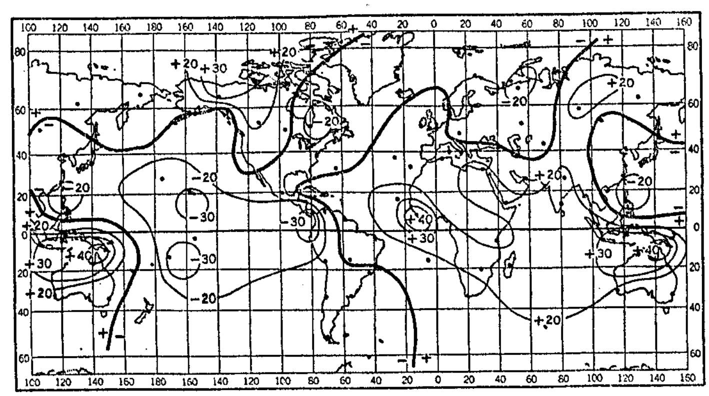

Chart 265. Correlations between District No. 10 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

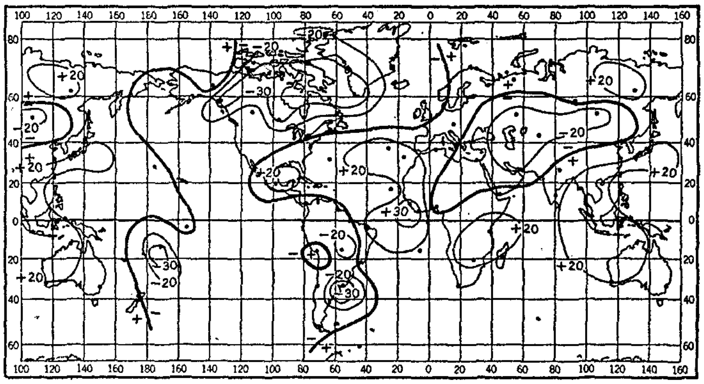

Chart 266. Correlations between District No. 10 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

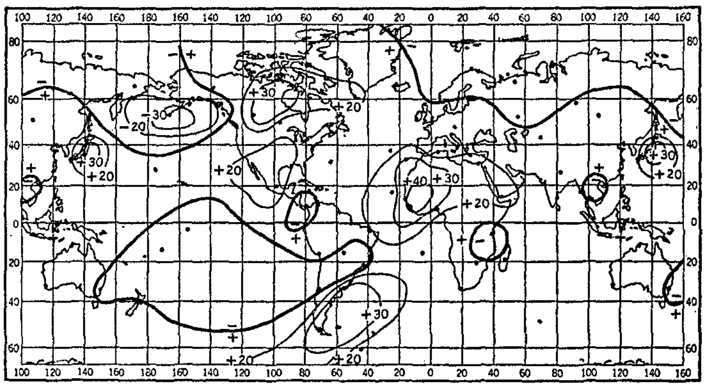

Chart 67. Correlations between District No. 10 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

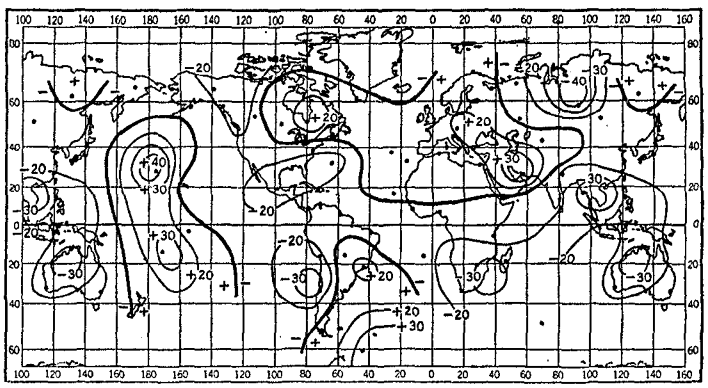

Chart 268. Correlations between District No. 11 U. S. winter precipitation and SON foreign pressures (1 quarter before).

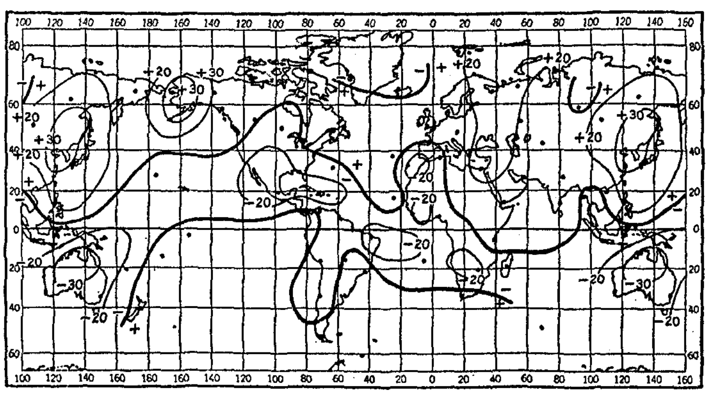

Chart 269. Correlations between District No. 11 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

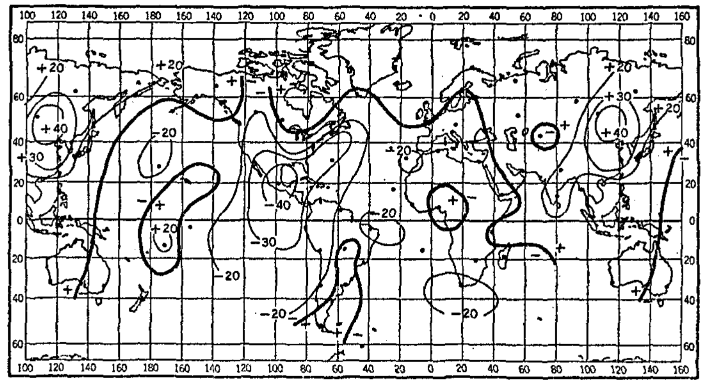

Chart 270. Correlations between District No. 11 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

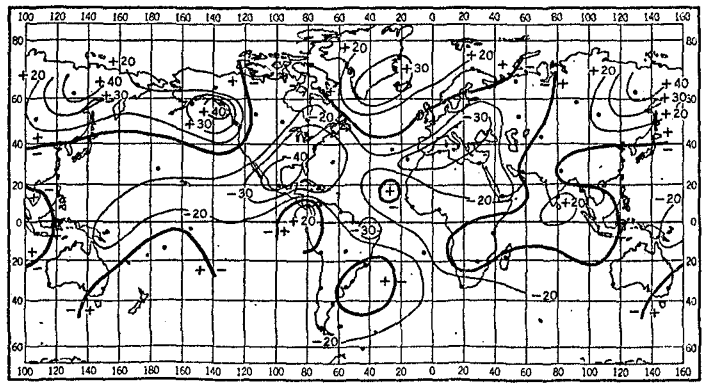

Chart 271. Correlations between District No. 11 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

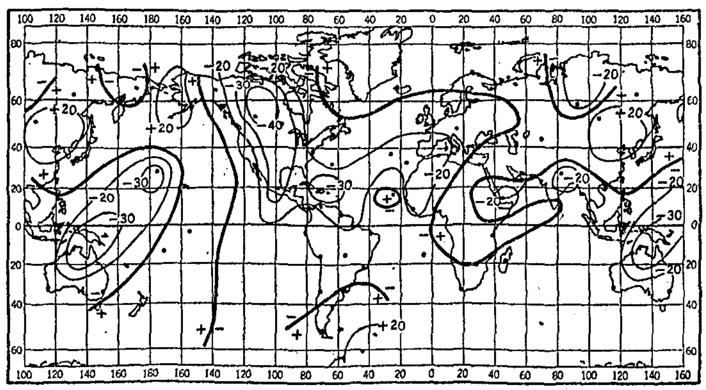

Chart 272. Correlations between District No. 11 U. S. spring precipitation and SON foreign pressures (2 quarters before).

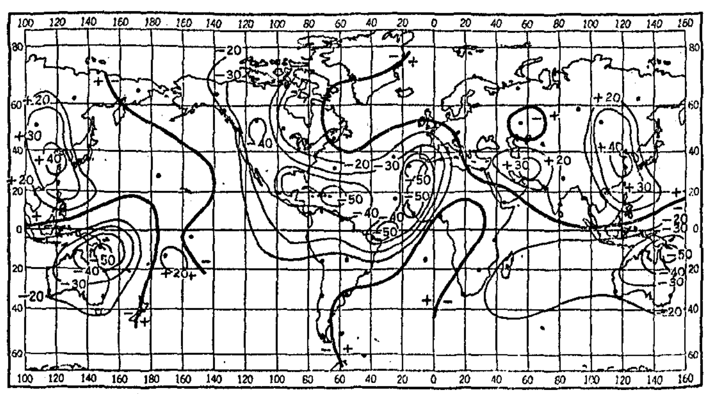

Chart 273. Correlations between District No. 11 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

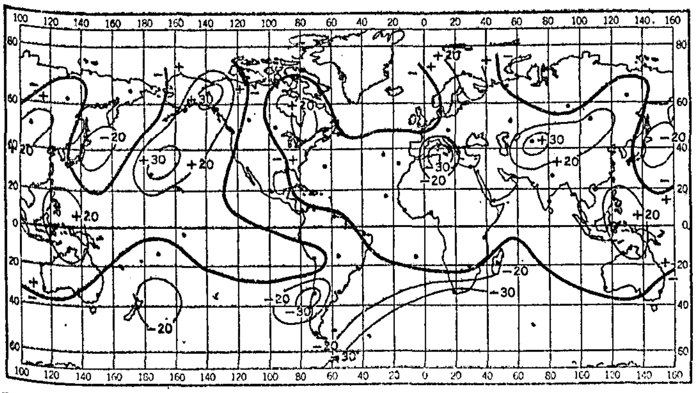

Chart 274. Correlations between District No. 11 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

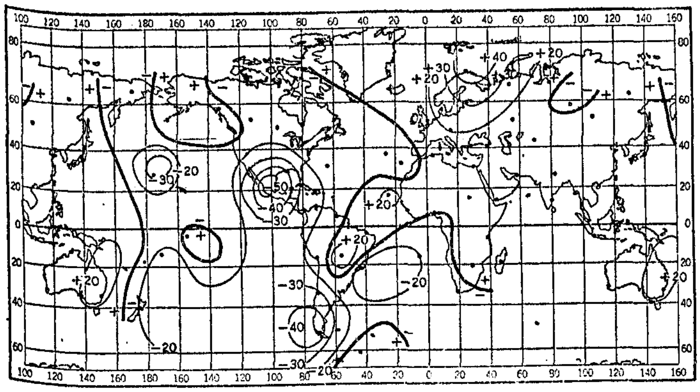

Chart 275. Correlations between District No. 11 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

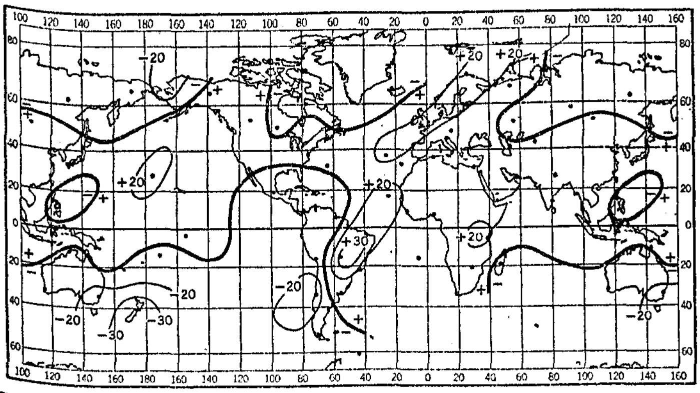

Chart 276. Correlations between District No. 11 U. S. summer precipitation and SON foreign pressures (3 quarters before).

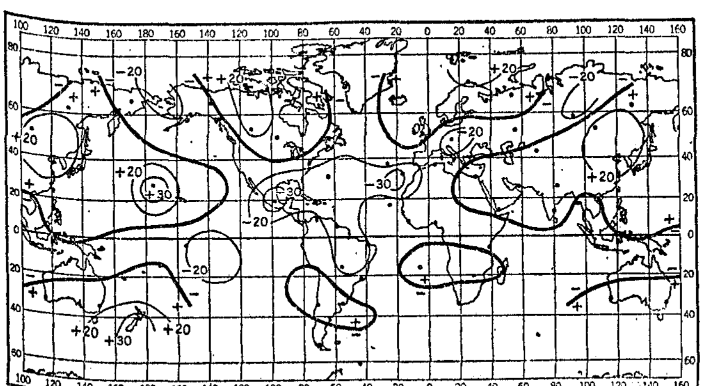

Chart 277. Correlations between District No. 11 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

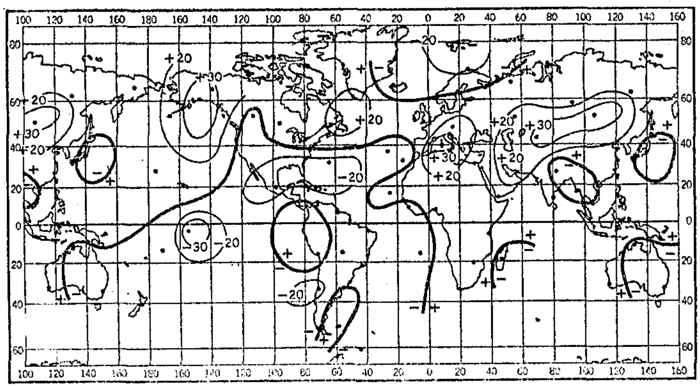

Chart 278. Correlations between District No. 11 U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

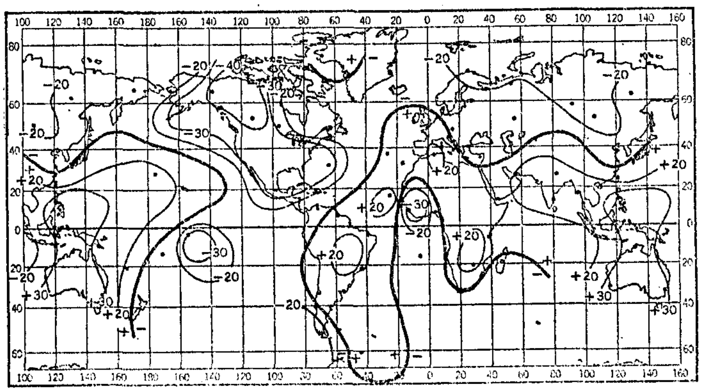

Chart 279. Correlations between District No. 11 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).

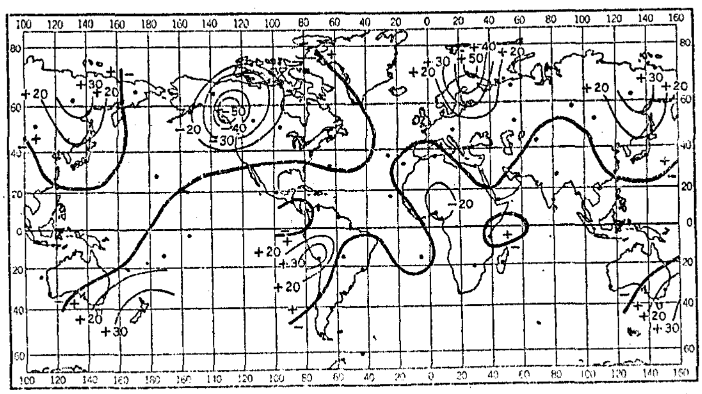

Chart 280. Correlations between District No. 12 U. S. winter precipitation and SON foreign pressures (1 quarter before).

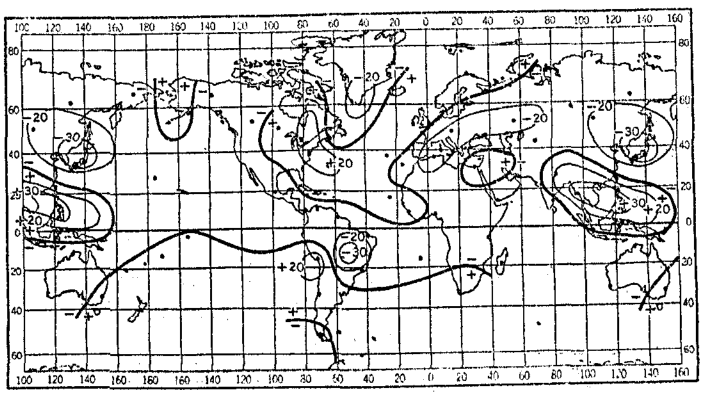

Chart 281. Correlations between District No. 12 U. S. winter precipitation and JJA foreign pressures (2 quarters before).

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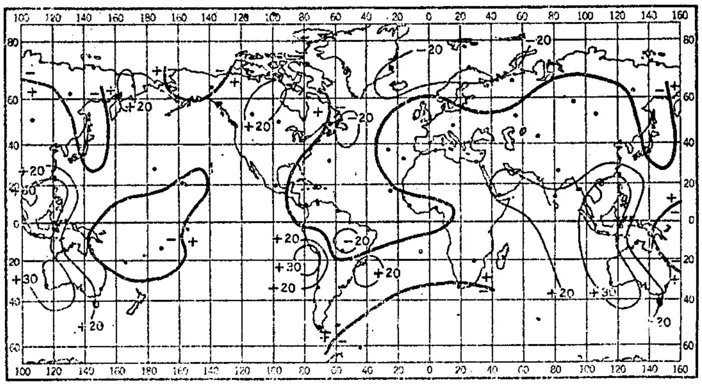

Chart 282. Correlations between District No. 12 U. S. winter precipitation and MAM foreign pressures (3 quarters before).

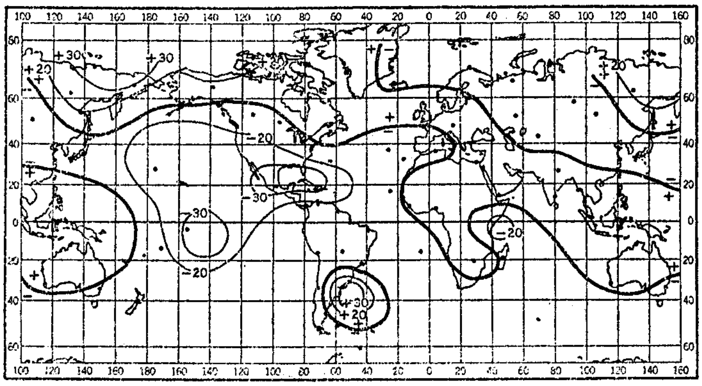

Chart 283. Correlations between District No. 12 U. S. spring precipitation and DJF foreign pressures (1 quarter before).

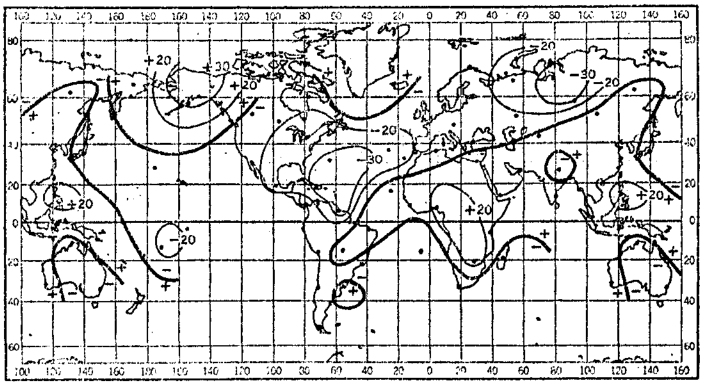

Chart 284. Correlations between District No. 12 U. S. spring precipitation and SON foreign pressures (2 quarters before).

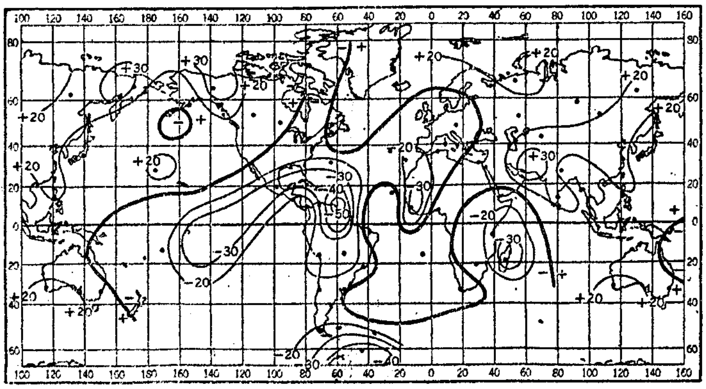

Chart 285. Correlations between District No. 12 U. S. spring precipitation and JJA foreign pressures (3 quarters before).

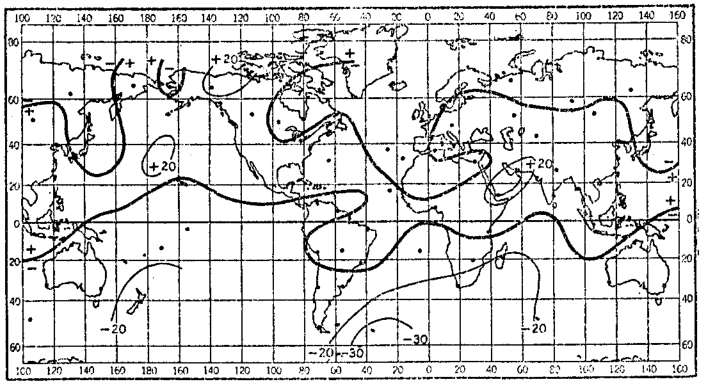

Chart 286. Correlations between District No. 12 U. S. summer precipitation and MAM foreign pressures (1 quarter before).

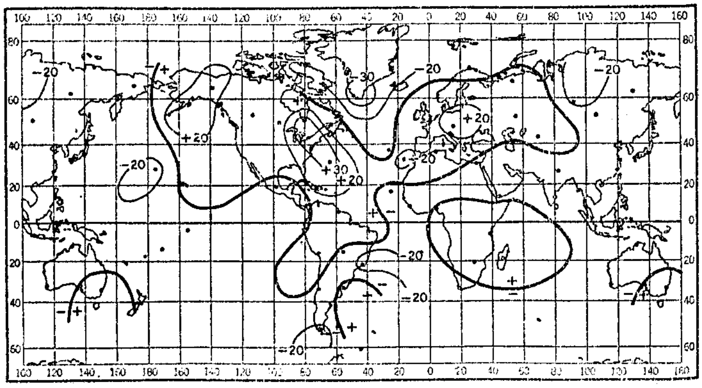

Chart 287. Correlations between District No. 12 U. S. summer precipitation and DJF foreign pressures (2 quarters before).

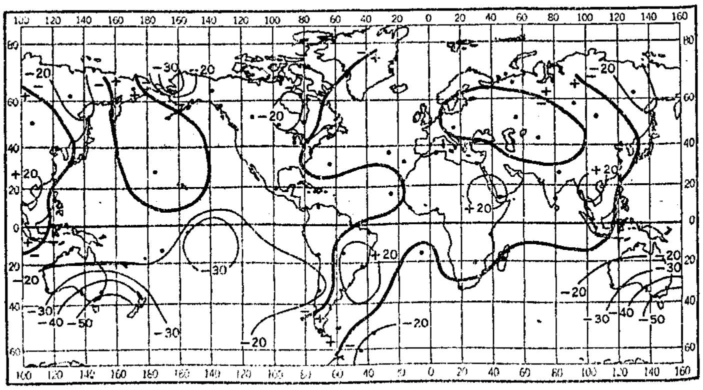

Chart 288. Correlations between District No. 12 U. S. summer precipitation and SON foreign pressures (3 quarters before).

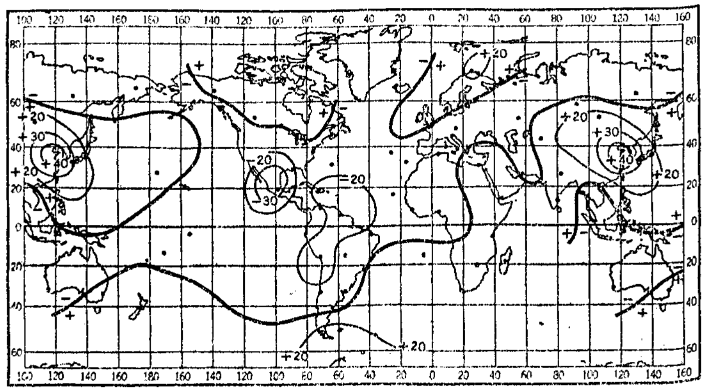

Chart 289. Correlations between District No. 12 U. S. autumn precipitation and JJA foreign pressures (1 quarter before).

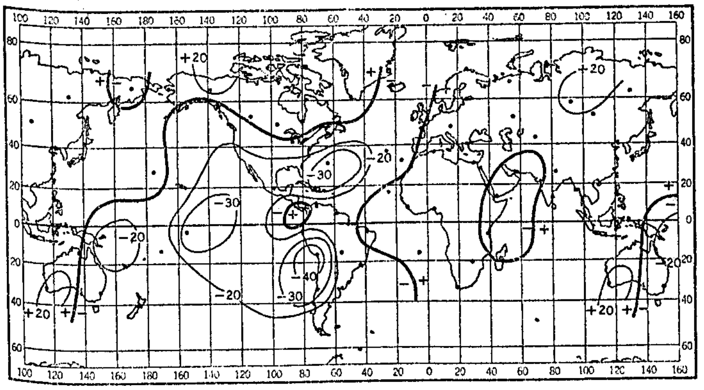

Chart 290 'Correlations between District No. 12, U. S. autumn precipitation and MAM foreign pressures (2 quarters before).

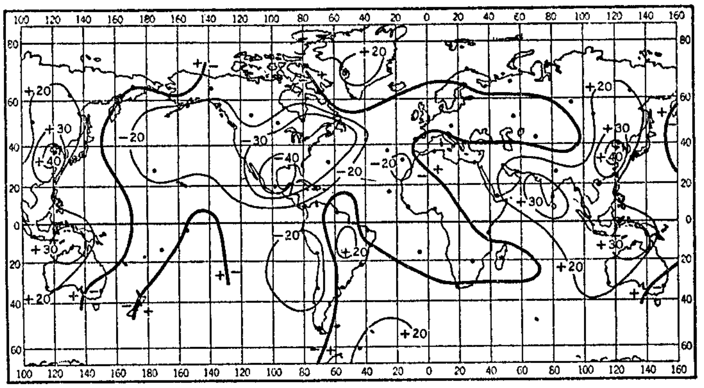

Chart 291. Correlations between District No. 12 U. S. autumn precipitation and DJF foreign pressures (3 quarters before).