NO. 3.

METEOROLOGY

OBSERVATIONS ARRANGED AND REDUCED

BY

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CONTENTS

INTRODUCTION

On his expedition to the magnetic North pole and through the Nort West Passage (1903—1906) in the "Gjøa," Captain Roald Amundsen brought with him meteorological instruments, necessary for observations on board and on shore. Instruments etc. which had been used on Sverdrups expedition with the „Fram" (1898—1902) were transferred to Amundsen and supplemented. When leaving Oslo the Expedition was in possession of:

2 Mercury barometers	6 Maximum mercury thermometers
3 Aneroid barometers	2 Hair hygrometers
2 Richard barographs	1 Hand anemometer with reserve cups
2 Richard thermographs	1 Rain gauge
12 Mercury thermometers, $^1/_5°$	1 Snow gauge
10 Mercury thermometers, $^1/_1°$	2 Measuring glasses
12 Mercury sling thermometers	3 Standard alcohol thermometers
26 Toluol sling thermometers	1 Thermometer comparator
1 Thermometer sling apparatus	2 Wooden frames for the water thermometer
9 Minimum alcohol thermometers	1 Deep sea thermometer.

In addition hereto come accessories, handbooks, forms and diaries.

The meteorologist of the Expedition was the first engineer, Sergeant Peder Ristvedt, later assistant officer at the Custom-house in Oslo. He received some training at the Meteorological Institute before the start. During the forced wintering at King Point the meteorological work was taken over by Lieutenant Godfred Hansen, as Ristvedt was occupied in hunting.

The data which the Expedition brought home were contained in two soldered iron boxes, which were opened on the 11th of December 1906. The contents were numbered and registered, and the meteorological observations have, according to the List page 15, the numbers 71—90. After No. 90 the following remark is added: "The journal for the voyage King Point—Nome etc. was by accident lost in the sea during the voyage in the Pacific." We have for our own use renumbered above 20 items with the figures 1—20 and as No. 21 we have added the original journal of the voyage Oslo —Godhavn, Greenland, June 18—July 31 1903, which was sent home from Godhavn. This report entered in the Register for Ship Diaries of the Meteorological Institute as No. 864.

The entire expedition may naturally be divided into the following five parts:

I. The voyage Oslo—Gjøahavn, Jun. 17—Sep. 11 1903.
II. Gjøahavn, Sep. 12 1903,—Aug. 12 1905.
III. The voyage Gjøahavn—King Point, Aug. 13—Sep. 3 1905.
IV. King Point, Sep. 4 1905,—Jul. 9 1906.
V. Voyage King Point—San Francisco, Jul. 10—Oct. 19 1906.

As the 5th part falls out, on account of the loss of the diary, only four parts remain. These parts are in the following pages discussed in chronological order.

I. THE VOYAGE OSLO—GJØAHAVN

The material is contained in diaries registered in the List as Nos. 5, 21 and 15. The first is a copy of the two latter. No. 5 is a meteorological diary in octavo folio of the pattern used by Norwegian ships, while the two others are ordinary fieldbooks. The copy has been checked by the writer.

Instruments. Three aneroids, one toluol and one mercury thermometer with sling apparatus and one mercury thermometer in wooden frame for measuring the surface temperature of the sea were used during the voyage. Observations were made of pressure, temperature of the air and the sea, wind, clouds and precipitation.

Pressure. Mercury barometer and barograph were not used on account of lack of space, but three aneroid barometers were read simultaneously.

The two aneroids from the Meteorological Institute bear the trade-mark of the French firm Naudet, but are signed A. J. Krogh, Christiania, No. 153—1902 and No. 154—1902. They were wall aneroids, 14 cm. across the face, with curved thermometers divided into full centigrade degrees at the lower part of the dial. The third aneroid belonged to the ship, but lacked number and was in the diaries indicated as "The Old."

No comparison had been made before the start between the aneroids and the standard barometer of the Meteorological Institute in Oslo, because it was supposed that mercury barometer should be read once a day. The three aneroids were, however, read on board at the Oslo observation hours 8 a.m. 2 p.m. and 8 p.m. L. M. T. during the last six days, 11th to 16th of June, while Gjøa was lying ready for start. This gave a series of 17 readings (the first at 2 o'clock on the 11th), which may be compared with readings of the station barometer of Oslo. This barometer was placed a good half kilometre farther east, 25 metres above sea level. Disregarding differences of the pressure at this distance, one gets a control of the aneroids by reducing the station barometer for temperature, latitude and height assuming the height of the ship aneroids, which hung in the stern cabin of the deeply loaded Gjøa, to be equal to sea level. Reduced in this way, the barometer stand of the station increased from 757 to 767 during the time from 11th at 2 p.m. to 14th 8 a.m. and decreased to 758 during the rest of the time. In these periods No. 153 had a mean correction of 1.9 and 2.2 respectively and 2.1 for the entire period. No. 154 had + 1.5 in all cases and "The Old," — 7.8, — 8,8 and — 8.3 mm. respectively.

From Gjøahavn numerous observations exist from which the corrections of the aneroids can be computed. The aneroids were read simultaneously with both mercury barometers in the observatory, where the observations were commenced on the 2nd of Nov. 1903, about one month and a half after the arrival. (The ship aneroid, "The Old," was left on board, and the observation of this barometer was discontinued on the 19th Oct.). From the simultaneous readings of the two Krogh aneroids I have selected 86 from the month of November and compared them with the corresponding corrected readings of the station barometer Adie C. 763. The results were:

$$\text{for No. 153, corr.} = + 0.003\ (B - 759.62) - 1.11$$
$$\text{for No. 154, corr.} = + 0.033\ (B - 756.80) + 1.70$$

According to this, No. 153 should have an almost constant correction of about — 1 mm. for which reason this instrument was regarded as the best of the three barometers which were used during the voyage.

However, on further examination it became apparent that the temperature correction was considerable, so large indeed that the correction may be considered a function of the temperature alone. Computing the correction as a linear function of the temperature one finds:

$$\text{Corr.} = -0.078\,(T - 7.21) - 1.174 = -0.078\,(T - 7.84).$$

Applying this equation I obtain a very good agreement with the correction based on readings in the harbour of Oslo. These were taken at a mean temperature of 20° and gave a correction of — 2.12 mm. If the correction is calculated by means of the equation, introducing T = 20°, I get — 2.17 mm. Thus the aneroid remained unaltered during the voyage, and the readings have been corrected by means of the above equation.

The observations of the two other aneroids are used as a control.

Temperature of the Air and of the Sea. The toluol sling thermometer N. 892 was used for measuring the air temperature until the 13th of August at midnight and the mercury sling thermometer No. 7 for the rest of the period. These two thermometers were of similar construction and the scales were graduated to 1° C.

The temperature of the sea surface was measured by the mercury thermometer No. 933, the scale of which was graduated to $^1/_5°$.

These three thermometers had, according to the Corr. Register of the Meteorological Institute, the following corrections on the 19th of March 1903.

			At	— 19°	0°	9°	15°
Air	Sl.	To. No.	892	+ 0.1	+ 0.1	—	—
	Sl.	Me. No.	7	—	+ 0.0	—	—
Sea	$^1/_5°$	Me. No.	933	— 0.2	— 0.1	+ 0.1	+ 0.0

No. 7 and No. 933 are among the few thermometers which were not brought back by the Expedition. No. 892 was, however, returned and was examined on the 28th of May 1907, when the correction at 0° was + 0.2°. The thermometer was not examined on the Expedition. A correction of + 0.1° has been applied to the readings from the voyage.

The zero point of No. 7, which was frequently used both at Gjøahavn and at King Point, was tested several times in melting snow and showed each time 0.0°. The readings are therefore used without corrections. No. 933 has not been examined. As the sea temperatures for the greater part were read to $^1/_{100}°$ I have applied corrections of $^1/_{100}°$.

between	16.5°	13.5°	4.5°	1.0°	— 1.0°
and	13.5°	4.5°	1.0°	— 1.0°	— 1.5°
Corr.	+ 0.00°	+ 0.01°	+ 0.00°	— 0.01°	— 0.02°

Besides the observations with instruments, direct observations of wind, clouds and precipitations were made without use of instruments.

The Direction of the Wind was observed by compass as long as this could be used. This was the case until the Expedition on 28th of August reached Franklin Strait, about one degree and a half north of James Ross' Magnetic Pole, but from here it failed. From 8 p.m. on the 28th of August the true direction of the wind was recorded, as far as this was possible in the unknown waters with frequent fog. 16 points of the compass were used, but occasionally the diary gives a by-point, in nearly all cases N_bE. Reducing the directions from magnetic to true, 32 points have been introduced.

The Force of the Wind was estimated according to the scale 0—6. According to The Observer's Handbook an uneven wind shall be noted by two figures with a dash between them, 2—3, where the figure after the dash indicates the force in the squalls,

This instruction is misunderstood to mean an average of the two figures, in our case 2.5. As the force of a squall seldom passes beyond the next degree, and thus is recorded as 0—1, 1—2 etc., the misapprehension lies close at hand. The note books have sometimes 0—1 and sometimes 0.5, 1—2 and 1.5 etc. and both observers use the two terms. The latter term means probably a mean force, but what is meant by the first term, which apparently is according to rule, remains doubtful, but a mean force is probably meant also here, since the note books at the end of August have such notations as 1.0, 2.0 etc. A few times, also in August, 0—0.5 has been recorded and no jumps are greater than from one degree to the next. I have not attempted to undertake any change or improvements in the records, but have entered them in the tables, with both notations mingled.

The observations of Clouds includes Amount and Form.

Amount of Clouds is noted by the scale 0—10, mostly according to rules. For nearly cloudless sky with one or more scattered dots of clouds the observers sometimes put down 0.5, meaning that 0 was too little and 1 too much. This does not occur very often, and most frequently in the later part of the passage. Similarly they found it misleading to record 10 for an overcast sky with small glimpses of blue in it and indicated this by putting 9.5. This occurs only two times at midnight between the 13th and 14th of July. Otherwise whole numbers are used for amount of clouds. These deviations from rule have also been accepted when preparing the tables.

Cloud Forms were noted according to the "Atlas international des Nuages." Fog and haze were sometimes entered under the heading "precipitation" and sometimes under the heading "cloud forms." Rainy and snowy air is often recorded under "cloud forms."

Precipitation has been recorded as is customary at sea. Rain, snow, sleet, hail, fog and haze are noted. In the Tables I have entered the hydrometeors under the heading "Weather," using the symbols ● = rain, ∗ = snow, ●∗ = sleet, ≡ = fog, ∾ = haze, and adding the index 0 and 2 in order to indicate a slighter or greater degree. They are put under the heading *Weather*. As mentioned under Cloud Forms, fog was frequently entered under that heading, without simultaneously being noted under precipitation. In these cases I have left the column Cloud Form open and have entered fog with corresponding symbol under Weather. Remote fog is, however, placed under Remarks, where also such notes as "rainy air," "snowy air" etc. are found.

Observations of the state of the sea were not made. No reason is mentioned. The log-book contains some scattered observations of swell, but mostly in an uncertain and summary way, which makes it difficult to estimate the value of the observations. I have therefore not included them in the Tables. The log-book contains little beyond items dealing with the navigation, such as geographical position, courses and distances and dead reckoning from noon to noon on most of the days. Dead reckoning was used only in open water and probably could not be undertaken with any accuracy when navigating in the ice. During the voyage the meteorological observations were made every second hour, and accordingly the geographical positions ought to have been determined at the hour of observation. This was possible when courses and distances were available, but where no such information existed, the determination of the positions could not be undertaken. The noon positions were always noted in the Meteorological Diary, and in the tables additional information is given as derived from the log-book and from Amundsen's book "Nordvest-passagen."

During the voyage the day was divided into four six-hour watches. Ristvedt observed during his watch, 2—8 and Wiik during his watch, 8—2.

The Tables have headings for month, days, hours, latitude, longitude, pressure, temperature of the air, surface-temperature of the sea, force and direction of the wind, amount and form of clouds, precipitation and remarks. The remarks are scanty and

mostly about mist. In the column for longitude there have been put at the top to the right at some hours small figures as indices, which refer to notes at the bottom of the tables.

Nearly one week's stay at Godhavn on Disco Island divides the voyage in three parts.

1. Oslo—Godhavn, June 17—July 25.
2. Godhavn, July 25—July 31.
3. Godhavn—Gjøahavn, July 31—September 14.

The "Gjøa" actually reached Gjøahavn already on the 9th of September in the afternoon, or rather Petersen's Bay, as the harbour was entered on the 11th, but the observations were continued as before until the 14th at 8 o'clock in the evening, when the observations of the voyage may be regarded as finished. The observatory ashore was not completed, and the ordinary station observations did not begin before the 2nd of November, and in the meantime observations were taken as during the voyage, except that the number was reduced to three times a day. As the observations were taken as term observations of a fixed station, I have combined them with the ordinary station series, which started on the 2nd of November.

II. GJØAHAVN

The small cove which was called "Gjøahavn" was discovered on the 9th of September 1903, when the Gjøa in the afternoon stood into Petersen's Bay on the south side of King William's Land to anchor for the night. The harbour was entered in the evening of Saturday the 12th.

The unloading of the ship was begun on the 14th and finished on the 17th, when the work on the necessary buildings on shore began. The first seven weeks of the stay at Gjøahavn were used for the building of houses and other preparations for the approaching winter and during this time the meteorological observations were continued on board with the instruments used during the voyage. In the meantime the observatory on shore was completed and the 2nd of November the regular station observations were started. The combined living-house and observatory was, as mentioned above, built of packing-cases in the way described on page 8. The entrance of the house faced the west and in front of the door, at a distance of about 20 metres a flag-pole about four metres high carried the wind indicator with a cross for orientation below it. Beside the flag-pole, a little to the north, the meteorological screen and on the other side the rain gauge was placed. The exterior arrangement will otherwise be seen from the sketch in Fig. 4.

The thermograph, the psychrometer, the hair hygrometer and the maximum and minimum thermometers were placed in the meteorological screen. In the combined living house and observatory, which they called "Magneten," Ristvedt put up the four barometers and the barograph.

The arrangement of the interior of the observatory is seen from Fig. 5. The four barometers were the two Krogh aneroids, which had been in use since the beginning of the Expedition,

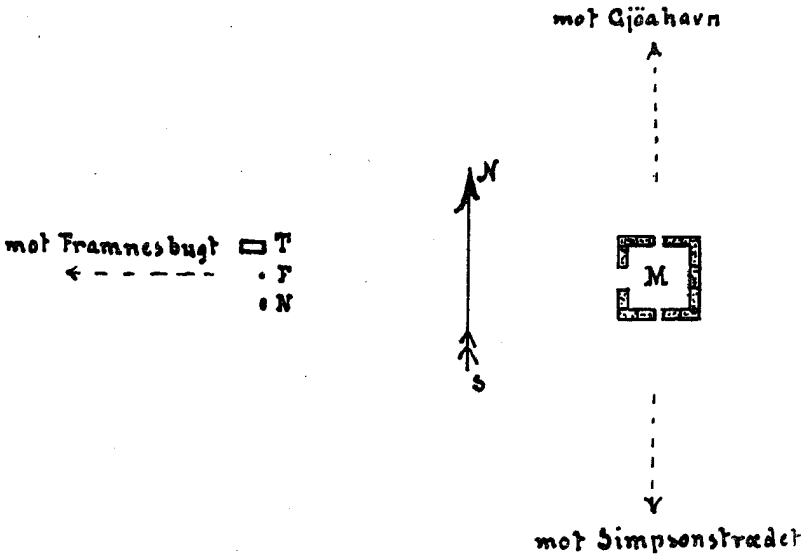

Fig. 4. The plan of site of the observatory.

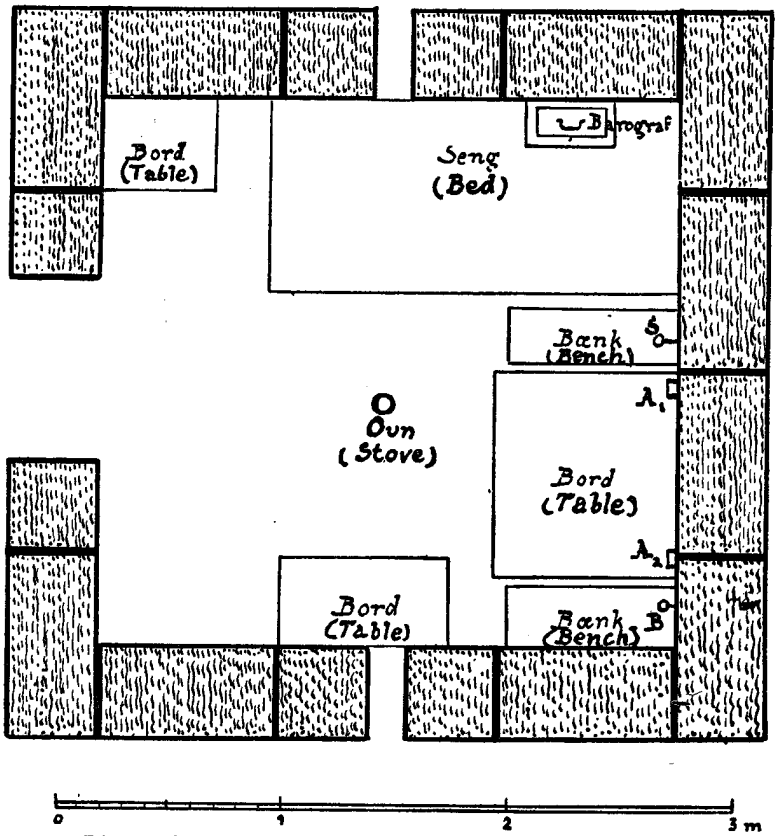

Fig. 5. The interior of the meteorological observatory.

No. 153 and No. 154, A_1 and A_2 on the sketch, and the two mercury Kew pattern, the station barometer Adie C. 763 (B) and the marine barometer Adie C. 764 (S). The barometers were hung on the eastern wall and remained unaltered the whole time until the house was pulled down the 15th of May 1905, when they were moved to a screen beside the meteorological screen. The barometer screen is not properly described in "Remarks to the Meteorological Observations", but has probably been only a closed shed.

The barograph, which had been placed on a shelf in the living-house was later taken on board the Gjøa, as it trembled when anybody passed through the door. Further informations is to be found among the comments to the different instruments.

The geographical ordinates of Gjøahavn are, according to Professor Geelmuyden:

$$\varphi = 68° 37' 18'' \text{ N} \quad \text{and} \quad \lambda = 95° 53' 0'' \text{ W. Gr.}$$

These data are, however, referred to "Uranienborg" (U on the map given in Fig. 3, No. 1, p. 10) where the astronomical telescope stood, or to a location about 400 metres to the north and 150 metres to the east of the living-house (M), where the meteorological instruments were placed. The exact co-ordinates of the living-house are, therefore:

$$\varphi = 68° 37' 5'' \text{ N} \quad \lambda = 95° 53' 15'' \text{ W. Gr.}$$

The Observatory Work.

On the 14th of September at 8 o'clock in the evening the two-hourly observations were discontinued because of preparations for the winter and from the 15th observations were taken at 8, 2, 8. The hours 9, 3, 9 were found to be more convenient, for which reason these observation terms were adopted from the 19th. The ordinary station work commenced on the 2nd of November and continued regularly till the 12th of August 1905, at 9 o'clock in the evening. Meanwhile the living house for the two ordinary observers, Ristvedt and Wiik, had been pulled down already on the 15th of May, and the registering of temperature and pressure had ceased on the 31st of July at 9 o'clock in the morning. Only the ordinary three daily observations were continued.

Gjøahavn was thus a station of second order, at which registration of pressure and temperature were undertaken and may therefore be considered as being a station between first and second order.

Instruments and Observations. — *The Four Barometers* were hung on the eastern wall of the living-house, the two mercury on each side with the aneroids between them. The cisterns of the mercury barometers were 1.1 meter above the ground, which in "Remarks to the Meteorological Observations" (No. 12 in the List page 16) is stated to be 20 metres above sea level. Nothing is mentioned as to how this height was measured, but since the barograph was placed on board the Gjøa from 16th of November 1903 till 27th of June 1904, the correctness of this statement could be checked. The height of the barometers has therefore been taken as 21 metres.

The four barometers were read regularly and thus a good body of material was accumulated for determination of the corrections of the aneroids, as is shown when discussing the observations of the voyage. Professor Mohn determined the correction of the mercury barometers by comparisons with the standard barometer of the Meteorological Institute of Oslo, Fuess No. 214 (+0.12 mm.). By means of long series of observations before the departure and after the return of the Expedition he found for:

Adie C. 763: corr. = — 0.11 + 0.0179 (b — 755), M. E. = + 0.11 mm.
Adie C. 764: corr. = + 0.14 — 0.0125 (b — 755), M. E. = + 0.16 mm.

The comparisons between Adie C 763 and the standard barometer Fuess No. 214 which were undertaken before the departure and after the return of the Expedition agree well. They indicate a small change in the correction of Adie C 763, but this does not amount to 0.1 mm. and as the time at which the change took place is unknown, the mean result of the comparisons has been adopted. The errors in the absolute values of the pressure which may thus have been introduced are smaller than 0.1 mm.

The readings of Adie C 763 have been employed in the following and the readings of the second mercury and of the two aneroids have been used for control. The readings have been reduced to 0° of temperature and 45° of latitude, and to the sea level.

The Barograph, a Richard barograph, the number of which was not stated, was at first placed on a shelf in "Magneten," but as it trembled too much when anybody passed the doorway, it was on the 16th of November moved on board the Gjøa and placed on a shelf in the fore cabin. For the first two weeks therefore there are no usable records. The series does not commence till the 16th at 12 o'clock noon.

In the fore cabin the barograph remained up to the 27th of June 1904, when it was moved to the thermograph hut and placed beside the thermograph on the floor of the screen. Here it remained for the rest of the time, and worked here, as in the other localities, fairly well, without any serious irregularity. The watch naturally gained or lost somewhat, but there were no difficulties about the adjustment. A single stoppage of one day and a half occurred. The pen worked well, but a few times it failed to register short pieces of the curve, probably because it had not been filled.

During the time the barograph remained on board the time for change of paper was at 12 o'clock noon, but when the barograph was moved into the thermograph hut, the change of paper was altered to 9 a. m. Some uncertainties as to the hour of change could be settled by studies of the curves and comparisons with the readings of the barometers.

The readings of each of the 24 hours from the diagram were referred to the corrected and reduced readings of mercury Adie C 763. Thus, as these readings are reduced to sea level, the data given in the tables mean pressure at sea level.

The Thermograph Hut (the meteorological screen) is to be seen in the sketch below, Fig. 3.

Unfortunately one gets a very faint impression of what it looked like. It was built on the spot and described by Ristvedt in "Remarks to the Meteorological Obser-

vations of the Gjøa Expedition," page 3: "The hut is constructed of thin boards, 80 cm. long and 12 cm. broad, which on the two long walls are put together with openings between them, in the manner used for a louver, to allow the air free circulation, while the two short walls and the bottom are entirely covered. The roof of the screen is combed and covered with tar-boards, which, as well as everything else, are painted white. Inside, in the middle, a beam is fixed on which are placed the psychrometer and the maximum

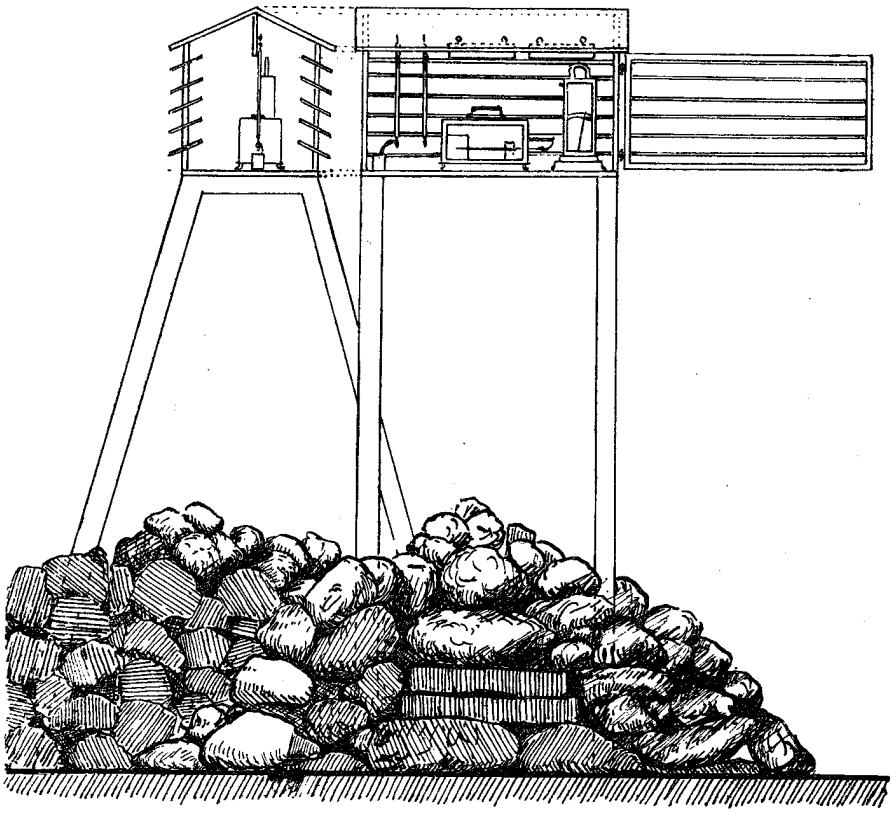

Fig. 6. Scetch of the meteorological screen.

and minimum thermometer. The thermograph and the hair hygrometer stand on the floor of the screen. The hut is fastened to four 2-metre long posts, which at the lower ends are kept in position by means of heavy stones."

Ristvedt has verbally stated that the screen was constructed of the outer packing-cases. The dimensions of these cases were 80 × 40 × 50 cm. and they were made of $^3/_4$-inch boards. The long sides were removed and replaced by louvers, and the short sides were at the top sawn in shape of a comb with the height of 40 cm. on the sideedges, under the eaves, and of 50 cm. at the top under the beam with a flush, tight roof nailed on to the side walls. Thus they got a hut with a combed roof, tight all over, except the louvered long walls. The one louver wall, facing the north, served as a door with hinges to the right and hook and clasp to the left. Along the middle of the screen, from one of the short walls to the other a rail was nailed for suspension of the instruments.

According to above description the drawing in Fig. 6 has been prepared, looking at the screen from the north to show the door opening. At the front—that means the north side—in the heap of stones, which had been gathered around the legs to keep them steady, a couple of level stones were placed as a platform to stand on, the elevation of which was so arranged that the eyes of the observer were level with the middle of the hut. With the 2-metre long legs somewhat inclined, the bottom of the hut had a height above the ground of about 1.9 metres. As the rail for the suspension of the instruments

was about 40 cm. above the floor and the mercury thermometers are 36 cm. long, the bulb was about 1.95 metres above ground.

The arrangement of the instruments will be seen in the drawing. During the warm season a wick connected the wet bulb thermometer with a vessel filled with water, which was placed on the floor. This vessel is also indicated in the drawing, where it will be seen to the left, where the wet bulb hung. The barograph was in the midsummer of 1904 placed in the screen behind the thermograph.

With tight gablewalls, roof, and floor, and louvers only at the two side walls, the ventilation could not be very good. This fact reveals itself plainly in the readings of the temperature instruments placed within. As soon as the sun shines on the screen the temperature rises unreasonably. Fortunately the sling thermometer, which was used at every observation, allows of a sharp control.

The small ventilation did not protect against snowdrift. Inconveniences caused by snowdrift are mentioned in the remarks only twice, the first time as early as the 27th of November 1903, and the second the 27th and 28th of April 1904, but the fact that Roald Amundsen in "Nordvestpassagen," when speaking of the new meteorological screen which Lund made for the station at King Point, remarks that Lund had "constructed it so as to prevent snowdrift from entering" shows that the experience from Gjøahavn gave occasion to special care in order to prevent trouble of this kind.

Thermometers. The following thermometers were used: Two $^1/_5°$ mercury thermometers for the psychrometer, No. 929 as dry and No. 932 as wet, in use from the 2nd of November to 8th of December 1903, 10th of April to 22nd of October 1904 and from 25th of April 1905. Mercury sling thermometer No. 7, used from 2nd of November to 8th of December 1903, 23rd of April to 10th of December 1904, and from 29th of March 1905, one toluol sling thermometer No. 893, used from the 8th of December 1903 to the 23rd of April 1904, except on one day, the 11th of March 1904, when it was examined and exchanged for the mercury No. 12, and one toluol sling thermometer No. 894, used from 10th of December 1904 to 29th of March 1905. Mercury No. 7 was the one which was used on board the Gjøa during the last part of the voyage. (See page 33). Besides these, a maximum mercury No. 910 was used in the same periods as the psychrometer. As they did not possess any maximum toluol thermometer, the maximum temperature was not observed in the winter. Minimum toluol No. 916 was used until December 1903 and later No. 917. All the thermometers, including the sling thermometer with the sling apparatus, were placed in the meteorological screen.

In "Remarks to the Meteorological Observations" it is not always stated when the thermometers were changed. The only thing to go by when seeking for time of change is the date when the zero point was tried. When at this examination a new thermometer is mentioned, it is probable that the change took place that day.

All the thermometers were examined as to the zero point several times during the stay at Gjøahavn, but no further examination was undertaken. The assumption was, that the thermometers were to be examined at temperatures below zero, and for this purpose they brought with them alcohol standard thermometers. As no comparisons with these were undertaken, one must use the corrections as derived from comparisons with the standard thermometer, Kew No. 499, at the Meteorological Institute in Oslo. Before the start all the thermometers, except the maximum and minimum, were examined in March 1903. After the return the thermometers which were brought back were again examined in May 1907, but in most cases only as to the zero point. In the Correction Journal of the Institute I find:

Year	at	929	932	7	12	893	894
	°	°	°	°	°	°	°
1903.....	15	− 0.02	+ 0.01	—	—	—	—
»	9	− 0.03	+ 0.02	—	—	—	—
»	0	0.0	0.0	0.0	− 0.1	0.0	− 0.1
»	− 19	− 0.1	− 0.1	—	—	+ 0.7	+ 0.5
1907.....	11	—	—	—	− 0.15	—	—
»	0	0.0	+ 0.02	—	0.0	—	—

Thermometers which are not represented in 1907 were not returned.

It is seen that the correction at zero has increased for both the thermometers Nos. 932 and 12, and the same applies to the corrections of the other toluol thermometers which were returned and for which the corrections have not been stated here, because they were not used. The examination of the zero point corrections in the field also indicates a change in the same direction, but the determinations do not give such consistent results that we can be certain as to the time of the change. In view of this circumstance and of the small value of the changes, the corrections at zero which were determined in Oslo before the departure have been adopted for all thermometers.

As to the corrections at low temperatures it must be regretted that no comparisons with the available standard thermometers were undertaken in the field. As regards the mercury thermometers the lack of control observations is of small importance, because these thermometers usually have corrections of less than 0.2°, which also represents the limit to which these thermometers can be read, they having a graduation into full degrees and only a few millimeters per degree. The correction at zero has therefore been used for the whole scale of the mercury sling thermometer No. 7 and for readings below zero of No. 12. The situation is less favorable in the case of the toluol thermometers, because this liquid requires a graduation which depends upon the temperature. The two thermometers which were used at Gjøahavn were not returned and could therefore mot be thoroughly examined, but after a study of thermometers of similar construction the correction at zero has been adopted as valid for temperatures higher than—15° and the correction at—19° as valid for temperatures below—15°.

The values of the temperature have been based on the readings of the sling thermometers, because of the poor ventilation of the hut. A discussion of the corrections of the other thermometers at different temperatures is thus not necessary. The maximum and minimum temperatures have been read off from the curves of the thermograph, because the maximum thermometer, being a mercury thermometer, failed to function in the coldest season and because several misunderstandings arose as to the handling of the minimum thermometer.

The Thermograph, Richard No. 9369, was placed on the floor of the screen on the 2nd of November 1903 (se Fig. 6). This instrument caused much trouble. The clock stopped frequently already during the first days and on the 11th of November, when the temperature was — 30.5°, the oil was removed from the clock-work. It worked until the 18th, when it again stopped. Petroleum was now applied and after this it worked, except for a single stop on the 29th of November, until the 8th of February 1904. This time, however, it could not be made to work again, in spite of repeated attempts. A whole week was in this way lost in experiments and this thermograph was therefore replaced by thermograph No. 9368, this latter being first cleaned of oil. At a later examination it appeared that a forelock had dropped out from its place in the clockwork of No. 9369.

No. 9368 was highly unreliable and had so little sensibility, "that the curve looked like a straight line", as Wiik states in a remark the 11th of April 1904, when No. 9369

was again put back into the screen. With some few stops now and then this instrument was kept working till they left in August 1905. Petroleum was applied to the clockwork again the 12th of June 1905, and it proved also in this case to be the right thing in spite of the fact that petroleum, according to experience, should not be applied to steel. The reason probably is that the pivots has kept enough oil, even after the cleaning, to protect them against corrosion, which petroleum otherwise is known to cause.

Besides the stops, the records show other irregularities. Thus the adjustment was not very satisfactory. As a rule the clock accelerated up to two hours in one week. On the other hand it happened, especially later on during the stay, that the clock accelerated one week only to go slow the next. Pen and ink worked fairly well.

The first paper was applied at 12 o'clock on the 2nd of November 1903. During the first week the time was marked three times a day, at 9, 3 and 9, when the sling thermometer was read. The second week the following system, which was followed all the time since, was introduced: Marking of the time at 3 p. m. and a simultaneous reading of the sling thermometer.

It has, on account of the stops and insufficient notes regarding these, frequently been difficult to evaluate the diagrams, but in doubtful cases a close examination of the curve and a comparison with the directly observed temperatures have made the use of the registrations possible.

The Hair Hygrometer, a Koppe, with *muslin pusher* at the back[1]), was placed on the floor in the screen. The instrument was taken into use on the 15th of November 1903, and was afterwards in operation the whole time. The 13th of November it had been tested at 20 degrees below zero with moistened muslin and the pointer put at 100. On the 14th it was tested anew, also at 20 degrees below zero, the pointer being exactly at the 100-line, and on the next day the readings began. On the 27th of December the hair broke. Snow had drifted into the screen and gathered on the instruments. New hair was inserted, the instrument verified and regulated. On the 8th of February 1904, ice had gathered on the weight. The instrument showed on examination with wet muslin 105 per cent. After having removed the ice, another test was made with moistened muslin and the instrument corrected.

This is what is stated as to the verification of the hair hygrometer, and it does not appear to have been tested later. I have , however, chosen the hair hygrometer as the main instrument for the observations of humidity. The psychrometer, being supplied with mercury thermometers, was not read at low temperatures, and in cold periods the hygrometer only was used. As to the rest of the period, there are only some months with temperatures above zero, and even for this period the readings of the psychrometer are unreliable, especially because it stood in a screen which was poorly ventilated. The hair hygrometer, however, which is practically independent of ventilation as well as of temperature and pressure, gives much more reliable values, if it is kept under control as to the stand. The examinations in the field are in this respect of no use. They only state that the instrument has been adjusted now and then and give no information as to the constancy of the instrument. In order to obtain an idea of the constancy the readings of the psychrometer have been compared with those of the hygrometer. Plotting the readings of these instruments on millimeter paper and combining the points into curves, the hygrometer gives a more regular curve than the psychrometer. The latter oscillates to both sides of the former. The differences between the readings of the two instruments, H—P, are on the average positive for the cold part of the year and negative for the warmer. The mean monthly differences range from — 4 per cent, in

[1]) Described in " Die Messung des Feuchtigkeitsgehalts der Luft mit besonderer Berücksichtigung des Prozenthygrometers mit Justirvorrichtigung" von Dr. Karl Koppe, Zürich 1878. (according to "Handbuch der Nautischen Instrumente", 2te Auf., Berlin. 1890).

July 1904, to + 5.9 per cent, for April 1905. The total mean of the 897 differences is + 1.27 per cent, taking into consideration even figures so improbable as — 43 and + 46 per cent, which represent the greatest of the differences. Excluding 17 of the most improbable divergencies, putting the limit at ± 20 per cent, the mean is + 0.84, and putting the limit at ± 10 per cent one finds + 0.85 as a mean of 798 data. In order to obtain a more homogeneous material and to avoid the readings when the screen has been exposed to the direct rays of the sun, I have selected all differences H—P taken at cloudiness 10 and found corresponding means of + 0.45, + 0.88 and + 0.64 per cent respectively. A similar examination has been undertaken also at temperatures about or above zero, in order to reduce the inaccuracy at low temperatures. The results of these comparisons are set forth in the following table, giving the means of the difference H—P, within the different groups.

Temperature	Cloudiness	Mean of H — P		
		All p. c.	± 20 p. c.	± 10 p. c.
All	All	+ 1.27	+ 0.84	+ 0.85
	10	+ 0.45	+ 0.88	+ 0.64
≷0°	All	— 1.41	— 1.14	— 0.38
	10	— 0.61	— 0.68	— 0.51

The ventilation is of great importance for the psychrometer, and I have therefore examined the conditions during very strong wind, but only for a single period in May 1904, from the 21st in the morning to the 26th in the evening. During this period the wind velocity varied between 11 and 31 m/s, with a mean of 19.6 m/s. The direction was NNW, veering N to E, and the wind passed the screen through the open louvers. The mean of 16 differences, H—P, is—0.44 per cent, and the single values range from + 4 to—7 per cent.

These examinations do not give any definite result as to the constancy of the hygrometer, but seem to indicate that it has remained constant. I have therefore not applied any correction to the readings except excluding occasionally one half per cent. Thus I have entered 96 instead of 96.5 per cent, which means a correction of—0.5, in agreement with the result that the general mean H—P was positive and between a half and one per cent.

The Anemometer was Mohn's Hand Anemometer, which has been described in "Den Norske Nordhavs Expedition", 1876—1878, 2nd Volume, Meteorology, pp. 6—10, and in the "Quarterly Journal of the Royal Meteorological Society" (London) January 1878, pp. 37—39.

The 25th of December 1903 one of the arms carrying the cups broke. It was immediately repaired. Otherwise no failure is noted.

By a misunderstanding the reading was taken after an interval of 20 seconds up to the 9th of September 1904, while the instrument is constructed for giving the wind velocity in m. p. s. after an interval of 30 seconds. For this reason the reading for the period from the 2nd of November 1903 until the 9th of September 1904 have been reduced by means of the formula:

$$^3/_2\, r + 1 = v$$

where r is the reading of the velocity after 20 sec., and 1 represents the constant of friction.

The direction of the wind was obtained by means of a vane on the flag-pole. Below the vane a rectangular cross indicated the true directions, the arms being marked with the letters N, E, S, W. The height of the flag-pole was 4 metres.

The Precipitation Gauges were of the usual Norwegian pattern, a small, circular, jug-shaped gauge with spout and handle and with a fixed deep funnel for rain, and a square, higher gauge with loose, flat funnel half way down for snow. The gauges were originally mounted on a stand with the opening one metre above the ground, supported by boards on each side.

The gauge was placed on the west side of the house near the flag-pole and the screen, and, like these, about 20 metres from the house. The gauge had its place on the south side of the flag-pole (Fig. 4, page 35). However, in "Remarks" we find the statement: "as every location in the neighbourhood is always exposed to wind and snow-drift, it will be difficult to obtain reliable values for the precipitation in the winter". In the hope of finding a more favourable place, the gauge was removed to the flat roof of the living-house, "Magneten." "25th of December 1903: The snow gauge was from to-day placed on the flat roof of our house, as it constantly became filled with drifting snow." The gauge was mounted directly on the roof. The rim of the gauge was here about 2.5 metres above ground. It is not stated if the rain gauge ever was in use. As may be expected, the results of the measurement of snowfall were not better here, where a 3 to 4-metre long house-wall increased the whirls and eddies.

On account of these difficult conditions the records of precipitation are imperfect and inexact. This applies especially to the measurements. The meteorological diaries contain only 58 remarks, and of these 32 deal with precipitation. The small number of remarks is perhaps explained by the fact that the observations were entered in ship's diaries, containing only a small space for remarks. This column has principally been used for notations of cloud forms, and thus little space was left. However, the absence of remarks concerning precipitation must principally be ascribed to an insufficient knowledge of the importance of supplementary information as to the weather between the hours of observations. The number of days with precipitation in each month is thus most likely too small.

It looks as if measurements were made two times a day, in the morning and in the evening. As notes about precipitation during the night, with measuring in the morning, are very scanty and thus most of the measurements concern precipitation in the day-time, with measuring in the evening, the measurement has been referred to the date when most of the precipitation fell, which means that the precipitation during the night has been added to the measurement of the previous day. Since, in many cases, no figure is entered when precipitation and especially snowfall have been recorded and since it has not been stated whether or not the snowfall has been too small to be measured, as is sometimes done concerning rain, I have been obliged in these cases to leave the column "precipitation" open. The reason why no measurements are given is probably that it was impossible to tell how much was due to drifting snow.

Direct Observations. — Besides the observations by instruments, *observations of clouds and kind of precipitation*, as well as *observations of northern lights and other occasional phenomena*, were made.

Clouds. — *Amount of Clouds* is estimated according to the scale 0—10. The darkness seems to have influenced the estimation, because, as shall be shown later, the evening hour of observation shows only for the brightest time of the year an amount which agrees with that of the two other observations, but in the dark season the amount of clouds in the evning differs from that of the two other hours, 9 a. m. and 3 p. m., which both give nearly the same mean monthly values for the cloudiness.

Form of Clouds are recorded as:

CiSt, CiCu, ASt, ACu, StCu, CuNi, Ni, Cu, St and Fr. St.

When observing the cloud forms the darkness has caused even still greater difficulties than in estimating the amount of clouds.

Precipitation has been noted as rain, snow, sleet, fog (mist) and haze. As most of the notes about precipitation were made at the term hours of observation, the kind of precipitation has been indicated by symbols in the column headed "Amount of Clouds" after the numbers.

Observations of Aurora were entered in a separate book giving a short description of the display, the time, the position in the sky, and partly an estimate of the height and of the extension. The number of aurorae amounts to 90, besides 1 in September and 3 in October 1903, observed on board the Gjøa, when lying in the harbour.

Rings round the Sun and the Moon, (Halos and Corona), besides other optical phenomena, are entered in another note book. Five notes refer to cirrus-like bands and stripes across the sky through the Zenith. These phenomena may be classed among Aurorae.

The Material is to be found in Nos. 1, 2, 5, 6, 7, 10, 12, 14, 16, 17, 18 and 19 of the List (page 15). No. 1 and No. 2 contain barograms and thermograms, Nos. 5—7 are copies of Nos. 16—19, which contain the original observations. The original diaries have been compared with the copies and thus two controlled sets of the same observations are available. No. 10 is the Aurora Journal, No. 12 contains "Remarks to the Meteorological Observations," and the corrections of the thermometers. No. 14 contains additional meteorological observations by the observer P. Ristvedt, who explains: "This book contains observations which could not, on account of the small space, be entered in the journal under the heading "Remarks"." It gives data as to optical phenomena, and possibly reference to five displays of Aurora.

The Height of the Various Instruments above the ground has partly been mentioned before, when dealing with the separate instruments. We shall here collate the various determinations, besides what is further necessary. We found:

Height above	sea level of the Hill	H = 20	m.
»	» sea level of the cistern of the mercury barometer	H_b = 21	»
»	» ground of the bulb of the mercury thermometer	h = 1.95	»
»	» ground of the rain gauge	h_r = 1.00	»
»	» ground of the snow gauge	h_r = 2.50	»

However, the temperature was measured by sling thermometer, the height of which has to be referred to the height of the hand which may be estimated at 1.25 m. The height above ground of the hair hygrometer may be put at 2.00 m., and that of the anemometer at about 1.8 m. The vane was 4 metres above ground, as mentioned in the Introduction.

Only the height above sea level of the Hill itself and the height of the flag-pole with the vane on top are actually stated in "Remarks". The height of the gauges, while placed on the ground, is entered according to verbal information from Ristvedt. The rest of the measurements are estimated and are therefore more uncertain, and especially the height of the anemometer is doubtful. The uncertainty here is at least a quarter of a meter, as the height of the cups depends on the way in which the anemometer is carried. However, it seems natural to hold the instrument in such manner that the small window for reading is level with the eye. The cups then should be about 1.75 metres above ground.

Results of Continuous Records.

Pressure. — The hourly values of the pressure (in mm.) are given in Table II, which also shows year and month, name of station, latitude (φ) and longitude (λ), and the applied reduction to standard gravity. The series starts at noon on the 16th

of November 1903, but the values for the hours from 1 to 11 a. m. have been extrapolated. The means for the days are placed in the last vertical column to the right and the hourly means in the second last line at the bottom. The bottom line," Corr. M" (Corrected Mean), contains the means reduced to noon according to the usual method. [1])

The record was ended at 9 o' clock a. m. on the 31st of July 1905, but values for the remaining part of that day have been extrapolated by means of the observations at 3 and 9 p. m. A few gaps have been filled by interpolation. All extrapolated and interpolated values are printed in italics as well as a few of the hour observations, which it has been found necessay to change.

The Daily Period. The deviations of the corrected mean of the hourly values from their common mean have been calculated and entered in the table below, expressed in hundredths of a millimeter. Minus means below and plus above the mean.

In order to obtain a complete month also for November 1903, where the records do not begin till the middle of the month, I have computed the differences at 9 a. m., 3 p. m. and 9 p. m. between means for 29 days (2nd—30th) and for 15 days (16th—30th):

	9 a. m.	3 p. m.	9 p. m.
2—30	760.49	760.53	760.41
16—30	63.39	63.16	62.65
Diff.	— 2.90	— 2.63	— 2.24

These values have been plotted on co-ordinate paper and a freehand curve has been drawn. The curve has then been extended to midnight on both sides, after comparison with a full month, which was treated as if it were incomplete. For this comparison the next month, December, was selected, having a period very similar to that for November. In this way the following hourly means for the 29 days, 2nd to 30th of November, were obtained:

Means	0	1	2	3	4	5	6	7	8	9	10	11	Noon
(2—30)	60.36	60.41	60.48	60.52	60.56	60.57	60.56	60.55	60.54	60.49	60.46	60.42	60.34
Corr. Mean ..	60.47	60.51	60.57	60.60	60.63	60.63	60.61	60.59	60.58	60.52	60.48	60.43	60.34
Deviation ..	— 0.01	+ 0.03	+ 0.09	+ 0.12	+ 0.15	+ 0.15	+ 0.13	+ 0.11	+ 0.10	+ 0.04	0.00	— 0.05	—0.14

Means	1	2	3	4	5	6	7	8	9	10	11	Midt.	Mean
(2—30)	60.28	60.28	60.53	60.52	60.63	60.60	60.58	60.42	60.41	60.44	60.55	60.59	60.49
Corr. Mean ..	60.27	60.26	60.50	60.48	60.59	60.55	60.52	60.35	60.33	60.35	60.45	60.48	60.48
Deviation ..	— 0.21	— 0.22	+ 0.02	0.00	+ 0.11	+ 0.07	+ 0.04	— 0.13	— 0.15	— 0.13	— 0.03	0.00	

[1]) H. Wild; Die Temperaturverhältnisse des Russischen Reiches. Erste Hälfte. Page 9.

Pressure, Diurnal Period 0.01 mm., Deviation from Mean.

Gjøahavn.
Pressure. 0.01 mm. Deviation.

Daily Period.

Year	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midt	Days
January.																									
1904	+ 9	+ 13	+ 9	+ 9	+ 12	+ 9	− 7	− 14	− 21	− 22	− 22	− 30	− 26	− 21	+ 1	+ 12	+ 30	+ 32	+ 15	+ 5	0	+ 6	+ 1	+ 7	31
1905	− 68	− 65	− 58	− 44	− 28	− 18	+ 3	+ 14	+ 30	+ 38	+ 50	+ 53	+ 53	+ 59	+ 68	+ 52	+ 45	+ 31	+ 11	− 7	− 38	− 60	− 62	− 68	31
Mean	− 30	− 26	− 24	− 18	− 8	− 4	− 2	0	+ 5	+ 8	+ 14	+ 11	+ 14	+ 19	+ 34	+ 32	+ 38	+ 31	+ 13	− 1	− 19	− 27	− 30	− 30	
February.																									
1904	0	+ 7	+ 10	+ 16	+ 13	+ 7	+ 7	+ 4	− 1	− 7	− 7	− 6	− 9	+ 1	+ 8	+ 6	+ 1	− 2	0	− 4	− 14	− 10	− 8	0	29
1905	+ 7	+ 13	+ 11	+ 10	+ 4	− 1	− 3	− 8	− 9	− 13	− 16	− 19	− 18	− 16	− 3	+ 1	+ 10	+ 13	+ 15	+ 15	+ 5	− 5	+ 1	+ 2	28
Mean	+ 4	+ 10	+ 10	+ 13	+ 8	+ 3	+ 2	− 2	− 5	− 10	− 12	− 13	− 14	− 8	+ 2	+ 4	+ 5	+ 6	+ 7	+ 5	− 5	− 7	− 4	+ 1	
March.																									
1904	+ 6	+ 14	+ 4	+ 5	+ 3	0	− 5	− 19	− 21	− 23	− 27	− 25	− 19	+ 14	+ 13	+ 21	+ 26	+ 14	+ 13	+ 2	− 3	− 2	− 1	+ 1	31
1905	− 11	− 5	− 4	− 2	+ 1	− 2	− 3	− 1	− 1	− 6	− 9	− 7	− 3	+ 3	+ 16	+ 24	+ 24	+ 15	+ 15	+ 3	− 5	− 11	− 16	− 21	31
Mean	− 2	+ 5	0	+ 2	+ 2	− 1	− 4	− 10	− 11	− 14	− 18	− 16	− 11	+ 9	+ 15	+ 23	+ 25	+ 15	+ 14	+ 3	− 4	− 6	− 8	− 10	
April.																									
1904	+ 14	+ 21	+ 16	+ 23	+ 29	+ 19	+ 18	+ 5	− 10	− 23	− 24	− 21	− 17	− 20	− 2	+ 2	+ 7	− 4	− 5	− 7	− 13	− 9	− 1	+ 11	30
1905	− 17	− 16	− 17	− 14	− 5	− 1	− 4	− 6	+ 3	+ 3	− 1	− 1	+ 5	+ 8	+ 17	+ 21	+ 25	+ 26	+ 19	+ 11	− 1	− 11	− 18	− 20	30
Mean	− 2	+ 2	− 1	+ 4	+ 12	+ 9	+ 7	− 1	− 4	− 10	− 13	− 11	− 6	− 6	+ 7	+ 11	+ 16	+ 11	+ 7	+ 2	− 7	− 10	− 10	− 5	
May.																									
1904	+ 2	+ 1	0	+ 1	+ 1	− 2	+ 2	+ 1	− 4	− 10	− 7	− 6	− 2	+ 2	+ 10	+ 14	+ 11	+ 9	+ 6	− 5	− 5	− 6	− 4	− 4	31
1905	− 9	− 8	− 11	− 12	− 11	− 9	− 11	− 11	− 16	− 10	− 10	− 8	− 2	+ 5	+ 12	+ 18	+ 23	+ 20	+ 18	+ 16	+ 9	+ 2	− 2	− 4	31
Mean	− 3	− 3	− 5	− 5	− 5	− 5	− 5	− 5	− 10	− 10	− 8	− 7	− 2	+ 4	+ 11	+ 16	+ 17	+ 14	+ 12	+ 6	+ 2	− 2	− 3	− 4	
June.																									
1904	− 1	0	+ 7	+ 8	+ 7	+ 5	− 1	− 8	− 14	− 19	− 15	− 6	− 5	− 1	0	+ 2	+ 4	+ 10	+ 10	+ 1	+ 6	+ 5	0	+ 3	30
1905	+ 14	+ 10	+ 5	+ 2	0	+ 1	− 1	− 2	− 8	− 8	− 13	− 16	− 14	− 11	+ 2	+ 5	+ 4	+ 5	+ 5	+ 4	+ 3	+ 1	+ 3	+ 7	30
Mean	+ 7	+ 5	+ 6	+ 5	+ 4	+ 3	− 1	− 5	− 11	− 13	− 14	− 11	− 9	− 6	+ 1	+ 3	+ 4	+ 8	+ 7	+ 3	+ 4	+ 3	+ 2	+ 5	

Pressure, Diurnal Period 0.01 mm., Deviation from Mean.

July.

1904	+	4	+	5	+	3	+	6	+	9	+	11	+	8	+	8	+	2	−	6	−	13	−	18	−	22	−	26	−	21	−	10	−	3	+	3	+	7	+	12	+	16	+	14	+	12	+	7	31
1905	−	8	−	12	−	10	−	7	−	7	−	5	−	1	−	1	+	3	+	8	+	6	+	6	+	5	+	8	+	11	+	10	+	4	−	1		0	−	4	−	7	−	1	−	3	−	7	31
Mean	−	2	−	3	−	3		0	+	1	+	3	+	4	+	4	+	3	+	1	−	3	−	6	−	9	−	9	−	5		0		0	+	1	+	3	+	4	+	5	+	6	+	5		0	

August.

1904	+	9	+	5	+	2	+	4	+	5	+	3	−	8	−	18	−	23	−	24	−	28	−	21	−	19	−	16	−	5	+	5	+	13	+	16	+	20	+	22	+	20	+	15	+	16	+	12	31

September.

1904	−	14	−	15	−	19	−	17	−	19	−	16	−	17	−	14	−	9	−	8	−	7	+	2	+	8	+	11	+	20	+	25	+	24	+	25	+	22	+	13	+	6	+	1	−	6	−	9	30

October.

1904	−	7	−	5	−	7	−	5	−	4	−	6	−	8	−	10	−	13	−	12	−	9	−	10		0	+	6	+	18	+	18	+	19	+	22	+	19	+	14	+	6	−	5	−	4	−	6	31

November.

1903	+	3	+	9	+	12	+	15	+	15	+	13	+	11	+	10	+	4		0	−	5	−	14	−	21	−	22	+	2		0	+	11	+	7	+	4	−	13	−	15	−	13	−	3		0	29
1904	+	9	+	12	+	16	+	15	+	14	+	12	+	12	+	6	+	4	+	1	−	12	−	18	−	18	−	13	−	4		0	−	3		0		0	−	12	−	6	−	6	−	1	+	4	30
Mean	+	6	+	10	+	14	+	15	+	14	+	12	+	11	+	8	+	4		0	−	9	−	16	−	20	−	18	−	1		0	+	4	+	3	+	2	−	13	−	11	−	10	−	2	+	2	

December.

1903	−	2	+	5	+	8	+	13	+	14	+	14	+	10	+	8	+	1	−	8	−	12	−	19	−	18	−	12	+	15	+	26	+	24	+	18	+	2	−	13	−	27	−	24	−	20	−	10	31
1904	−	5	−	7	−	12	−	4	−	9	−	20	−	29	−	32	−	32	−	27	−	18	−	9	+	5	+	24	+	41	+	40	+	35	+	32	+	22	+	10	+	7	−	2	−	2	+	1	31
Mean	−	3	−	1	−	2	+	4	+	3	−	3	−	10	−	12	−	15	−	18	−	15	−	14	−	6	+	6	+	28	+	33	+	29	+	25	+	12	−	2	−	10	−	13	−	11	−	4	

Seasons and Year.

Winter	−	10	−	6	−	5		0	+	1	−	2	−	3	−	5	−	5	−	7	−	4	−	5	−	2	+	5	+	21	+	23	+	24	+	21	+	11	+	1	−	11	−	16	−	15	−	11	
Spring	−	3	+	1	−	2		0	+	3	+	1	−	1	−	5	−	8	−	11	−	13	−	11	−	6	+	2	+	11	+	17	+	20	+	13	+	11	+	3	−	3	−	6	−	7	−	6	
Summer	+	4	+	2	+	2	+	3	+	3	+	3	−	2	−	7	−	11	−	12	−	15	−	13	−	12	−	10	−	3	+	3	+	6	+	8	+	10	+	10	+	10	+	8	+	7	+	6	
Autumn	−	5	−	3	−	4	−	2	−	3	−	3	−	5	−	6	−	6	−	7	−	8	−	8	−	4		0	+	12	+	14	+	15	+	17	+	14	+	5		0	−	4	−	4	−	5	
Year	−	3	−	1	−	2		0	+	1		0	−	3	−	6	−	8	−	9	−	10	−	9	−	6	−	1	+	10	+	14	+	16	+	15	+	12	+	5	−	1	−	5	−	5	−	4	

Gjøahavn.
Pressure. 0.01 mm. Deviation.

Daily Period.

Observed (o) and computed (c) mean values, and their difference (d = o—c).

	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midt.
January.																								
o	—30	—26	—24	—18	— 8	— 4	— 2	0	+ 5	+ 8	+ 14	+ 11	+ 14	+ 19	+ 34	+ 32	+ 38	+ 31	+ 13	— 1	— 19	— 26	— 30	— 30
c	—29	—25	—21	—17	—12	— 7	— 1	+ 4	+ 7	+ 8	+ 9	+ 11	+ 16	+ 22	+ 30	+ 36	+ 35	+ 28	+ 14	— 1	— 16	— 27	— 32	— 32
d	— 1	— 1	— 3	— 1	+ 4	+ 3	— 1	— 4	— 2	0	+ 5	0	— 2	— 3	+ 4	— 4	+ 3	+ 3	— 1	0	— 3	0	— 2	— 2
February.																								
o	+ 4	+ 10	+ 10	+ 13	+ 8	+ 3	+ 2	— 2	— 5	—10	—12	—13	—14	— 8	+ 2	+ 4	+ 5	+ 6	+ 7	+ 5	— 5	— 7	— 4	+ 1
c	+ 7	+ 11	+ 14	+ 12	+ 9	+ 5	— 1	— 5	— 9	—12	—14	—15	—13	— 9	— 3	+ 4	+ 8	+ 9	+ 7	+ 2	— 2	— 4	— 3	+ 2
d	— 3	— 1	— 4	+ 1	— 1	— 2	+ 3	+ 3	+ 4	+ 2	+ 2	+ 2	— 1	+ 1	+ 5	0	— 3	— 3	0	+ 3	— 3	— 3	— 1	— 1
March.																								
o	— 2	+ 5	0	+ 2	+ 2	— 1	— 4	—10	—11	—14	—18	—16	—11	+ 9	+ 15	+ 23	+ 25	+ 15	+ 14	+ 3	— 4	— 6	— 8	—10
c	— 1	+ 1	+ 2	+ 2	+ 1	— 1	— 4	— 8	—13	—16	—17	—14	— 6	+ 5	+ 15	+ 22	+ 23	+ 19	+ 11	+ 3	— 4	— 8	— 7	— 5
d	— 1	+ 4	— 2	0	+ 1	0	0	— 2	+ 2	+ 2	— 1	— 2	— 5	+ 4	0	+ 1	+ 2	— 4	+ 3	0	0	+ 2	— 1	— 5
April.																								
o	— 2	+ 2	— 1	+ 4	+12	+ 9	+ 7	— 1	— 4	—10	—13	—11	— 6	— 6	+ 7	+ 11	+ 16	+ 11	+ 7	+ 2	— 7	—10	—10	— 5
c	— 4	0	+ 4	+ 6	+ 8	+ 8	+ 6	+ 1	— 4	— 9	—13	—13	— 9	— 2	+ 6	+ 12	+ 14	+ 12	+ 7	0	— 5	— 9	— 9	— 7
d	+ 2	+ 2	— 5	— 2	+ 4	+ 1	+ 1	— 2	0	— 1	0	+ 2	+ 3	— 4	+ 1	— 1	+ 2	— 1	0	+ 2	— 2	— 1	— 1	+ 2
May.																								
o	— 3	— 3	— 5	— 5	— 5	— 5	— 5	— 5	—10	—10	— 8	— 7	— 2	+ 4	+ 11	+ 16	+ 17	+ 14	+ 12	+ 6	+ 2	— 2	— 3	— 4
c	— 4	— 4	— 4	— 5	— 5	— 5	— 5	— 7	— 8	— 9	— 9	— 7	— 2	+ 4	+ 11	+ 15	+ 17	+ 15	+ 11	+ 6	+ 2	— 1	— 3	— 3
d	+ 1	+ 1	— 1	0	0	0	0	+ 2	— 2	— 1	+ 1	0	0	0	0	+ 1	0	+ 1	+ 1	0	0	— 1	0	— 1
June.																								
o	+ 7	+ 5	+ 6	+ 5	+ 4	+ 3	— 1	— 5	—11	—13	—14	—11	— 9	— 6	+ 1	+ 3	+ 4	+ 8	+ 7	+ 3	+ 4	+ 3	+ 2	+ 5
c	+ 5	+ 6	+ 6	+ 6	+ 5	+ 2	— 1	— 6	—10	—13	—14	—12	— 9	— 5	0	+ 4	+ 6	+ 6	+ 6	+ 4	+ 4	+ 3	+ 3	+ 4
d	+ 2	— 1	0	— 1	— 1	+ 1	0	+ 1	— 1	0	0	+ 1	0	— 1	+ 1	— 1	— 2	+ 2	+ 1	— 1	0	0	— 1	+ 1
July.																								
o	— 2	— 3	— 3	0	+ 1	+ 3	+ 4	+ 4	+ 3	+ 1	— 3	— 6	— 9	— 9	— 5	0	0	+ 1	+ 3	+ 4	+ 5	+ 6	+ 5	0
c	— 1	— 3	— 3	— 2	+ 1	+ 3	+ 5	+ 5	+ 3	0	— 4	— 6	— 8	— 7	— 5	— 3	0	+ 2	+ 4	+ 5	+ 5	+ 5	+ 3	+ 1
d	— 1	0	0	+ 2	0	0	— 1	— 1	0	+ 1	+ 1	0	— 1	— 2	0	+ 3	0	— 1	— 1	— 1	0	+ 1	+ 2	— 1
August.																								
o	+ 9	+ 5	+ 2	+ 4	+ 5	+ 3	— 8	—18	—23	—24	—28	—21	—19	—16	— 5	+ 5	+ 13	+ 16	+ 20	+ 22	+ 20	+ 15	+ 16	+ 12
c	+ 7	+ 6	+ 5	+ 5	+ 3	— 1	— 8	—15	—22	—26	—27	—25	—20	—12	— 4	+ 4	+ 11	+ 16	+ 20	+ 21	+ 20	+ 18	+ 14	+ 10
d	+ 2	— 1	— 3	— 1	+ 2	+ 4	0	— 3	— 1	+ 2	— 1	+ 4	+ 1	— 4	— 1	+ 1	+ 2	0	0	+ 1	0	— 3	+ 2	+ 2

The next table shows the observed (o) Means in the preceding tables for the de-

viation and the computed (c) values of the deviations and their difference (d = o — c).

September.

o	—	14	—	15	—	19	—	17	—	19	—	16	—	17	—	14	—	9	—	8	—	7	+	2	+	8	+	11	+	20	+	25	+	24	+	25	+	22	+	13	+	6	+	1	—	6	—	9
c	—	13	—	15	—	17	—	18	—	18	—	17	—	15	—	13	—	10	—	7	—	4	+	1	+	7	+	14	+	20	+	24	+	26	+	25	+	21	+	15	+	7	+	1	—	5	—	9
d	—	1		0	—	2	+	1	—	1	+	1	—	2	—	1	+	1	—	1	—	3	+	1	+	1	—	3		0	+	1	—	2		0	+	1	—	2	—	1		0	—	1		0

October.

o	—	7	—	5	—	7	—	5	—	4	—	6	—	8	—	10	—	13	—	12	—	9	—	10		0	+	6	+	18	+	18	+	19	+	22	+	19	+	14	+	6	—	5	—	4	—	6
c	—	8	—	7	—	6	—	5	—	5	—	6	—	9	—	11	—	13	—	13	—	11	—	7	—	1	+	6	+	14	+	19	+	22	+	21	+	17	+	11	+	5	—	1	—	5	—	7
d	+	1	+	2	—	1		0	+	1		0	+	1	+	1		0	+	1	+	2	—	3	+	1		0	+	4	—	1	—	3	+	1	+	2	+	3	+	1	—	4	+	1	+	1

November.

o	+	6	+	10	+	14	+	15	+	14	+	12	+	11	+	8	+	4		0	—	9	—	16	—	20	—	18	—	1		0	+	4	+	3	+	2	—	13	—	11	—	10	—	2	+	2
c	+	9	+	13	+	14	+	13	+	12	+	12	+	11	+	9	+	4	—	3	—	11	—	16	—	18	—	14	—	6	+	1	+	4	+	3	—	2	—	8	—	12	—	11	—	6	+	2
d	—	3	—	3		0	+	2	+	2		0		0	—	1		0	+	3	+	2		0	—	2	—	4	+	5	—	1		0		0	+	4	—	5	+	1	+	1	+	4		0

December.

o	—	3	—	1	—	2	+	4	+	3	—	3	—	10	—	12	—	15	—	18	—	15	—	14	—	6	+	6	+	28	+	33	+	29	+	25	+	12	—	2	—	10	—	13	—	11	—	4
c	—	2	+	1	+	2	+	1	—	1	—	3	—	6	—	11	—	15	—	19	—	19	—	14	—	3	+	10	+	23	+	31	+	32	+	24	+	12	—	1	—	10	—	13	—	12	—	7
d	—	1	—	2	—	4	+	3	+	4		0	—	4	—	1		0	+	1	+	4		0	—	3	—	4	+	5	+	2	—	3	+	1		0	—	1		0		0	+	1	+	3

Winter.

o	—	10	—	6	—	5		0	+	1	—	2	—	3	—	5	—	5	—	7	—	4	—	5	—	2	+	5	+	21	+	23	+	24	+	21	+	11	+	1	—	11	—	16	—	15	—	11
c	—	9	—	5	—	3	—	2	—	1	—	2	—	2	—	4	—	5	—	7	—	7	—	5		0	+	8	+	17	+	23	+	25	+	21	+	11		0	—	9	—	15	—	16	—	13
d	—	1	—	1	—	2	+	2	+	2		0	—	1	—	1		0		0	+	3		0	—	2	—	3	+	4		0	—	1		0		0	+	1	—	2	—	1	+	1	+	2

Spring.

o	—	3	+	1	—	2		0	+	3	+	1	—	1	—	5	—	8	—	11	—	13	—	11	—	6	+	2	+	11	+	17	+	20	+	13	+	11	+	3	—	3	—	6	—	7	—	6
c	—	3	—	1		0	+	1	+	1	+	1	—	1	—	4	—	8	—	12	—	13	—	11	—	6	+	2	+	11	+	17	+	18	+	16	+	10	+	3	—	3	—	6	—	7	—	5
d		0	+	2	—	2	—	1	+	2		0		0	—	1		0	+	1		0		0		0		0		0	+	2	—	3	+	1		0		0		0		0	—	1

Summer.

o	+	4	+	2	+	2	+	3	+	3	+	3	—	2	—	7	—	11	—	12	—	15	—	13	—	12	—	10	—	3	+	3	+	6	+	8	+	10	+	10	+	10	+	8	+	7	+	6
c	+	4	+	3	+	3	+	3	+	3	+	1	—	2	—	6	—	10	—	13	—	15	—	14	—	12	—	8	—	3	+	2	+	6	+	8	+	10	+	10	+	10	+	8	+	7	+	5
d		0	—	1	—	1		0		0	+	2		0	—	1	—	1	+	1		0	+	1		0	—	2		0	+	1		0		0		0		0		0		0	+	1

Autumn.

o	—	5	—	3	—	4	—	2	—	3	—	3	—	5	—	6	—	6	—	7	—	8	—	8	—	4		0	+	12	+	14	+	15	+	17	+	14	+	5		0	—	4	—	4	—	5
c	—	6	—	6	—	4	—	3	—	2	—	1	—	3	—	5	—	8	—	10	—	10	—	7	—	2	+	4	+	10	+	14	+	16	+	14	+	11	+	6	+	2	—	1	—	4	—	5
d	+	1	+	3		0	+	1	—	1	—	2	—	2	—	1	+	2	+	3	+	2	—	1	—	2	—	4	+	2		0	—	1	+	3	+	3	—	1	—	2	—	3		0		0

Year.

o	—	3	—	1	—	2		0	+	1		0	—	3	—	6	—	8	—	9	—	10	—	9	—	6	—	1	+	10	+	14	+	16	+	15	+	12	+	5	—	1	—	5	—	5	—	4
c	—	3	—	1		0		0		0	—	1	—	3	—	5	—	8	—	10	—	11	—	9	—	5	+	1	+	8	+	14	+	17	+	15	+	11	+	5	—	1	—	4	—	5	—	5
d		0		0	—	2		0	+	1	+	1		0	—	1		0	+	1	+	1		0	—	1	—	2	+	2		0	—	1		0	+	1		0		0	—	1		0	+	1

The last column of the table gives for each month the number of days on which the calculation is based. All the months have values for two years except August, September and October, which have only one year. When two years are given, an arithmetic mean has been taken and, as far as possible, plus and minus are given equal weight.

The last part of the table gives the means for the meteorological seasons (Dec.—Feb., etc.) and for the year.

The means for each month, season and year have been represented by means of Bessels Formula.

$$p_z - p_m = a_1 \sin (A_1 + t) + a_2 \sin (A_2 + 2t) + a_3 \sin (A_3 + 3t)$$

where t is reckoned from midnight. The *Constants* of the formula are

Month, Season, Year	a_1	A_1	a_2	A_2	a_3	A_3
	mm.	° ′	mm.	° ′	mm.	° ′
January	0.276	240 3	0.117	293 51	0.043	32 28
February	0.083	84 59	0.086	309 19	0.027	9 2
March	0.090	171 1	0.124	313 28	0.034	65 28
April	0.014	147 11	0.110	295 45	0.023	68 40
May	0.094	180 39	0.061	302 31	0.020	71 20
June	0.080	106 44	0.051	306 18	0.007	99 2
July	0.028	82 53	0.048	212 32	0.012	102 40
August	0.206	119 35	0.075	274 13	0.014	195 46
September	0.210	196 29	0.044	289 40	0.011	43 8
October	0.134	181 28	0.083	297 43	0.005	27 21
November	0.101	31 12	0.003	297 3	0.057	42 52
December	0.117	185 23	0.162	320 19	0.050	65 48
Winter	0.103	217 26	0.118	307 40	0.037	37 9
Spring	0.065	175 50	0.099	303 33	0.027	68 26
Summer	0.103	114 25	0.048	269 36	0.007	152 34
Autumn	0.083	181 58	0.070	294 53	0.015	112 42
Year	0.069	172 11	0.082	298 55	0.020	44 40

The extremes of the daily period for pressure are calculated according to the parabolic formula[1]):

$$y = \frac{1}{4}(c - a)\,x, \qquad x = \frac{1}{4} \cdot \frac{c - a}{b - \frac{1}{2}(c + a)}$$

where y means the value of the extreme, x its epoch, a, b, c the values of the three neighbouring hourly means.

The values for *Minima* and *Maxima* are:

Months	1st Minimum		1st Maximum		2nd Minimum		2nd Maximum	
	mm.	h. m.	mm.	h. m.	mm.	h. m.	mm.	h. m.
January	− 0.326	11 34 p.m					+ 0.363	4 27 p.m
February	− 0.040	10 6 p.m	+ 0.141	3 7 a.m	− 0.154	11 54 a.m	+ 0.088	5 47 p.m
March	− 0.079	10 22 p.m	+ 0.026	3 19 a.m	− 0.171	10 40 a.m	+ 0.235	4 45 p.m
April	− 0.092	10 40 p.m	+ 0.089	5 26 a.m	− 0.132	11 25 a.m	+ 0.139	5 1 p.m
May					− 0.095	10 26 a.m	+ 0.171	4 59 p.m
June	+ 0.031	10 3 p.m	+ 0.062	2 50 a.m	− 0.137	10 59 a.m	+ 0.063	5 57 p.m
July	− 0.030	2 42 a.m	+ 0.051	7 34 a.m	− 0.076	1 9 p.m	+ 0.052	9 0 p.m
August					− 0.274	10 49 a.m	+ 0.214	8 8 p.m
September	− 0.178	4 30 a.m					+ 0.265	5 5 p.m
October	− 0.077	0 45 a.m	− 0.050	4 15 a.m	− 0.130	9 41 a.m	+ 0.220	5 21 p.m
November	− 0.121	9 18 p.m	+ 0.140	3 9 a.m	− 0.177	12 42 p.m	+ 0.044	5 14 p.m
December	− 0.134	10 10 p.m	+ 0.017	3 4 a.m	− 0.195	10 27 a.m	+ 0.323	4 31 p.m
Winter	− 0.162	10 46 p.m	− 0.014	4 42 a.m	− 0.074	10 43 a.m	+ 0.250	4 45 p.m
Spring	− 0.068	10 46 p.m	+ 0.013	4 53 a.m	− 0.131	10 57 a.m	+ 0.185	4 53 p.m
Summer	+ 0.028	2 30 a.m	+ 0.031	3 47 a.m	− 0.151	11 16 a.m	+ 0.105	7 58 p.m
Autumn	− 0.058	1 15 a.m	− 0.063	5 45 a.m	− 0.105	10 30 a.m	+ 0.155	4 54 p.m
Year	− 0.055	11 9 p.m	+ 0.001	4 0 a.m	− 0.111	10 34 a.m	+ 0.166	5 12 p.m

[1]) H. Mohn: Meteorology. The Norwegian North Polar Expedition 1893—1896. Scientific Results, Vol. VI, p. 469.

As will be seen, the double wave is frequently almost blurred. Especially does this apply to the forenoon-wave during the summer half-year. However, all curves suggest the presence of a double wave.

From the observations of the second Fram Expedition, 1898—1902, ("Fram II"), Professor Mohn has for the Ellesmere Land, at a mean latitude for the four winter quarters of 77° 11′, found: [1]):

	1st Minimum		1st Maximum		2nd Minimum		2nd Maximum	
	mm.	h. m	mm.	h. m	mm.	h. m.	mm.	h. m.
Year	+ 0.115	0 57 a.m	+ 0.002	6 31 a.m	− 0.058	11 0 a.m	+ 0.158	5 48 p.m

The Annual Period. The mean pressures for each month, as derived from Table II, are:

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											(763.25)	760.06
1904	761.55	762.60	764.93	765.09	761.17	762.65	758.22	754.30	759.58	760.43	761.82	760.13
1905	64.20	64.09	62.77	65.88	64.50	60.80	59.72					
Mean	762.88	763.34	763.85	765.48	762.84	761.72	758.97	754.30	759.58	760.43	762.54	760.10
Sm.	762.25	763.35	764.13	764.41	763.22	761.31	758.49	756.79	758.48	760.68	761.28	761.34

The value from the incomplete November 1903, is enclosed in brackets. The mean values, which for November is based on 45 days, give a somewhat irregular curve with two maxima, in April and November, and two minima, in August and December. After smoothing by the formula, $s = \frac{1}{4}(a + 2b + c)$, the curve gets a more regular course with extremes in the same months, except that the maximum in November and the minimum in December disappear. These smoothed values are given in the lowest row of figures in the table. The range of the direct monthly means is 765.48 — 754.30 = 11.18 mm., and the mean for the year is 761.32 mm.

From the observations of "Fram II", Professor Mohn found a yearly period with maximum in March and November and with minimum in January and August. The range was found to be 11.8 mm. and the mean of the year 761.40 mm.

The lowest recorded pressures are.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....											(48,7)	41.5
1904.....	48.0	39.1	43.5	43.1	35.5	42.2	46.2	38.7	46.5	45.1	44.2	44.1
1905.....	30.0	46.9	44.2	54.6	52.2	42.9	43.9					
Mean	39.0	43.0	43.8	48.8	43.9	42.6	45.0	38.7	46.5	45.1	46.5	42.8
Smoothed	41.0	42.2	44.9	46.3	44.8	43.5	42.8	42.2	44.2	45.8	45.2	42.8

The smoothed curve shows maximum in April and October and minimum in January and August. The lowest pressure, 730.0, was recorded on the 14th of January 1905, at 3 o'clock in the morning. At 9 p. m. on the preceding evening a south wind was blowing with a velocity of 9 m. p. s. and snow was falling. In the morning of the 14th at 9 a. m. there blew north wind of 9 m. p. s. which increased to quite a storm towards

[1]) Rep. of the Sec. Norw. Arct. Exp. in the Fram, 1898—1902, page 56.

the evening, with clearing sky, the amount of clouds being 2 in the morning and 0 in the evening. The temperature was—19.5° at 9 p. m. on the 13th and—33.5° at 9 p.m on the 14th.

"Fram II": Maximum in May and minimum in January.

The highest recorded pressures are:

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....											(76.0)	70.1
1904.....	76.2	82.2	83.8	78.1	73.2	75.7	65.5	64.1	74.8	74.6	76.0	71.2
1905.....	87.9	78.5	74.5	79.8	72.2	71.1	67.8					
Mean	82.0	80.4	79.2	79.0	72.7	73.4	66.6	64.1	74.8	74.6	76.0	70.6
Smoothed	78.8	80.5	79.5	77.5	74.5	71.5	67.7	67.4	72.1	75.0	74.3	74.8

The smoothed curve shows maximum in February and October and minimum in August and November. The highest recorded pressure, 787.9 the 30th of January 1905, at 3 o'clock in the afternoon, occurred in the same month as the lowest pressure. The air was calm, the sky half-clear and the temperature was —35.5° C.

„Fram II": Maximum in February, minimum in August.

The differences between the highest and lowest mean pressure of each month are:

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
43.0	37.4	35.4	30.2	28.8	30.8	21.6	25.4	28.3	29.5	29.5	27.8

The variation of the pressure is greatest in January and least in July, greatest in winter, least in summer.

"Fram II": Greatest in February, least in August, greatest in winter, least in summer.

Temperature of the Air.— Table III contains the temperature at each hour, as derived from the corrected diagrams. The recording was started at 12 o'clock noon, the 2nd of November 1903, and ended at 9 o'clock in the forenoon on the 31st of July 1905.

Both days have been completed by extrapolation based on the term observations and, as far as possible, on the readings of the extremes. As mentioned on page 40, several stops occurred, especially in the beginning, before the observers had gained acquaintance with the instruments. These and other gaps, occurring from various reasons, have been filled out by interpolations, based on the term observations and the extremes, even if the gap, as sometimes happens, extends over several days in succession. The incomplete material had in one way or other to be amplified and it seemed best to fill up all the gaps, having reliable term observations and at any rate one of the extremes upon which the interpolation could be based. Also those portions of the diagram where the pen no doubt had been working, but had written a straight line, were considered as gaps. Such portions especially occurred when the reserve thermograph 9368 was used during one week in April 1904. All the extrapolated or interpolated values are printed in italics.

The tables give for each day the hourly means for the 24 hours of the day, 1 a. m. to 12 p. m., in the first column to the right of the hours, headed "Mean." The four following columns give the maximum and the minumum for each day with the time of occurrence, the last column gives the difference between the maximum and the minimum. As mentioned on page 12, these extremes have been derived from the corrected curves, as the observations of the extremes were encumbered with mistakes and misunderstandings. The given values are probably correct within some few tenths. The

time is given in whole hours, in tenths and in half tenths of the hour, and with the sign minus when the time lies before a fixed standard point, and with plus (no sign) when after. This standard point is for the maximum put at noon and hence the forenoon hours get negative sign and the afternoon hours positive sign up to and including midnight on both sides. For the minimum the standard point is put at midnight, and the forenoon with its hours up to and including noon get positive sign, while the afternoon gets negative. The following gives a general view as to the designation used

	M	1	2	3	4	5	6	7	8	9	10	11	N	1	2	3	4	5	6	7	8	9	10	11	M
Max.:	—12,	—11,	—10,	—9,	—8,	—7,	—6,	—5,	—4,	—3,	—2,	—1,	0,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,
Min.:	0,	1,	2,	3,	4,	5,	6,	7,	8,	9,	10,	11,	12,	—11,	—10,	—9,	—8,	—7,	—6,	—5,	—4,	—3,	—2,	—1,	—0,

where M means midnight and N noon. This way of indicating the time, which is used at the Norwegian Meteorological Institute, Oslo, is somewhat difficult to decipher, but the numbers are convenient for computations.

The second last row of figures, headed "Mean", contains the monthly means for each of the 24 hours, the mean of the maximum and minimum, with their times of occurrence and their difference. The lowest line, marked Corr. M. (Corrected Mean), contains the hourly means reduced to noon in the usual way (H. Wild, Die Temperaturverhältnisse des Russ. Reiches).

Table III also gives in the headings: The year, the mean of the month, the name of the station, latitude (φ), longitude (λ) and the height above ground of the bulb of the thermometer, referred to the hand slinging the thermometer. Interpolated values are as stated, printed in italics, and the same applies to readings which it has been necessary to correct.

The Daily Period. In computing the daily period, the same method has been adopted as used when discussing the pressure. The figures express the deviations in hundredths of a degree centigrade.

The *Constants* of the Harmonic Analysis are:

Month, Season, Year	a_1	A_1	a_2	A_2	a_3	A_3
	m.m.	° ′	m.m.	° ′	m.m.	° ′
January	0.126	102 9	0.020	298 4	0.072	213 49
February	0.910	222 1	0.279	1 14	0.201	168 9
March	2.591	233 19	0.674	17 20	0.063	70 25
April	3.236	233 41	0.330	30 49	0.207	60 55
May	2.830	237 5	0.121	311 28	0.136	27 12
June	1.962	238 1	0.140	236 33	0.121	34 56
July	2 585	230 50	0.208	263 11	0.105	67 48
August	1.972	237 50	0.109	349 0	0.144	69 33
September	0.777	241 20	0.235	23 44	0.061	90 9
October	0.558	261 50	0.451	67 1	0.135	242 17
November	0.110	249 22	0.139	337 34	0.118	177 32
December	0.149	63 47	0.048	336 58	0.023	273 41
Winter	0.240	208 23	0.111	355 40	0.087	184 28
Spring	2.855	234 43	0.339	14 10	0.127	49 8
Summer	2.172	235 10	0.115	271 7	0.095	61 27
Autumn	0.476	249 52	0.231	42 2	0.062	193 51
Year	1.423	235 7	0.155	11 20	0.038	94 0

Gjøahavn.
Temperature. 0.01°. Deviation.

Daily Period.

Year	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midt	Days
January.																									
1904	+ 2	+ 6	+ 20	+ 16	+ 14	+ 26	+ 20	+ 8	+ 1	+ 3	— 9	+ 2	+ 8	+ 4	— 12	— 26	— 22	— 22	— 20	— 9	+ 3	+ 4	— 3	— 3	31
1905	+ 7	+ 3	+ 2	+ 3	— 4	— 19	— 21	— 25	— 35	— 41	— 35	— 23	— 16	0	+ 11	+ 1	+ 5	+ 26	+ 35	+ 33	+ 36	+ 28	+ 21	+ 16	31
Mean	+ 4	+ 4	+ 11	+ 9	+ 5	+ 3	— 1	— 9	— 17	— 19	— 22	— 11	— 4	+ 2	— 1	— 13	— 9	+ 2	+ 7	+ 12	+ 19	+ 16	+ 9	+ 6	
February.																									
1904	— 81	— 87	— 82	— 81	— 76	— 69	— 60	— 52	— 53	— 33	+ 12	+ 72	+133	+157	+156	+130	+ 83	+ 47	+ 22	+ 4	— 18	— 25	— 37	— 51	29
1905	— 65	— 73	— 68	— 54	— 46	— 36	— 33	— 34	— 21	— 20	— 1	+ 36	+ 78	+111	+126	+106	+ 65	+ 41	+ 24	+ 11	— 7	— 25	— 47	— 59	28
Mean	— 73	— 80	— 75	— 68	— 61	— 53	— 47	— 43	— 37	— 27	+ 5	+ 54	+105	+134	+141	+118	+ 74	+ 44	+ 23	+ 7	— 13	— 25	— 42	— 55	
March.																									
1904	—221	—218	—217	—200	—198	—174	—148	—106	— 9	+ 77	+185	+273	+328	+354	+341	+279	+213	+114	+ 32	— 50	—119	—155	—177	—201	31
1905	—153	—172	—172	—179	—183	—176	—157	— 97	+ 1	+ 47	+102	+166	+231	+286	+312	+312	+251	+138	+ 49	— 25	— 94	—139	—158	—169	31
Mean	—187	—195	—195	—190	—191	—175	—153	—102	— 4	+ 62	+143	+219	+279	+320	+326	+295	+232	+126	+ 40	— 38	—107	—147	—168	—185	
April.																									
1904	—292	—309	—323	—327	—300	—232	—152	— 44	+ 84	+174	+234	+310	+368	+395	+406	+356	+282	+169	+ 60	— 40	—128	—189	—236	—269	30
1905	—221	—246	—252	—266	—259	—219	—136	— 57	+ 28	+ 79	+138	+192	+253	+311	+322	+289	+256	+196	+101	+ 19	— 62	—116	—164	—196	30
Mean	—256	—277	—287	—296	—279	—225	—144	— 50	+ 56	+127	+186	+251	+311	+353	+364	+323	+269	+182	+ 81	— 10	— 95	—152	—200	—232	
May.																									
1904	—269	—268	—255	—242	—187	—126	— 72	— 11	+ 80	+157	+193	+239	+256	+275	+292	+263	+227	+162	+ 71	— 15	—113	—184	—223	—254	31
1905	—253	—273	—279	—256	—225	—163	—111	— 42	+ 61	+114	+160	+209	+241	+266	+280	+273	+242	+187	+125	+ 34	— 64	—130	—176	—220	31
Mean	—261	—270	—267	—249	—206	—144	— 91	— 26	+ 70	+136	+176	+224	+248	+271	+286	+268	+234	+175	+ 98	+ 10	— 88	—157	—200	—237	
June.																									
1904	—198	—198	—178	—153	—117	— 90	— 39	+ 26	+ 85	+111	+146	+166	+159	+172	+162	+160	+120	+ 83	+ 51	+ 2	— 49	— 93	—139	—180	30
1905	—198	—207	—205	—197	—161	—111	— 61	— 15	+ 52	+ 81	+106	+140	+167	+191	+215	+195	+173	+142	+104	+ 37	— 28	— 95	—142	—185	30
Mean	—198	—202	—192	—175	—139	—100	— 50	+. 5	+ 68	+ 96	+126	+153	+163	+182	+188	+177	+146	+112	+ 77	+ 19	— 39	— 94	—140	—183	

July.

1904	—292	—314	—294	—260	—205	—137	— 73	— 6	+ 81	+120	+167	+202	+235	+271	+304	+278	+240	+184	+114	+ 51	— 57	—147	—207	—250	31
1905	—196	—209	—234	—238	—190	—137	—113	— 55	+ 35	+ 58	+ 86	+128	+175	+205	+236	+245	+226	+163	+127	+ 77	— 17	— 74	—129	—162	31
Mean	—244	—262	—264	—249	—198	—137	— 93	— 31	+ 58	+ 89	+126	+165	+205	+238	+270	+261	+233	+173	+120	+ 64	— 37	—111	—168	—206	

August.

1904	—168	—180	—190	—181	—155	—107	— 49	+ 4	+ 50	+ 71	+117	+158	+191	+199	+207	+192	+159	+118	+ 58	— 8	— 79	—111	—135	—151	31

September.

1904	— 56	— 59	— 55	— 55	— 56	— 47	— 38	— 17	+ 9	+ 25	+ 53	+ 72	+ 85	+ 92	+105	+ 95	+ 62	+ 23	— 10	— 34	— 44	— 53	— 53	— 52	30

October.

1904	— 20	— 20	— 13	— 27	— 41	— 38	— 53	— 39	+ 20	+ 53	+ 80	+ 99	+105	+ 96	+ 65	+ 25	— 18	— 48	— 53	— 53	— 30	— 19	— 23	— 55	31

November.

1903	— 22	— 7	+ 6	+ 16	+ 34	+ 38	+ 36	+ 20	+ 13	+ 9	+ 11	+ 32	+ 28	+ 12	+ 11	— 6	— 27	— 32	— 36	— 26	— 16	— 17	— 18	— 14	29
1904	— 13	— 23	— 23	— 13	— 2	+ 2	— 17	— 43	— 54	— 40	— 26	— 15	+ 20	+ 38	+ 49	+ 69	+ 32	+ 34	+ 27	+ 6	— 5	— 11	— 4	+ 5	30
Mean	— 17	— 15	— 8	+ 2	+ 16	+ 20	+ 10	— 11	— 20	— 16	— 8	+ 9	+ 24	+ 25	+ 30	+ 32	+ 3	+ 1	— 5	— 10	— 10	— 14	— 11	— 4	

December.

1903	+ 46	+ 37	+ 28	+ 15	+ 1	— 17	— 23	— 35	— 46	— 57	— 50	— 44	— 37	— 21	— 11	— 3	+ 5	+ 9	+ 30	+ 43	+ 48	+ 25	+ 27	+ 38	31
1904	— 18	+ 2	+ 16	+ 27	+ 24	+ 24	+ 28	+ 26	+ 25	+ 30	+ 24	+ 14	+ 6	+ 5	— 6	— 17	— 17	— 32	— 33	— 31	— 37	— 26	— 19	— 23	31
Mean	+ 14	+ 20	+ 22	+ 21	+ 13	+ 4	+ 3	— 4	— 10	— 13	— 13	— 15	— 16	— 8	— 9	— 10	— 6	— 12	— 2	+ 6	+ 6	0	+ 4	+ 8	

Seasons and Year.

Winter	— 18	— 19	— 14	— 12	— 15	— 15	— 15	— 19	— 22	— 20	— 10	+ 9	+ 28	+ 42	+ 44	+ 31	+ 19	+ 11	+ 9	+ 8	+ 4	— 3	— 9	— 13	
Spring	—234	—247	—249	—245	—225	—181	—129	— 59	+ 41	+108	+169	+232	+280	+315	+326	+296	+245	+161	+ 73	— 12	—113	—152	—189	—218		
Summer	—203	—215	—215	—202	—164	—115	— 64	— 7	+ 58	+ 85	+123	+158	+186	+206	+221	+210	+179	+134	+ 85	+ 25	— 52	—105	—148	—180	
Autumn	— 31	— 31	— 26	— 28	— 27	— 22	— 27	— 23	+ 3	+ 21	+ 42	+ 60	+ 71	+ 71	+ 67	+ 50	+ 15	— 8	— 23	— 32	— 28	— 28	— 29	— 37	
Year	—122	—128	—126	—122	—107	— 83	— 59	— 27	+ 20	+ 49	+ 81	+115	+141	+159	+164	+147	+115	+ 75	+ 36	— 3	— 47	— 72	— 94	—112	

Gjøahavn.
Temperature. 0.01° Deviation.

Daily Period.

Observed (o) and computed (c) mean values and their difference (d = o—c)

	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midt.
January.																								
o	+ 4	+ 4	+ 11	+ 9	+ 5	+ 3	— 1	— 9	— 17	— 19	— 22	— 11	— 4	+ 2	— 1	— 13	— 9	+ 2	+ 7	+ 12	+ 19	+ 16	+ 9	+ 6
c	+ 3	+ 3	+ 6	+ 10	+ 10	+ 5	— 3	— 12	— 19	— 20	— 16	— 10	— 5	— 3	— 5	— 6	— 6	— 2	+ 5	+ 13	+ 17	+ 16	+ 12	+ 7
d	+ 1	+ 1	+ 5	— 1	— 5	— 2	+ 2	+ 3	+ 2	+ 1	— 6	— 1	+ 1	+ 5	+ 4	— 7	— 3	+ 4	+ 2	— 1	+ 2	0	— 3	— 1
February.																								
o	— 73	— 80	— 75	— 68	— 61	— 53	— 47	— 43	— 37	— 27	+ 5	+ 54	+105	+134	+141	+118	+ 74	+ 44	+ 23	+ 7	— 13	— 25	— 42	— 55
c	— 73	— 82	— 80	— 69	— 56	— 49	— 47	— 48	— 44	— 25	+ 10	+ 57	+102	+131	+136	+117	+ 84	+ 47	+ 18	0	— 12	— 23	— 38	— 56
d	0	+ 2	+ 5	+ 1	— 5	— 4	0	+ 5	+ 7	— 2	— 5	— 3	+ 3	+ 3	+ 5	+ 1	— 10	— 3	+ 5	+ 7	— 1	— 2	— 4	+ 1
March.																								
o	—187	—195	—195	—190	—191	—175	—153	—102	— 4	+ 62	+143	+219	+279	+320	+326	+295	+232	+126	+ 40	— 38	—107	—147	—168	—185
c	—186	—189	—195	—198	—194	—177	—143	— 90	— 21	+ 59	+143	+222	+284	+321	+323	+289	+224	+137	+ 44	— 41	—107	—150	—173	—182
d	— 1	— 6	0	+ 8	+ 3	+ 2	— 10	— 12	+ 17	+ 3	0	— 3	— 5	— 1	+ 3	+ 6	+ 8	— 11	— 4	+ 3	0	+ 3	+ 5	— 3
April.																								
o	—256	—277	—287	—296	—279	—225	—144	— 50	+ 56	+127	+186	+251	+311	+353	+364	+323	+269	+182	+ 81	— 10	— 95	—152	—200	—232
c	—253	—279	—297	—298	—273	—219	—141	— 50	+ 40	+124	+197	+259	+310	+345	+354	+331	+273	+185	+ 83	— 15	— 97	—156	—197	—226
d	— 3	+ 2	+ 10	+ 2	— 6	— 6	— 3	0	+ 16	+ 3	— 11	— 8	+ 1	+ 8	+ 10	— 8	— 4	— 3	— 2	+ 5	+ 2	+ 4	— 3	— 6
May.																								
o	—261	—270	—267	—249	—206	—144	— 91	— 26	+ 70	+136	+176	+224	+248	+271	+286	+268	+234	+175	+ 98	+ 10	— 88	—157	—200	—237
c	—260	—268	—264	—246	—211	—156	— 87	— 11	+ 64	+129	+181	+222	+252	+273	+281	+270	+235	+176	+ 95	+ 6	— 81	—153	—206	—241
d	— 1	— 2	— 3	— 3	+ 5	+ 12	— 4	— 15	+ 6	+ 7	— 5	+ 2	— 4	— 2	+ 5	— 2	— 1	— 1	+ 3	+ 4	— 7	— 4	+ 6	+ 4
June.																								
o	—198	—202	—192	—175	—139	—100	— 50	+ 5	+ 68	+ 96	+126	+153	+163	+182	+188	+177	+146	+112	+ 77	+ 19	— 39	— 94	—140	—183
c	—190	—199	—197	—181	—149	—102	— 45	+ 13	+ 64	+103	+130	+148	+162	+173	+181	+179	+161	+125	+ 73	+ 13	— 48	—101	—142	—171
d	— 8	— 3	+ 5	+ 6	+ 10	+ 2	— 5	— 8	+ 4	— 7	— 4	+ 5	+ 1	+ 9	+ 7	— 2	— 15	— 13	+ 4	+ 6	+ 9	+ 7	+ 2	— 12
July.																								
o	—244	—262	—264	—249	—198	—137	— 93	— 31	+ 58	+ 89	+126	+165	+205	+238	+270	+261	+233	+173	+120	+ 64	— 37	—111	—168	—206
c	—245	—265	—264	—243	—203	—145	— 83	— 19	+ 38	+ 86	+131	+170	+207	+240	+259	+259	+236	+186	+121	+ 44	— 33	—102	—164	—211
d	+ 1	+ 3	0	— 6	+ 5	+ 8	— 10	— 12	+ 20	+ 3	— 5	— 5	— 2	— 2	+ 11	+ 2	— 3	— 13	— 1	+ 20	— 4	— 9	— 4	+ 5
August.																								
o	—168	—180	—190	—181	—155	—107	— 49	+ 4	+ 50	+ 71	+117	+158	+191	+199	+207	+192	+159	+118	+ 58	— 8	— 79	—111	—135	—151
c	—171	—184	—188	—178	—151	—108	— 56	— 2	+ 46	+ 87	+121	+151	+180	+200	+209	+198	+165	+112	+ 48	— 14	— 68	—107	—135	—155
d	+ 3	+ 4	— 2	— 3	— 4	+ 1	+ 5	+ 6	+ 4	— 16	— 4	+ 7	+ 11	— 1	— 2	— 6	— 6	+ 6	+ 10	+ 6	— 11	— 4	0	+ 4

The next table shows the observed (o = Mean in the table of deviations) and

the computed (c) values of the deviations and their differences (d = o — c).

September.

o	— 56	— 59	— 55	— 55	— 56	— 47	— 38	— 17	+ 9	+ 25	+ 53	+ 72	+ 85	+ 92	+105	+ 95	+ 62	+ 23	— 10	— 34	— 44	— 53	— 53	— 52
c	— 52	— 54	— 57	— 59	— 55	— 47	— 33	— 16	+ 4	+ 27	+ 49	+ 72	+ 90	+101	+100	+ 86	+ 61	+ 28	— 5	— 31	— 47	— 54	— 55	— 53
d	— 4	— 5	+ 2	+ 4	— 1	0	— 5	— 1	+ 5	— 2	+ 4	0	— 5	— 9	+ 5	+ 9	+ 1	— 5	— 5	— 3	+ 3	+ 1	+ 2	+ 1

October.

o	— 20	— 20	— 13	— 27	— 41	— 38	— 53	— 39	+ 20	+ 53	+ 80	+ 99	+105	+ 96	+ 65	+ 25	— 18	— 48	— 53	— 53	— 30	— 19	— 23	— 55
c	— 24	— 22	— 23	— 28	— 36	— 43	— 42	— 27	+ 3	+ 43	+ 82	+109	+113	+ 94	+ 58	+ 17	— 18	— 40	— 47	— 45	— 38	— 32	— 28	— 26
d	+ 4	+ 2	+ 10	+ 1	— 5	+ 5	— 11	— 12	+ 17	+ 10	— 2	— 10	— 8	+ 2	+ 7	+ 8	0	— 8	— 6	— 8	+ 8	+ 13	+ 5	— 29

November.

o	— 17	— 15	— 8	+ 2	+ 16	+ 20	+ 10	— 11	— 20	— 16	— 8	+ 9	+ 24	+ 25	+ 30	+ 32	+ 3	+ 1	— 5	— 10	— 10	— 14	— 11	— 4
c	— 17	— 14	— 6	+ 5	+ 13	+ 13	+ 6	— 6	— 16	— 19	— 11	+ 4	+ 21	+ 31	+ 31	+ 23	+ 9	— 3	— 9	— 11	— 9	— 9	— 11	— 15
d	0	— 1	— 2	— 3	+ 3	+ 7	+ 4	— 5	— 4	+ 3	+ 3	+ 5	+ 3	— 6	— 1	+ 9	— 6	+ 4	+ 4	+ 1	— 1	— 5	0	+ 11

December.

o	+ 14	+ 20	+ 22	+ 21	+ 13	+ 4	+ 3	— 4	— 10	— 13	— 13	— 15	— 16	— 8	— 9	— 10	— 6	— 12	— 2	+ 6	+ 6	0	+ 4	+ 8
c	+ 14	+ 18	+ 20	+ 20	+ 15	+ 8	+ 1	— 6	— 11	— 13	— 13	— 13	— 13	— 12	— 11	— 10	— 7	— 5	— 2	0	+ 2	+ 3	+ 6	+ 9
d	0	+ 2	+ 2	+ 1	— 2	— 4	+ 2	+ 2	+ 1	0	0	— 2	— 3	+ 4	+ 2	0	+ 1	— 7	0	+ 6	+ 4	— 3	— 2	— 1

Winter.

o	— 18	— 19	— 14	— 12	— 15	— 15	— 15	— 19	— 22	— 20	— 10	+ 9	+ 28	+ 42	+ 44	+ 31	+ 19	+ 11	+ 9	+ 8	+ 4	— 3	— 9	— 13
c	— 18	— 20	— 18	— 13	— 10	— 12	— 17	— 22	— 25	— 19	— 6	+ 11	+ 28	+ 38	+ 40	+ 33	+ 23	+ 13	+ 7	+ 4	+ 3	— 1	— 6	— 13
d	0	+ 1	+ 4	+ 1	— 5	— 3	+ 2	+ 3	+ 3	— 1	— 4	— 2	0	+ 4	+ 4	— 2	— 4	— 2	+ 2	+ 4	+ 1	— 2	— 3	0

Spring.

o	—234	—247	—249	—245	—225	—181	—129	— 59	+ 41	+108	+169	+232	+280	+315	+326	+296	+245	+161	+ 73	— 12	—113	—152	—189	—218
c	—231	—243	—249	—245	—223	—181	—122	— 49	+ 28	+103	+172	+232	+279	+308	+315	+293	+242	+165	+ 74	— 16	— 94	—152	—191	—215
d	— 3	— 4	0	0	— 2	0	— 7	— 10	+ 13	+ 5	— 3	0	+ 1	+ 7	+ 11	+ 3	+ 3	— 4	— 1	+ 4	— 19	0	+ 2	— 3

Summer.

o	—203	—215	—215	—202	—164	—115	— 64	— 7	+ 58	+ 85	+123	+158	+186	+206	+221	+210	+179	+134	+ 85	+ 25	— 52	—105	—148	—180
c	—206	—216	—216	—199	—165	—119	— 61	— 4	+ 47	+ 92	+127	+158	+186	+205	+217	+211	+185	+142	+ 81	+ 16	— 48	—104	—148	—181
d	+ 3	+ 1	+ 1	— 3	+ 1	+ 4	— 3	— 3	+ 11	— 7	— 4	0	0	+ 1	+ 4	— 1	— 6	— 8	+ 4	+ 9	— 4	— 1	0	+ 1

Autumn.

o	— 31	— 31	— 26	— 28	— 27	— 22	— 27	— 23	+ 3	+ 21	+ 42	+ 60	+ 71	+ 71	+ 67	+ 50	+ 15	— 8	— 23	— 32	— 28	— 28	— 29	— 37
c	— 31	— 30	— 29	— 28	— 27	— 26	— 23	— 16	— 2	+ 17	+ 41	+ 62	+ 75	+ 75	+ 64	+ 42	+ 17	— 5	— 21	— 29	— 32	— 32	— 31	— 31
d	0	— 1	+ 3	0	0	+ 4	— 4	— 7	+ 5	+ 4	+ 1	— 2	— 4	— 4	+ 3	+ 8	— 2	— 3	— 2	— 3	+ 4	+ 4	+ 2	— 6

Year.

o	—122	—128	—126	—122	—107	— 83	— 59	— 27	+ 20	+ 49	+ 81	+115	+141	+159	+164	+147	+115	+ 75	+ 36	— 3	— 47	— 72	— 94	—112
c	—121	—127	—128	—121	—106	— 84	— 56	— 23	+ 12	+ 49	+ 84	+116	+142	+157	+158	+144	+116	+ 78	+ 35	— 6	— 43	— 72	— 94	—110
d	— 1	— 1	+ 2	— 1	— 1	+ 1	— 3	— 4	+ 8	0	— 3	— 1	— 1	+ 2	+ 6	+ 3	— 1	— 3	+ 1	+ 3	— 4	0	0	— 2

The parabolic formula (p. 50) gives the following *Maxima* and *Minima*.

Months, Seasons, Year	Minimum		Maximum		Range	M.O.
	°	h. m.	°	h. m.	°	°
January	— 0.20	9 43 a.m.	0.17	9 23 p.m.	0.37	0.09
	— 0.06	4 19 p.m.	—0.03	2 6 p.m.		
	0.03	1 27 a.m.	0.10	4 32 a.m.		
February	— 0.82	2 19 a.m.	1.37	2 43 p.m.	2.19	0.59
March	— 1.98	3 58 a.m.	3.27	2 34 p.m.	5.25	1.69
April	— 3.01	3 30 a.m.	3.55	2 47 p.m.	6.56	2.84
May	— 2.68	2 11 a.m.	2.81	2 56 p.m.	5.49	1.82
June	— 1.99	2 19 a.m.	1.82	3 18 p.m.	3.81	1.27
July	— 2.67	2 25 a.m.	2.62	3 31 p.m.	5.30	1.65
August	— 1.88	2 47 a.m.	2.09	2 57 p.m.	3.97	1.26
September	— 0.59	3 46 a.m.	1.02	2 26 p.m.	1.61	0.52
October	— 0.44	6 21 a.m.	1.14	0 42 p.m.	1.58	0.43
November	— 0.17	0 36 a.m.	0.33	2 33 p.m.	0.50	0.13
	— 0.19	9 43 a.m.	0.14	5 35 a.m.		
	— 0.11	8 0 p.m.	—0.09	9 39 p.m.		
December	— 0.13	10 28 a.m.	0.20	3 15 a.m.	0.33	0.10
Winter	— 0.25	8 47 a.m.	0.40	2 41 p.m.	0.64	0.17
	— 0.20	1 54 a.m.	— 0.10	5 15 a.m.		
Spring	— 0.25	3 7 a.m.	3.16	3 16 p.m.	5.66	1.84
Summer	— 2.18	2 30 a.m.	2.17	3 10 p.m.	4.35	1.39
Autumn	— 0.33	10 50 p.m.	0.74	1 36 p.m.	1.07	0.33
Year	— 1.28	2 33 a.m.	1.60	2 31 p.m.	2.88	0.91

The winter does not show any marked period.

The months February to October have a regular period with minimum at 2—3 in the morning and maximum at 2—3 in the afternoon, except in October, when the minimum occurs at half past six in the morning and the maximum at a quarter to one in the afternoon. The October curve gives suggestion of a double wave, and the same applies to the February curve. The period of the year also shows these features. The winter curve has a pronounced double wave, the Autumn curve only a faint suggestion, while the Spring and the Summer curves appear as single waves, with the extremes about three o'clock morning and evening. The Year shows a clean single wave, with extremes at half-past 2 o'clock.

The Daily Range has a yearly period with maximum in April and July. The last does not totally disappear by use of the smoothing formula, $\frac{1}{4}$ (a + 2b + c).

The Mean Ordinate, (M. O.), has the same period through the year as the range. Its value is between one third and one quarter of the range through the year.

Professor Mohn found (Rep. of the Sec. Norw. Arct. Exp. in the Fram, 1898—1902, page 111) for Ellesmere Land, at a mean latitude for the four winter quarters of 77° 11′, the mean ordinate to be $^1/_4$ of the daily range for the winter and between $^1/_4$ and $^1/_5$ for the summer.

The Annual Period. Table III contains the mean temperature, mean minima, mean maxima and the mean range for each month.

The means from both years, in the line marked "Mean," give a uniform curve with minimum in February and maximum in July. In the lowest line, "Red.," these means are reduced to the middle day of the month according to Kleiber's method (Hann, Lehrb. d. Met. Leipzig, 1901, p. 99).

Monthly Mean Temperature.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
1903											— 20.61	— 31.70
1904	— 36.50	— 39.51	— 37.06	— 20.42	— 10.64	— 0.25	6.31	3.60	— 4.32	— 13.70	— 20.28	— 36.37
1905	— 34.89	— 36.94	— 31.28	— 16.18	— 5.35	— 0.42	6.21					
Mean	— 35.70	— 38.22	— 34.17	— 18.30	— 7.99	— 0.34	6.26	3.60	— 4.32	— 13.70	— 20.45	— 34.03
Red.	— 35.71	— 38.49	— 39.66	— 18.07	— 7.88	— 0.30	6.65	3.72	— 4.26	— 13.81	— 20.21	— 33.44

Mean Monthly Maximum.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
1903											— 17.19	— 28.34
1904	— 32.78	— 35.84	— 32.72	— 14.87	— 7.14	2.26	10.14	6.25	— 2.25	— 11.53	— 15.85	— 31.63
1905	— 30.89	— 33.81	— 26.84	— 11.68	— 1.73	2.41	9.58					
Mean	— 31.84	— 34.82	— 29.78	— 13.28	— 4.44	2.33	9.86	6.25	— 2.25	— 11.53	— 16.52	— 29.99

Mean Monthly Minimum.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
1903											— 24.20	— 34.33
1904	— 40.01	— 42.81	— 41.82	— 26.25	— 14.98	— 3.55	2.37	0.97	— 6.52	— 18.48	— 24.64	— 36.72
1905	— 38.43	— 40.33	— 35.91	— 21.74	— 10.01	— 3.48	2.80					
Mean	— 39.22	— 41.57	— 38.86	— 24.00	— 12.49	— 3.52	2.59	0.97	— 6.52	— 18.48	— 24.42	— 35.53

"Fram II" (page 114 and 117) has also maximum in July but minimum in January.

Aperiodic Range.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
1903.....											7.01	5.99
1904.....	7.23	7.05	9.10	11.38	7.85	5.81	7.77	5.27	4.26	6.95	8.79	5.09
1905.....	7.54	6.52	9.07	10.06	8.28	5.89	6.78					
Mean	7.38	6.79	9.08	10.72	8.07	5.85	7.27	5.27	4.26	6.95	7.90	5.54
Smoothed	6.77	7.51	8.79	9.39	8.03	6.75	6.41	5.52	5.18	6.52	7.07	6.59

Maximum and *Minimum* both show an annual period, which is similar to that of the Mean, with two bumps, in April and in November, indicating irregularities in the uniform curve.

The Aperiodic Range has a very irregular course with not less than four waves. After smoothing with $^1/_4$ (a + 2b + c) two pronounced waves remain with summits in April and November and troughs in September and December, highest in April and lowest in September.

"Fram II" (page 115) shows in the smoothed curve a maximum in March, only one or two tenths larger than in April and February, and a minimum in August and September of equal amount.

The *Mean for the Year* is—16.36° (Red.—16.37°). By the parabolic formula (page 50). I determine the minimum and maximum of the reduced mean curve and find that:

The Coldest Day is the 12th of February
with a temperature of — 38.51°
The Warmest Day is the 21st of July,
with a temperature of . . . . . — 6.85°
Annual Mean is . . . . . — 16.36°
which occurs on the 20th of April and 25th of October

Temperature below—16.4° thus prevailed for . . . . . 176 days
Temperature above—16.4° thus prevailed for . . . . . 187 »
Temperature passes zero, with rising curve, the 18th of June
Temperature passes zero, with falling curve, the 2nd of September
Temperature below zero during altogether . . . . . 288 days
Temperature above zero during altogether . . . . . 75 »
The Sun below horizon the whole day from 3rd of December to 10th of January
The Sun above horizon the whole day from 24th of May to 19th of July
Dark Season . . . . . 38 days
Sunny Season . . . . . 57 »
Equinoctial Season . . . . . 270 »
The Absolutely Lowest Temperatures recorded for each month are:

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
1903											— 31.0	— 40.5
1904	— 47.9	— 51.6	— 53.6	— 43.9	— 25.5	— 10.3	0.3	— 1.3	— 18.3	— 27.2	— 36.0	— 42.7
1905	— 44.7	— 45.2	— 42.9	— 28.5	— 18.0	— 10.7	— 0.3					
Mean	— 46.3	— 48.4	— 48.3	— 36.2	— 21.7	— 10.5	0.0	— 1.3	— 18.3	— 27.2	— 33.5	— 41.6

The absolutely lowest temperatures of the months which are represented in two years, are indicated by heavier type. The lowest for the whole 21 months is—53.6° at 1 o'clock in the night of the 2nd of March 1904. This occurred unfortunately during a period when the thermograph was out of function and where values between the fixed hours of readings had therefore to be interpolated. The value given above, however, can hardly have any considerable error, since at 9 o'clock in the evening on the 1st of March there is a reading with the sling thermometer of—52.7° and at 9 o'clock in the morning of the 2nd a reading of—50.5° and since the minimum thermometer in the morning of the 1st showed—53.0° and in the morning of the 2nd—54.1°. The uncertainty lies in the correction of the sling thermometer, which was determined at zero and at — 19° only.

The months of 1904 were colder than the corresponding months of 1905, except the two summer months, June and July, which were about one degree warmer in 1904. In 1904 the temperature in July remained above zero the whole time. The same was the case on the south side of Ellesmere Land in Gaasefjord, Fram's fourth winter quarter in 1902, where the lowest temperature in July was 0.8° (Fram II, page 117).

The mean values show an annual period, which agrees well with the other temperature curves, having minimum in February. (Fram II again had minimum in January).

Days with Temperatures below — 40°.

Year	December	January	February	March	April
	Days	Days	Days	Days	Days
1903	30 — 31 2				
1904		1 — 3 3	1 — 3 3	1 — 10 10	1 1
		5 1	10 — 20 11	16 — 17 2	
	18 1	9 1	22 — 29 8	20 — 26 7	
	20 — 23 4	14— 16 3		28 — 31 4	
		18 — 24 7			
	26 — 31 6	29 — 31 3			
1905		1 & 2 2	5 — 12 8	1 — 3 3	
		10 1	17 — 23 7	6 — 9 4	
		15 — 17 3	25 — 26 2	16 — 18 3	
		19 1			
		24 — 26 3			
Total	13	28	39	33	1
Mean per year	6.5	14.0	19.5	16.5	
Fram II, Mean per year (page 117)	4.5	12.5	5.5	11.25	

Thermometer Readings below—50° were taken on the 18th and 29th of February, 1st and 2nd of March 1904. March 1st 1904, had a mean temperature of —50.94°. Fram II, with its four winters, had only 2 days with readings below—50°, the 19th and 20th of January, 1901.

The Number of Days with Readings below—40° becomes, as a *Mean for the Year*, 114/2 = 57. Fram II had with its four winters 34 days.

Days with Mean Temperature below — 40°.

Year	December	January	February	March
	Days	Days	Days	Days
1904	21 & 22 2	2 1	1 — 3 3	1 — 4 4
	30 & 31 2	9 1	12 & 13 2	7 & 8 2
		15 1	16 1	24 & 25 2
		19 1	18 — 19 2	
		22 1	22 — 28 7	
		29 1		
		31 1		
1905		16 1	7 — 12 6	8 1
		19 1	18 1	
		25 1	21 & 22 2	
Total	4	10	24	9
Mean pr. Year	2.0	5.0	12.0	4.5

The Highest Absolute Temperatures of each Month.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
	°	°	°	°	°	°	°	°	°	°	°	°
1903											— 4.9	— 17.0
1904	— 23.4	— 24.0	— 19.5	**0.2**	0.2	8.8	17.6	12.0	4.4	— 0.1	**— 3.8**	**— 14.1**
1905	**— 16.8**	**— 17.5**	**— 10.4**	— 2.9	**6.4**	**11.9**	**18.0**					
Mean	— 20.1	— 20.7	— 15.0	— 1.4	3.3	10.3	17.8	12.0	4.4	— 0.1	— 4.4	— 15.6

The absolutely highest values are printed in heavy type. In the months May to September the temperature rises above zero. The absolutely highest temperature was 18.0 degrees at 6.45 in the afternoon of the 18th of July 1905.

The annual variation of the mean values is similar to the annual variation of the mean and the minimum temperatures, with minimum in February and maximum in July (Fram II, minimum in January).

Days with Temperature above 10°.

Year	June	July	August
	Days	Days	Days
1904		2 1	1 & 2 2
		4 1	4 1
		10 1	
		12 1	
		16 & 17 2	
		20 & 21 2	
		23 1	
		25 1	
		29 — 31 3	
1905	26 & 27 2	6 & 7 2	
		10 & 11 2	
		16 — 19 4	
		21 — 24 4	
Total	2	25	3
Pr. Year	1.0	12.5	3.0

The Mean Number of Days with Temperature above 10° is for the two years: 30/2 = 15. Fram II has 5.

Temperatures above 15 degrees were reached only on 6 days in July, 3 in each year, the 16th, 30th and 31st in 1904 and 17th, 18th and 22nd in 1905. In 1905 the means for the 24 hours of these days are above 10°, nearly 11 degrees, while in 1904 only the 30th gets a mean temperature above 10° (10.48°).

The Absolute Range of the Temperature for the 21 months with records from 2nd of November 1903 until 31st of July 1905, amounts to 18.0° + 53.6° = 71.6 degrees (Fram II, 13.3 + 51.4 = 64.7 degrees). On the 18th of July, when the maximum occurred, a breeze, 3 m. p. s., was blowing from the SW at about 3 p. m., but the velocity gradually decreased and at 9 p. m. calm was recorded. The amounts of cloud at the two hours were 1 and 9. The pressure at 6 and 7 p. m. was 761 mm. The minimum occurred on the 2nd of March 1904, at 1 a. m. At 9 p. m. on the 1st, a wind from NNW was blowing with a velocity of 4 m. p. s. and at the observation in the morning of the 2nd the direction was the same but the velocity 11 m. p. s. This occurred in the midst of a period of clear weather, which began on the 26th of February in the evening, or rather the 24th although the afternoon of the 26th was overcast with snowfall, and ended in the evening of the 4th of March. The pressure at 1 a. m. on the 2nd of March was 761 mm.

The Differences between the Mean Highest and Lowest Temperatures of each month are:

Jan.	Feb.	Mar.	Apr.	May.	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
26.2	27.7	33.3	34.8	25.0	20.8	17.8	13.3	22.7	27.1	29.1	26.0

The range is greatest in April and least in August. The annual period is fairly regular. The August value appears to be somewhat low, the November value to be a little too high. The irregularities disappear in a smoothed curve. (Fram II, greatest range 33.2° in February, smallest range 11.8° in July).

Interdiurnal Variability of the Temperature. The data in the following table have been computed from the Table III by means of the difference from one day to the next between the mean temperatures. Positive (rising temperature) and negative (falling temperature) changes were treated separately, average values were computed and entered in the two first columns of the table. The third column contains the mean interdiurnal temperature changes, regardless of sign. The fourth and the fifth column contain the *mean* number of days with rising and falling temperatures for each month. Below the columns 4 and 5 the number of days of the year are given. The figures below columns 1, 2 and 3 give the annual mean, calculated (in the first row) as an arithmetic mean and (in the last row) as a weighted mean.

Month and Year	1	2	3	4	5
	Temperature		Mean of 1 and 2	Temperature	
	rising	falling		rising	falling
	+ °	− °	± °	Days	Days
January 1904 and1905	4.05	4.31	4.18	16	15
February —»—	3.61	3.73	3.67	15	13.5
March —»—	3.84	4.42	4.13	17	14
April —»—	3.58	4.08	3.83	18.5	11.5
May —»—	2.42	2.09	2.26	16.5	14.5
June —»—	1.17	1.10	1.13	17	13
July —»—	1.48	1.40	1.44	15.5	15.5
August 1904	0.74	1.14	0.94	15	16
September »	0.98	1.99	1.43	14	16
October »	4.84	3.15	4.00	12	19
November 1903 and 1904	4.44	4.65	4.55	14.5	15.5
December —»—	2.26	3.33	2.79	15.5	15.5
Year, Mean and Total	2.784	2.949	2.867	186.5	179.0
» Weighted Mean	2.856	3.056	2.956		

The three first columns indicate a pronounced annual period, with a somewhat irregular course, which when smoothed gives maxima in February—March and November, a well defined minimum in July—August, and a secondary minimum in December. The interdiurnal variability is greatest in winter, as with "Fram II", where, however, the minimum occurs in June, the maximum in February.

The temperature falls more quickly than it rises, contrary to what was the case with "Fram" II.

Observations at Fixed Hours.

Table IV, which contains *in extenso* the direct observations at fixed hours, begins with the 8 a. m. observation on the 9th of September 1903. However, on the 9th of September at 8 a. m. the Gjøa was still in Ross Strait, on the east side of King William's Land. At 10 a. m. she rounded Cape Matheson, about 4 p. m. she anchored in Petersen's Bay, outside the entrance of Gjøahavn, and on the 12th in the evening she was moored in the inner harbour. These differences in location are of no consequence. In Petersen's Bay the vessel was closer to the "House-Hill" than at the anchoring place in Gjøahavn. In Ross' Strait, through which they sailed at 8 a. m. on the 9th, they were certainly some twenty kilometers off the station, but the observations coincide with those at the two following observation hours.

As the Sea Tables closed at 8 p. m. on the 14th of September, at the last of the two-hourly observations, Table IV includes 6 days of Sea Observations. Actually the

observations until the 1st of November at 9 a. m. should be called "Sea Observations," because the same instruments were used and the same set of observations were made but the number of daily readings was reduced to three. As to the observations in these two months, September and October, I refer the reader to the "Voyage." The measurements of the sea temperature were discontinued on the 1st October in the evening, when ice froze up.

As mentioned on page 8, the hours for observations were on the 19th of October 1903, changed from 8, 2, 8 to 9, 3, 9. To get some idea of what influence this change has had on the homogeneity, the observations of the barometer and the thermometer of the month of October were plotted on co-ordinate paper, and from free-hand curves for each of the two elements the values were read off at 8, 2, 8 on the days between 19th and 31st and the values at 9, 3, 9 on the days between 1st and 18th. The monthly means of these series of observations have been compared with the monthly means of the series of direct readings. The differences are small, as is seen from following comparison.

Season	Pressure m.m.			Temperature °C		
1903, October Mean	I	II	III	I	II	III
Observed 1 — 18: 8, 2, 8. 19 — 31: 9, 3, 9	751.88	751.58	751.76	— 11.65	— 9.90	— 10.82
From curve 1 — 31: 8, 2, 8	51.95	51.63	51.70	— 11.73	— 9.94	— 10.79
—»— 1 — 31: 9, 3, 9	51.88	51.60	51.75	— 11.47	— 9.92	— 10.99

I, II, III are 1st, 2nd and 3rd observation hours.

As to the pressure, the difference between the observed values and those derived from either combination is only a few hundredths. As to the temperature, the difference is negligible at the hours of 8, 2, 8, whereas for 9, 3, 9 it amounts to nearly two tenths at the hours I and III. A mean of the two combinations reduces also in this case the difference to a few hundredths, and therefore no reduction has been undertaken.

The actual hour-observations, made according to instructions for stations of II order, were started on the 2nd of November, at 3 p. m. On the 1st the observations were taken on board the Gjøa. The morning observations on the 2nd and the minimum observation for the 1st and the 2nd are interpolated.

As the two first months differ somewhat from the rest, including November, they have different headlines. The section for the temperature of the air has no column for minimum, which was not observed at sea. Also there is no column for Absolute and Relative Humidity, nor for measurements of precipitation, as no such observations were taken during the voyage. The Table has, on the other hand, a column for the temperature of the sea. The rest of the columns: Pressure, Wind, Clouds and Remarks are identical, but since the force of the wind in the two first months was merely estimated, the headline gives "force" instead of "velocity." The data at top of the Tables are also somewhat different on account of the different contents in the columns. In the first place the locality in the Tables from September and October is entered as "Gjøahavn. On Board the Gjøa," but over the other tables as "Gjøahavn. On Shore." In the second place, the correction for Gravity is not stated in September and October, since the pressure was observed by aneroids. The indications of height are different, latitude and longitude the same.

The different headings are retained in the final summary, Table V, and thus a distinction is made between the two first months and the 22 last. However, in the headlines for the two months, the columns for the minimum of the temperature of the air

and of the measurement of the precipitation have been retained in order to give the two sets the same number of columns.

The Pressure and the Temperature of the Air have both been discussed when dealing with the records. However, this discussion did not embrace the observations on board the "Gjøa" during the two months of September and October 1903, nor the observations during 11 days in August 1905. Furthermore, November 1903 is now complete. With this supplementation we obtain the following *Annual Period of the Pressure:*

Pressure of the Air. **The Annual Period.**
m.m.Mean, 700 +

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(61.1)	51.7	60.1	60.1
1904.....	61.6	62.6	64.9	65.1	61.2	62.7	58.2	54.3	59.6	60.4	61.8	60.1
1905.....	64.2	64.1	62.8	65.9	64.5	60.8	59.7	(58.0)				
Mean	62.9	63.3	63.9	65.5	62.9	61.7	59.0	55.2	60.3	56.0	61.0	60.1
Diff. of Mean ...	0.0	0.0	0.0	0.0	+ 0.1	0.0	0.0	+ 0.9	+ 0.7	− 4.4	− 1.5	0.0

Minimum read.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(46.1	23.2	32.4	41.6
1904.....	48.4	39.5	43.6	43.3	37.7	42.5	49.8	38.9	46.5	45.3	45.2	44.1
1905.....	33.2	47.2	44.3	55.3	52.7	43.2	44.1	(50.0)				
Mean	40.8	43.3	44.0	49.3	45.2	42.8	47.0	44.4	46.3	34.3	38.8	42.8
Diff. of Mean ...	+ 1.8	+ 0.3	+ 0.2	+ 0.5	+ 1.3	+ 0.2	+ 2.0	+ 5.7	− 0.2	−10.8	− 7.7	0.0

Maximum read.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(72.0	72.3	76.0	69.9
1904.....	75.2	81.9	83.2	78.1	73.1	75.6	65.5	64.1	74.7	74.0	75.4	71.2
1905.....	87.9	78.5	74.4	79.6	72.0	71.1	67.5	(67.0)				
Mean	81.5	80.2	78.8	78.9	72.5	73.4	66.5	65.5	73.4	73.1	75.7	70.6
Diff. of Mean ...	− 0.5	− 0.2	− 0.4	− 0.1	− 0.2	0.0	− 0.1	+ 1.4	− 1.4	− 1.5	− 0.3	0.0

In the above tables the figures in brackets for August and September indicate incomplete series. In the first table, "Mean" is therefore computed from the actual number of days with observations, for August 31 days + 11 days and for September 22 days + 30 days. The lowest row in each table, "Diff of Mean", give sthe deviations of the means from those on pages 23 and 24. In the first table the mean deviations will be appreciable only in the autumnal months, from which a larger material has now

been used. In the two other tables the changes are for the same reason greatest in these same months, but here systematic changes occur also in the remaining months, as the data in our last tables have been derived from observations at fixed hours at which the extremes seldom occur. The minimum should be somewhat higher and the maximum somewhat lower at the fixed hours. Only the minima in October and November show a considerable departure from those recorded. In October this difference is due to the circumstance that the year 1903, with a minimum of 723.2 m.m. in the morning of the 20th, has been combined with the year 1904. For that reason we obtain a mean for the two years of 734.3, against 745.1 recorded in 1904. Something similar happens in November when taking into account the 15 first days of 1903. In the last half of the month, the barometer did not fall below to 748.7, while on the 6th in the evening it fell to 732.4. The mean ranges for the four months August to November are:

	Aug.	Sep.	Oct.	Nov.
Mean Max.....	65.5	73.4	73.1	75.7
Mean Min.	44.4	46.3	34.3	38.8
Range	21.1	27.1	38.8	36.9
Difference	− 4.3	− 1.2	+ 9.3	+ 7.3

The mean range thus becomes smaller in August and September, and greater in October and November, when taking the eye-readings into account.

For the temperature we obtain:

Temperature of the Air. **The Annual Period.**
°C. Mean.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(− 1.6)	− 11.1	− 20.5	− 31.7
1904.....	− 36.5	− 39.5	− 37.1	− 20.4	− 10.6	− 0.3	6.3	3.6	− 4.3	− 15.0	− 20.3	− 34.4
1905.....	− 34.9	− 36.9	− 31.3	− 16.1	− 5.4	− 0.4	6.2	(5.9)				
Mean	− 35.7	− 38.2	− 34.2	− 18.2	− 8.0	− 0.4	6.2	5.1	− 3.0	− 13.1	− 20.4	− 33.0
Diff. of Mean ...	0.0	0.0	0.0	+ 0.1	0.0	−0.1	− 0.1	+ 1.5	+ 1.1	+ 0.6	0.0	0.0

Minimum read.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(− 5.5)	− 26.3	− 31.0	− 40.5
1904.....	− 47.9	*− 51.6*	*− 53.6*	*− 43.9*	− 25.5	− 10.3	0.3	− 1.3	− 18.3	− 27.2	*− 36.0*	*− 42.7*
1905.....	− 44.7	− 45.2	*− 42.9*	− 28.5	− 18.0	− 10.7	− 0.3	0.0				
Mean	− 46.3	− 48.4	− 48.3	− 36.2	− 21.8	− 10.5	0.0	− 0.6	− 11.9	− 26.8	− 33.5	− 41.6
Diff. of Mean ...	0.0	0.0	0.0	0.0	0.0	0.0	0.0	+ 0.7	+ 6.4	+ 0.4	0.0	0.0

Maximum read.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(3.0)	— 0.5	— 5.5	— 17.0
1904.....	— 23.8	— 24.7	— *19.8*	0.0	0.0	7.0	17.0	12.0	4.2	— 0.4	— 4.5	— 15.8
1905.....	— 19.5	— 17.5	— 11.0	— 3.3	3.5	10.5	15.0	16.8				
Mean	— 21.6	— 21.1	— 15.4	— 1.7	1.8	8.7	16.0	14.4	3.6	— 0.5	— 5.0	— 16.4
Diff. of Mean ...	— 1.5	— 0.4	— 0.4	— 0.3	— 1.5	— 1.6	— 1.8	+ 2.4	— 0.8	— 0.4	— 0.6	— 1.2

As to the temperature no considerable difference from the recorded figures exists, except that the minimum temperature in September becomes higher, as the minimum for 1903 is—5.5°, while for 1904 we found—18.3°. Otherwise the figures for the minimum are the same as in the records except for September and October, when the values from 1903, which represent minima at an hour of observation, are added. The maximum, on the contrary, is a maximum noted at an observation hour.

The monthly means of pressure and temperature for the additional or completed months has been computed by means of the formula for pressure: $m = n + c$ and for temperature $m = q + c\,(II - q)$, or $m = n - k\,(n - \min)$, where m stands for mean, $n = 1/3\,(I + II + III)$, $q = 1/2\,(I + III)$, and where c and k are constants which have been computed by means of the recorded monthly values. The q-formula for temperature was used in September and October 1903, when no minimum was observed. The factor c of the q-formula is computed by means of:

$$c = \tfrac{1}{3} - \frac{k\,(n - \min)}{II - q}$$

The following *Wind Roses for Pressure and Temperature* are computed according to the formula[1]):

$$m = \frac{an + 2bp + cq}{n + 2p + q}$$

where m represents the weighted and smoothed values of the element in question for each of the 16 wind-directions N, NE, E etc., b the mean value of the element for a certain direction, a and c the values for the adjacent directions, n, p and q the corresponding number of wind observations. The lowest row in the table, (Year) contains weighted, but not smoothed, means of the figures of the column in question.

The Weights applied to the months and the year for each winddirection are entered in the following table. The figures in brackets for September, October and November, as well as for the year, refer to humidity. Observations of this element commenced in the first days of November.

The 11 first days of August 1905 are not taken into account when computing the wind roses.

[1]) Mohn, Meteorology. Roald Amundsen's Antarct. Exp. Sci. Results. Vidensk. Skr. 1915. I. Mat.-Nat. Kl., No. 5, Page 28.

Weights for Wind Roses.

Month	N	NE	E	SE	S	SW	W	NW	C	Total
January...	48.5	12.5	11.5	3	26.5	5	12.5	32.5	34	186
February .	30	5.5	2	0	25.5	20.5	28	17.5	42	171
March.....	42.5	2.5	8	0.5	26	14	14.5	49	29	186
April	49.5	16	14	19	17.5	13.5	13	19.5	18	180
May	41	24	15.5	12.5	10.5	19.5	18.5	36.5	8	186
June	43.5	24	4	6.5	19.5	19.5	21	31	11	180
July	40.5	30	11	13.5	27	13.5	2.5	27	21	186
August ...	25.5	18	11.5	2.5	7	3	5	18.5	2	93
September	74	8	25	3	8.5	7	9	15.5	6	156
	(43)	(3.5)	(9)	(2)	(7.5)	(4)	(6)	(13)	(4)	(92)
October ..	43	9.5	19	14	23	17.5	18	22	20	186
	(25)	(3.5)	(6.5)	(2)	(15)	(12)	(10.5)	(12.5)	(6)	(93)
November	54	3.5	13	4	32	7.5	13	33	20	180
	(51)		(12)			(5)				(68.5)
December .	78	15	2.5	0	5	17.5	14	32	22	186
Year	570	168.5	137	78.5	228	158	169	169	334	2076
	(518)	(158)	(107.5)	(65.5)	(219)	(147.5)	(158.5)	(322)	(217)	(1913)

The Baric Wind Rose.

Month	N	NE	E	SE	S	SW	W	NW	C
January.....	763.2	762.5	759.7	760.1	761.4	761.1	761.1	762.4	767.4
February.....	61.4	62.5	64.3		62.3	62.4	61.8	60.9	67.6
March.....	63.9	63.4	58.8	63.3	64.3	63.5	63.7	63.8	65.3
April	66.6	66.8	65.8	62.8	62.1	62.0	64.2	66.4	67.5
May	63.0	61.8	60.6	62.2	63.4	63.0	63.1	63.2	68.1
June	62.4	63.8	64.3	59.9	59.1	60.8	61.3	61.4	61.0
July	58.5	57.9	57.7	58.6	59.3	59.8	59.2	58.9	61.2
August	54.3	54.3	54.6	54.3	53.4	52.1	53.9	54.6	58.9
September	62.1	61.0	57.6	56.3	55.6	57.8	60.9	62.0	58.1
October.....	58.8	56.0	51.8	55.3	58.7	57.1	54.2	57.0	53.3
November	61.9	61.3	58.4	58.2	58.6	58.3	59.7	61.6	65.5
December	59.9	60.3	60.7		60.3	60.9	60.3	59.7	60.1
Year	761.83	760.51	758.32	758.49	760.78	760.64	760.37	761.12	763.97

The Baric Wind Rose shows a pronounced maximum in calm weather, maxima for winds from N and S and minima for winds from E and W. The Winter and the Spring months have generally higher pressures than the Summer and the Autumn months.

The Thermal Wind Rose.

Month	N	NE	E	SE	S	SW	W	NW	C
January.....	— 36.9	— 35.0	— 32.4	— 34.5	— 35.3	— 34.5	— 36.0	— 37.1	— 36.5
February.....	— 38.2	— 39.8	— 39.1		— 34.5	— 36.0	— 38.1	— 39.1	— 39.1
March.....	— 34.3	— 31.1	— 23.0	— 26.6	— 29.2	— 29.2	— 35.9	— 35.5	— 35.6
April	— 18.7	— 17.7	— 14.6	— 13.6	— 14.5	— 15.5	— 17.1	— 18.7	— 21.1
May	— 7.7	— 6.0	— 4.5	— 4.4	— 5.7	— 6.6	— 8.7	— 9.2	— 7.7
June	0.6	1.1	0.6	0.4	1.0	0.6	— 0.6	— 0.4	1.4
July	7.4	7.3	7.4	7.1	6.4	6.2	6.8	7.4	8.2
August	4.6	4.7	4.6	4.1	3.3	2.5	3.2	4.3	1.8
September	— 3.2	— 3.0	— 2.5	— 2.6	— 3.0	— 2.5	— 2.5	— 3.1	— 3.2
October.....	— 16.0	— 12.6	— 8.6	— 9.7	— 10.5	— 11.2	— 13.4	— 15.9	— 13.8
November	— 22.7	— 20.9	— 15.9	— 15.8	— 16.0	— 16.9	— 20.8	— 22.6	— 24.0
December	— 33.0	— 32.3	— 29.0		— 30.9	— 31.9	— 33.2	— 33.4	— 36.7
Year	— 17.34	— 8.41	— 8.93	— 6.35	— 15.81	— 15.43	— 19.99	— 19.39	— 24.67

The Thermal Wind Rose shows that in calm weather it is generally coldest. The coldest winds blow from W, NW and N, that is to say from the land. The warmest winds blow from SE, NE and E, or more or less from the sea. Winds from S and SE blow directly from Simpson Strait, but these winds have probably passed the vast continent to the south, while the East winds come from the open ocean, which is not very far off. In June and July warm weather prevails on calm days.

The Humidity of the Air. — The measurements of the humidity of the air commenced on the 3rd of November 1903. At the station the psychrometer and hair hygrometer were used, but during the coldest season of the year only the latter. The readings of the hair hygrometer are used in the following.

The Tension of the Water Vapour is computed by means of the relative humidity and the temperature. From the Summary, Table V, the mean has been calculated as an arithmetical mean of the three hour-observations: m = 1/3 (I + II + III). No correction to the mean of the day can be undertaken. However, in this latitude the correction does not exceed 0.1 m.m. and should be applied in the summer half-year only. Bodø, situated at 67° N, 1/3 of a degree farther south than Gjøahavn, has, according to Professor Dr. Mohn's computation, the correction 0.0 in the months October to March and — 0.1 in April to September (Jahrb. d. Norw. Met. Inst. für 1891, p. XV).

Thus no considerable error is introduced by using the mean without any correction:

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											(0.9)	0.3
1904	0.2	0.1	0.2	1.0	2.2	4.1	5.4	5.3	3.1	1.6	1.0	0.2
1905	0.2	0.2	0.3	1.4	3.0	4.2	5.8	(6.0)				
Mean	0.20	0.15	0.25	1.20	2.60	4.15	5.60	5.53	3.10	1.57	0.97	0.25

The figures in brackets have been derived from incomplete months and the mean in the bottom line is for these months a weighted one.

The Annual Period. The means in the lowest line of the table show a regular variation with maximum in July. *The Mean Range* amounts to: 6.0 — 0.1 = 5.9 mm.

The Highest and Lowest Values of the Tension of the Water Vapour for each month are seen from the two following tables:

Maximum of Tension of Water Vapour.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											(2.7)	1.2
1904	0.6	0.5	0.8	4.3	4.7	5.6	7.2	7.2	5.7	4.5	3.0	1.2
1905	0.8	1.0	1.8	3.4	5.4	7.1	9.4	(7.6)				
Mean	0.70	0.75	1.30	3.85	5.05	6.35	8.30	7.40	5.7	4.5	2.85	1.20

Minimum of Tension of Water Vapour.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											0.3	0.1
1904	0.0	0.0	0.0	0.2	0.7	2.5	3.6	3.1	1.1	0.5	0.2	0.1
1905	0.1	0.1	0.1	0.4	1.2	2.1	3.4	(4.6)				
Mean	0.05	0.05	0.05	0.30	0.95	2.30	3.50	3.85	1.1	0.5	0.25	0.10

Range. (Max.—Min.).

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
0.65	0.70	1.25	3.55	4.10	4.05	4.80	3.55	4.6	4.0	2.60	1.10

The Difference between Highest and Lowest is least in January and greatest in July. As to August the difference appears to be too small, probably because August 1905 is represented by the 11 first days only. The highest value occurred in July 1905, when on the 24th at 3 p. m., 9.4 mm. was observed during a fresh NW wind. During the coldest part of the year the tension of the water vapour does not exceed 0.1 mm.

The tension of the water vapour has a *Daily Period*, which almost disappears during the winter months, but during the summer months amounts to almost half a millimeter. In the following table the differences are entered between the monthly means at 3 p. m. and the average at 9 a. m. and 9 p. m.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											(0.00)	0.00
1904	0.00	0.10	0.00	0.25	0.50	0.15	0.35	0.40	0.15	0.05	0.10	0.00
1905	0.00	0.00	0.10	0.30	0.45	0.45	0.60	(0.45)				
Mean	0.00	0.05	0.05	0.275	0.475	0.30	0.475	0.412	0.15	0.05	0.31	0.00

The Atmic Wind Rose.

Month	N	NE	E	SE	S	SW	W	NW	C
January.....	0.2	0.1	0.3	0.2	0.2	0.2	0.2	0.2	0.2
February.....	0.1	0.1	0.1		0.2	0.2	0.2	0.1	0.1
March.....	0.2	0.3	0.6	0.5	0.4	0.3	0.2	0.2	0.2
April	1.0	1.1	1.5	1.6	1.6	1.5	1.2	1.0	0.9
May	2.4	2.7	3.0	3.1	2.9	2.8	2.4	2.2	2.2
June	4.1	4.3	4.2	4.2	4.4	4.2	3.9	3.9	4.2
July	5.5	5.6	5.7	5.6	5.4	5.3	5.5	5.6	5.9
August	5.4	5.5	5.6	5.5	5.2	5.1	5.1	5.3	3.6
September	3.1	3.0	2.6	2.9	2.8	2.9	3.2	3.2	2.7
October.....	1.0	1.4	2.5	2.2	2.0	2.0	1.7	1.1	1.0
November	0.7	0.9	1.3	1.4	1.4	1.3	0.9	0.8	0.7
December	0.3	0.3	0.4		0.4	0.3	0.3	0.3	0.2
Mean	1.81	3.09	2.64	3.17	2.02	2.10	1.56	1.72	1.21

The Atmic Wind Roses show, on the whole, the least moisture at calm except in July, when the highest tension of water vapour is found at calm, corresponding to the fact that in July the temperature is highest at calm. The feature that the warmest air contains the greatest amount of water vapour is also evident from the mean for the year, SE being the moistest wind, followed by NE, E, SW, S, N, NW and W, corresponding to the character of the thermal wind rose.

Relative Humidity. The means in the Summary, TableV, are computed from the formula: $m_1 = \frac{1}{2}(I + III)$. In order to see how much the results differ from values which are computed by means of Köppen's formula for reduction to mean of the day: $m_2 = q + c\,(II - q)$, the records for Bodø 1891, have been examined. The factor c for Bodø is according to the table page XVI, Jahrb. Now. Met. Inst.:

Jan.	Feb.	Mar.	Apr.	May	Jun.	Jul.	Aug.	Sep.	Oct.	Nov.	Dec.
.13	.25	.17	—.02	—.33	—.48	—.32	—.03	.13	.12	.00	.08

The difference, $m_1 - m_2$, is on the average about—0.5 per cent.

	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Mean
	− 0.07	− 1.12	0.00	− 0.15	− 1.65	− 0.48	− 1.44	− 0.08	+ 0.32	+ 0.34	0.00	+ 0.12	− 0.36
Smoothed .	− 0.28	− 0.72	− 0.32	− 0.49	− 0.98	− 1.01	− 0.86	− 0.38	+ 0.20	+ 0.20	+ 0.09	+ 0.04	− 0.37

The Mean Monthly Values of the Relative Humidity are:

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....											(89)	88
1904.....	83	76	76	84	89	85	71 .	87	87	91	86	75
1905.....	75	73	77	87	86	85	77	(85)				
Mean	79.0	74.5	76.5	85.5	87.5	85.0	74.0	87.9	87	91	87.7	81.5
Smoothed	78.5	76.1	78.2	83.8	86.4	82.9	80.2	84.2	88.2	89.2	87.0	82.4

Figures in brackets are derived from incomplete months and the means are weighted means. The smoothed curve for the annual period (smoothed) shows maximum in May and October, minimum in February and July. The range is 91—71 = 20 per cent.

The Highest and Lowest Relative Humidity are shown in the following table:

Maximum of Relative Humidity.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....											100	98
1904.....	91	89	83	83	94	96	99	100	100	100	100	88
1905.....	85	87	92	98	98	98	98	97				
Mean	88.0	88.0	87.5	90.5	96.0	97.0	98.5	98.5	100	100	100.0	93.0
Smoothed	89.2	87.9	89.7	94.1	97.1	97.2	96.7	98.0	99.6	100.0	98.2	93.5

Minimum of Relative Humidity.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....											70	82
1904.....	78	72	72	75	79	61	38	46	71	80	75	70
1905.....	70	69	70	76	54	65	54	53				
Mean	74.0	70.5	71.0	75.5	66.5	63.0	46.0	49.5	71	80	72.5	76.0
Smoothed	73.6	71.5	72.1	72.1	67.9	59.6	51.1	54.0	67.9	75.9	75.2	74.6
Range (Max.—Min.)												
Mean	14.0	17.5	16.5	20.5	30.5	35.5	49.0	49.0	29	20	27.5	17.0
Smoothed	15.0	16.4	17.7	22.0	27.2	37.6	45.6	44.0	31.7	24.1	23.0	18.9

The extremes show *an annual variation.* The highest maximum occurs in October and the lowest in February, while the highest minimum also comes in October, but the lowest minimum comes in July. The range is greatest in July and August, 49 per cent, and smallest in January, 14 per cent. The absolutely greatest difference is 100— 38 = 62 per cent.

The Daily Period disappears in the winter, but amounts in the summer to $6^1/_2$ per cent. which is seen from the following grouping of the difference II — q, the difference between afternoon and the mean of morning and evening of the monthly means.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											(0.0)	− 0.5
1904	0.0	0.0	0.0	0.0	− 1.5	− 6.0	− 7.0	− 6.0	− 3.5	+ 0.5	+ 1.0	0.0
1905	+ 0.5	+ 1.0	+ 1.5	+ 0.5	− 4.0	− 2.0	− 4.5	(− 9.0)				
Mean	+ 0.25	+ 0.50	+ 0.75	+ 0.25	− 2.75	− 4.00	− 5.75	− 6.59	− 3.5	+ 0.5	+ 0.21	− 0.25

The Wind Rose for Relative Humidity shows least humidity in calm weather. The moistest winds come from the E, the driest come from N and NW. The range is 86 — 78 = 8 per cent.

Wind Rose for Relative Humidity.

Month	N	NE	E	SE	S	SW	W	NW	C
January	78	79	83	80	79	80	81	79	76
February	73	73	72		76	75	75	75	76
March	76	77	81	80	79	77	76	75	76
April	84	84	85	87	87	87	87	85	83
May	86	86	88	88	89	89	89	87	82
June	85	85	86	88	86	85	86	87	80
July	73	73	74	75	75	75	74	73	73
August	86	88	90	90	89	92	89	86	68
September	86	86	88	86	83	83	84	86	86
October	87	90	97	95	93	92	91	88	88
November	86	88	90	92	92	91	86	85	85
December	82	83	87		81	80	81	82	79
Year	81.5	83.3	86.4	84.8	82.3	82.5	83.9	81.5	78.2

Clouds. — *Amount of Cloud.* Cloud observations were made from 9th of September 1903 to 11th of August 1905. The next table contains a grouping of the monthly means from the Summary. These means are calculated as arithmetical means of the three hours m = n.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903									(8.9)	7.7	6.6	3.2
1904	3.4	2.7	1.9	4.2	6.8	6.6	4.8	7.8	8.9	7.1	6.2	2.9
1905	3.4	2.2	2.9	5.7	7.0	8.0	6.8	(6.3)				
Mean	3.4	2.5	2.4	5.0	6.9	7.3	5.8	7.5	8.8	7.4	6.4	3.0

August and September are partly incomplete, and the means are weighted.

The Annual March is fairly regular, showing minimum of clouds in the winter and maximum in the summer. July shows a secondary minimum corresponding to a similar

secondary minimum of the relative humidity. September has the greatest amount of clouds, March the smallest, the mean range is 8.8 — 2.4 = 6.4.

The Daily Variation, according to II — q, the difference between afternoon and the mean of morning and evening, is little pronounced and very irregular, as will be seen from the following table.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(— 0.65)	1.25	0.60	1.05
1904.....	— 0.95	1.75	1.05	0.15	— 0.10	— 0.20	0.20	0.30	0.15	0.20	1.10	0.45
1905.....	0.35	1.20	0.40	— 0.25	0.25	0.15	0.00	(— 1.30)				
Mean	— 0.30	1.48	0.72	— 0.05	0.08	— 0.02	0.10	— 0.20	— 0.13	0.73	0.85	0.75
Smoothed ...	0.45	0.87	0.72	0.14	0.02	0.03	— 0.01	— 0.11	0.06	0.54	0.80	0.54

In the summer there is almost no variation, in the winter between 0.5 and 0.9. The darkness probably accounts for this result, because it is governed by the evening observations. Taking separately the difference between afternoon and morning, and between afternoon and evening, we obtain for the first combination, II — I, values which vary irregularly and show no difference between summer and winter, while the combination, II — III, shows an annual variation as obtained from the combination II — q, but with a greater range. The differences vary from 0.09 in July to 1.84 in February, while II — q gave — 0.11 in August and + 0.87 in February, all values being smoothed. The combination II — q, is thus entirely governed by the combination II — III. The latter gives for all the 24 months, except three, positive values, which in almost all of the single winter months amount to more than 1, in some cases exceed 2. This result supports the opinion that the evening values generally are too small. The total sums of the cloudiness at the three hours of observation for the period 9th of September 1903, to 11th of August 1905, show distinctly the influence of the darkness on the evening observations:

I	II	III
4158	4003	3331

The total sum is at the evening hour 700 units smaller than the total at the morning and the afternoon hour, which differ by 150 units only. Separating the data from summer and winter half-years we obtain:

	I	II	III
Apr.—Sep.	2396	2294	2216
Oct.—Mar.	1772	1709	1115

In summer the totals are almost the same at the three hours, but in winter the evening total deviates considerably from the two others which are almost equal. The fact that the brighter morning and afternoon hours, 9 a. m. and 3 p. m., in the winter have a small amount of clouds indicates that the cloudiness in winter actually is small.

Nephic Wind Roses.

Month	N	NE	E	SE	S	SW	W	NW	C
January	2.6	3.2	5.4	5.8	5.3	5.0	3.4	2.7	2.4
February	1.7	1.3	0.8		3.6	3.6	3.6	2.7	1.4
March	1.7	3.1	7.9	6.1	4.8	3.4	1.5	1.5	1.4
April	3.9	4.1	5.4	7.3	7.8	7.3	5.4	4.0	2.0
May	6.2	8.3	8.4	8.0	7.0	7.0	6.9	6.2	6.0
June	7.1	6.7	7.0	7.5	6.9	7.1	8.0	8.0	7.1
July	5.5	5.6	5.7	5.6	5.4	5.3	5.5	5.6	5.9
August	7.6	7.6	7.9	8.3	8.4	9.2	9.2	8.2	2.0
September	8.7	8.6	8.7	9.0	9.7	9.7	9.5	8.8	7.3
October	5.5	6.8	9.2	9.0	8.8	8.7	8.1	6.2	7.0
November	5.7	6.4	8.5	8.1	7.6	7.4	6.2	5.7	5.1
December	2.8	3.0	3.7		4.2	4.0	3.2	2.7	3.0
Year	4.80	6.15	7.47	7.87	6.50	6.01	6.16	4.84	3.35

The moist and warmest winds, coming from the SE and E, have the greatest amount of clouds, the cold and dry winds from N and NW, have the smallest. At calm the sky is clearest and simultaneously the temperature and the humidity are lowest. These results apply to the average conditions for the year. Many exceptions are found in the individual months, especially in summer.

Cloud Forms. In the observations of cloud forms the darkness influences the observations still more, as is evident from the total number of records of cloud forms at the three hours:

	I	II	III
Sep. 9, 1903—Aug. 11, 1905	574	597	378
Apr.—Sep.	317	339	303
Oct.—Mar.	257	258	75

The discrepancy, which was pointed out when discussing the observations of the amount of cloud, is now still greater.

The distribution of the observed cloud forms in each month is seen from the following grouping, where the figures represent means for two years, taking for August and September the number of days into consideration. The total number of observations in every month is found in the last line.

Month, Year	Ci	CiSt	CiCu	ASt	ACu	StCu	CuN	N	Cu	St	FrSt	Total
January			1.0	5.5	3.0	3.0	1.0	15.0	7.0	10.5	0.5	93
February		0.5		5.0	4.0	5.0	3.0	6.5	11.0	7.5	0.5	86
March	0.5	5.0	3.5	0.5	4.5	4.0	1.5	6.0	6.5	6.0		76
April		7.0	0.5		9.5	14.3	7.0	11.0	5.5	11.5		132
May		14.5			8.0	27.0	11.5	5.5	15.0	7.0		177
June	1.0	16.5			11.0	14.0	12.5	10.0	15.0	5.5		171
July	6.0	12.0	4.0		13.0	21.0	10.0	8.5	18.0	3.5		192
August	2.2	0.7	1.5		10.3	11.8	13.3	28.8	14.8	6.6	0.7	123
September	1.7	1.7	1.7		3.5	15.6	2.3	28.8	12.1	27.1		167
October	1.0	4.0	0.5	3.0	6.0	10.0	1.5	16.5	4.5	10.0		114
November	0.5	0.5	1.0	1.0	3.0	10.0	4.5	19.5	7.0	15.5	0.5	126
December				3.5	6.5	5.0	4.5	6.0	13.5	7.5	1.0	95
Year	12.9	62.4	13.7	18.5	82.3	138.4	72.6	162.1	129.9	118.7	3.2	
Sep. 9, 1903—Aug. 11, 1905	24	124	26	37	157	169	156	198	247	225	6	1569

The lower clouds are most frequent. Counting A-Cu and upwards as higher clouds, we find more than three times as many of the lower as of the higher clouds, 1181 and 368 respectively, or 76 and 24 per cent. Among the higher clouds A-Cu is most frequent, and next comes Ci-St.

Wind Roses for Form of Cloud.

Forms	Month	N	NE	E	SE	S	SW	W	NW	C
Cirrus	January ...	—	—	—	—	—	—	—	—	—
	February ..	—	—	—	—	—	—	—	—	—
	March	—	—	—	—	—	—	—	—	1
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	0.5	0.5	—	—	1
	July	3	0.5	3	1.5	0.5	0.5	—	—	2
	August	1	—	—	—	—	—	—	—	—
	September .	3	—	—	—	—	—	—	—	—
	October	1	—	—	—	—	—	—	1	—
	November..	—	—	—	—	—	—	—	—	1
	December ..	—	—	—	—	—	—	—	—	—
	Year	8	0.5	3	1.5	1	1	—	1	5
	Weighted Mean	0.014	0.003	0.022	0.019	0.004	0.006	—	0.003	0.021
Cirro-St.	January ...	—	—	—	—	—	—	—	—	—
	February ..	1	—	—	—	—	—	—	—	—
	March	3.5	—	—	—	1	—	—	2.5	2
	April	7	1	0.5	—	—	2.5	2	2	—
	May	12.5	4	0.5	1	2.5	4.5	0.5	1.5	3
	June	10.5	5.5	—	0.5	3	6.5	1.5	3.5	2
	July	2.5	7	3.5	0.5	6	1.5	0.5	0.5	3
	August	—	1	—	—	—	—	—	—	—
	September .	2	—	—	—	—	1	—	—	—
	October	1.5	—	—	—	—	1	1.5	2	2
	November..	—	—	—	—	—	—	—	—	1
	December ..	—	—	—	—	—	—	—	—	—
	Year	40.5	18.5	4.5	2	12.5	17	6	12	14
	Weighted Mean.....	0.071	0.110	0.033	0.025	0.055	0.108	0.036	0.036	0.060
Cirro-Cu	January ...	1	—	—	—	—	—	—	—	1
	February ..	—	—	—	—	—	—	—	—	—
	March	—	—	—	—	2	4	—	—	1
	April	—	—	—	—	1	—	—	—	—
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	—	—
	July	—	—	0.5	1.5	—	3	—	1	2
	August	1	—	1	—	—	—	—	—	—
	September .	1.5	0.5	0.5	0.5	—	—	—	—	—
	October	—	—	—	—	1	—	—	—	—
	November..	—	—	—	—	—	—	1	—	—
	December ..	—	—	—	—	—	—	—	—	—
	Year	3.5	0.5	2	2	4	7	1	1	4
	Weighted Mean.....	0.006	0.003	0.015	0.025	0.018	0.044	0.006	0.003	0.017
Alto-St.	January ...	5.5	—	—	0.5	1.5	—	—	1.5	1
	February ..	1	—	—	—	3	2	3	—	1
	March	—	—	—	—	1	—	—	—	—
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	—	—
	July	—	—	—	—	—	—	—	—	—
	August	—	—	—	—	—	—	—	—	—
	September .	—	—	—	—	—	—	—	—	—
	October	—	1	—	—	1	2	1	1	—
	November..	—	—	—	—	—	—	—	1	1
	December ..	1.5	—	—	—	—	0.5	1.5	1.5	2
	Year	8	1	—	0.5	6.5	4.5	5.5	5	5
	Weighted Mean.....	0.014	0.006	—	0.006	0.029	0.028	0.033	0.015	0.021

Wind Roses for Form of Cloud (continued).

Forms	Month	N	NE	E	SE	S	SW	W	NW	C
Alto-Cu	January ..	—	—	—	—	2	0.5	0.5	—	2
	February..	1	—	1	—	1	3	1	—	1
	March	1	1	—	—	2.5	0.5	—	1	3
	April	5	1.5	2	3.5	2.5	—	1	0.5	3
	May	1.5	—	0.5	0.5	0.5	3.5	1.5	3	5
	June	4.5	6	—	—	0.5	2.5	2.5	5	—
	July	5.5	4.5	0.5	2	4	3	0.5	4	2
	August ...	3.5	2.5	2	1	1	—	—	2	—
	September	2.5	—	—	—	—	—	—	2.5	—
	October ...	2.5	1	—	—	1.5	2	2	2	—
	November.	1.5	0.5	0,5	—	—	1	—	—	—
	December .	5.5	1.5	—	—	1	1	0.5	0.5	3
	Year	34	18.5	6.5	7	16.5	17	9.5	20.5	19
Weighted	Mean.....	0.059	0.110	0.047	0.089	0.072	0.108	0.056	0.061	0.082
Strato-Cu	January ..	1	—	—	—	1.5	0.5	1	3	1
	February..	1	—	—	—	1.5	1.5	1	2	3
	March.....	2	—	—	—	2	1	—	3	—
	April	11	4	3	1.5	0.5	3	1.5	3.5	1
	May	4.5	8	8.5	3.5	1.5	5	7	14	1
	June	7	4.5	1.5	2	3.5	3	1.5	2	1
	July	11.5	11	1	3	5	2	—	6.5	2
	August ...	2	2	1.5	—	—	—	—	3.5	—
	September	14	1	2	0.5	1	1.5	0.5	6.5	—
	October ...	7	—	1	2	1.5	1.5	2	3	2
	November.	8	—	—	—	2.5	2	2	4	1
	December .	7	—	—	—	—	—	1	2	—
	Year	76	30.5	18.5	12.5	20.5	21	17.5	53	12
Weighted	Mean.....	0.133	0.181	0.135	0.159	0.090	0.133	0.104	0.159	0.057
Cumulo-Ni	January ..	1	—	—	—	—	—	1	—	—
	February..	1.5	—	—	—	1	0.5	2.5	0.5	—
	March	1	—	2	—	—	—	—	—	—
	April	3.5	2	2.5	2	1.5	1	1	0.5	1
	May	4	4.5	1.5	1	—	5	4	2	—
	June	2.5	1.5	0.5	—	1.5	0.5	8.5	10	—
	July	5.5	2	2	1	2	1	1.5	3	2
	August ...	3	2.5	1	0.5	2	0.5	—	2.5	—
	September	3.5	—	—	—	—	—	—	0.5	—
	October ...	—	—	1	—	—	—	—	1	1
	November.	1.5	1.0	2.5	—	—	0.5	1	1.5	—
	December .	2.5	1.5	—	—	—	1.5	1	2.5	—
	Year	29.5	15	13	4.5	8	10.5	20.5	24	4
Weighted	Mean.....	0.052	0.089	0.095	0.057	0.035	0.066	0.121	0.072	0.017
Nimbus	January ..	4	—	3	0.5	8.5	2	2	3.5	5
	February..	0.5	—	—	—	4	2.5	3.5	1.5	1
	March	1	1	5	—	7	—	1	—	—
	April	2	1	0.5	1.5	6.5	3	4.5	—	2
	May	2.5	1	0.5	1.5	0.5	2	1.5	1.5	—
	June	5	1.5	1	2	4.5	0.5	2.5	3	—
	July	3.5	4	0.5	0.5	3.5	1	—	3	1
	August ...	9	4	3	1	3	2.5	5	8.5	—
	September	19	2	6	2	7.5	2.5	4.5	3.5	1
	October ...	3.5	—	7	2.5	7	3.5	4	1.5	5
	November	7	1	4	3	13	2	2	2.5	4
	December .	7	0.5	—	—	1	2.5	0.5	—	—
	Year	64	16	30.5	14.5	66	24	31	28.5	19
Weighted	Mean.....	0.112	0.095	0.223	0.185	0.289	0.152	0.183	0.085	0.082

Wind Roses for Form of Cloud (continued).

Forms	Month	N	NE	E	SE	S	SW	W	NW	C
Cumulus	January ..	6	—	1	—	1	1	1	2	3
	February..	5	1.5	—	—	4	0.5	3	5	3
	March	3	—	—	—	2	2	—	5	1
	April	3.5	2.5	1	—	—	0.5	0.5	1	2
	May	4.5	6.5	4	1.5	2	1	2.5	7	1
	June	6	4.5	0.5	—	—	1.5	9.5	8	—
	July	9	2.5	0.5	3.5	4.5	2.5	—	10.5	3
	August ...	5	2.5	3	—	2.5	0.5	—	1.5	1
	September	9	1.5	4	—	—	—	1	1.5	3
	October ...	5	—	—	—	1	—	—	2	1
	November.	5	—	1	—	13	0.5	1	3.5	2
	December .	13.5	1.5	—	—	—	3	1.5	5.5	2
	Year	74.5	23	15	5	30	13	20	52.5	22
Weighted	Mean.....	0.131	0.136	0.109	0.064	0.132	0.082	0.118	0.157	0.094
Stratus	January ..	4	1.5	2	2	—	—	0.5	8	2
	February..	1	1	—	—	1	—	3.5	4.5	4
	March	1	—	—	—	1.5	—	1.5	3.5	1
	April	4	1	1.5	2.5	4	2.5	2	2.5	3
	May	4.5	1.5	0.5	1.5	3	—	—	3	—
	June	3	0.5	—	—	1	2.5	1.5	1.5	1
	July	2.5	0.5	—	—	1	—	—	3	—
	August ...	2	1	—	1	1	0.5	0.5	1	1
	September	25	2	6.5	—	1	2	4.5	5	1
	October ...	5.5	—	1	1	2	4.5	1.5	2	2
	November.	8.5	—	1	—	4	1	2.5	10	4
	December .	4	1	—	—	2	0.5	1.5	3	3
	Year	65	10	12.5	8	21.5	13.5	19.5	47	22
Weighted	Mean.....	0.114	0.060	0.091	0.102	0.094	0.085	0.115	0.141	0.094
Fracto-St	January ..	0.5	—	—	—	—	—	—	0.5	—
	February..	—	—	—	—	—	—	0.5	0.5	—
	March	—	—	—	—	—	—	—	—	—
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	—	—
	July	—	—	—	—	—	—	—	—	—
	August ...	—	—	—	—	—	—	—	1	—
	September	—	—	—	—	—	—	—	—	—
	October ...	—	—	—	—	—	—	—	—	—
	November.	1	—	—	—	—	—	—	—	—
	December .	—	1	—	—	—	—	—	—	1
	Year	1.5	1	—	—	—	—	0.5	2	1
Weighted	Mean.....	0.003	0.006	—	—	—	—	0.003	0.006	0.004

The Wind Roses for Cloud-Forms show the total amount of cloud forms observed at each wind-direction and for each month and for the year. The numbers have been stated instead of the probability, because the observations are rather incomplete during the dark part of the day and of the year. The lowest line gives a weighted mean. The weights are for:

N	NE	E	SE	S	SW	W	NW	C
570	168.5	137	78.5	228	158	169	334	233

These weighted means give the probability for the occurrence.

Clear and Overcoast Days. —

Number of Clear Days.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903									(0)	1	4	10
1904	12	15	20	11	4	6	9	3	0	3	6	11
1905	16	17	13	6	4	2	3	(2)				
Total	28	32	·33	17	8	8	12	5	0	4	10	21

Number of Cloudy Days (*8—10*).

1903									(17)	10	11	1
1904	5	0	0	6	16	12	4	20	22	16	12	0
1905	5	0	2	10	12	19	13	(6)				
Total	10	0	2	16	28	31	17	26	39	26	23	1

The same features appear as in the other figures for clouds, cloudy in summer and clear sky in the winter.

Presipitation. — The record of precipitation is, as mentioned on p. 15, rather incomplete. Measurements were begun in November, after the station on shore was established, but occurrence of precipitation was noted on board the Gjøa, and was thus recorded during the whole period.

Precipitation measured.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903											(0.7)	5.0
1904	1.0	0.7	3.0	4.0	19.1	2.0	0.0	42.2	17.7	10.2	17.7	1.0
1905	10.4	7.3	12.3	7.3	5.9	7.4	17.3	(0.0)				
Total	11.4	8.0	15.3	11.3	25.0	9.4	17.3	42.2	17.7	10.2	18.4	6.0

Almost two thirds (64 pct.) of the precipitation fell during the summer half -year, April—September, in spite of the fact that September is represented in one year only and that August 1905 is represented only by a few days. The summer half-year therefore comprises 316 days, as against 334 days in the winter half-year, but the totals of precipitation are 122.9 and 69.3 mm. respectively. June has a surprisingly small precipitation, although the cloudiness is great, and the overcast days numerous. The small precipitation is perhaps accounted for by the fact that higher clouds, from A-Cu upwards, and especially Ci-St, occurred relatively often. The table for the distribution of cloud forms, page 74, shows that of 171 records of cloud forms in this month, 57, or exactly one third represent higher clouds, of which 33 are Ci-St.

The total amount of precipitation during the $21^1/_3$ months from which we have measurements is 192.2 mm. For the year this gives 109.8 mm. The complete year, 1904, has 118.6 mm. This amount is perhaps somewhat too small. However, "Fram II," which at her four winter quarters cannot be supposed to have had more favourable

conditions than had the "Gjøa" at Gjøahavn, measured in about 38 months an amount of only 237.1 mm., giving 74.7 mm. for the year. Of the two years with fairly continuous measurements, 1900 had 94.1, while 1901 had 50.0 mm., giving a mean of 72.2 mm. Taking into account that "Fram II" wintered in a higher latitude (difference 8.5°) one may perhaps regard the agreement as rather good.

Number of Days with Precipitation.

	Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
Rain and Snow ...	1903	—	—	—	—	—	—	—	—	5	15	4	2
	1904	4	5	1	7	5	4	2	17	11	11	9	1
	1905	5	5	5	8	5	5	8	—	—	—	—	—
	Total	9	10	6	15	10	9	10	17	16	26	13	3
Rain	1903	—	—	—	—	—	—	—	—	5	—	—	—
	1904	—	—	—	—	—	2	2	17	—	—	—	—
	1905	—	—	—	1	5	2	10	—	—	—	—	—
	Total	—	—	—	1	5	4	12	17	5	—	—	—
Snow	1903	—	—	—	—	—	—	—	—	7	15	4	2
	1904	4	5	1	7	5	3	—	6	11	11	9	1
	1905	5	5	5	7	3	3	1	—	—	—	—	—
	Total	9	10	6	14	8	6	1	6	18	26	13	3

Sleet was in 1904 observed once in June and seven times on six days in August, in 1905 three times in May and once in July. Thus it is seen that, out of 703 days, precipitation was noted on 144. Of this number, 77 days (53,4 pct.) fell in the period April —September, 44 days had rain, 120 days had snow. This gives for one year 75, 23 and 62 days respectively.

Rain fell only during the summer half-year, April—September. Snow, on the contrary, or at all events sleet, may fall during every month of the year. The one day in July 1905 which is counted as snow day was the 31st. This was sleet, noted at the morning observation when the wind was NE, 18 m. p. s. The temperature was 1.0 above zero and the minimum in the preceding night was 0.8 degree.

Hail was never observed.

Frequency of Precipitation. Counting for each hour of observation in each month and each year the number of records of precipitation we obtain a summary of the frequency of precipitation. The picture is for many reasons incomplete, but gives a general view of the distribution during the day.

Number of Cases of Precipitation. Months.

Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
I	2	3	3	10	4	5	5	8	10	16	5	1
II	4	5	3	4	3	5	4	5	8	14	8	2
III	8	3	3	5	6	4	2	12	8	13	8	0
Total	14	11	9	19	13	14	11	25	26	43	21	3
Smoothed	11	11	12	15	15	13	15	22	30	33	22	10

Hours	Winter	Spring	Summer	Autumn	Year
	Seasons and Year.				
I	6	17	18	31	72
II	11	10	14	30	65
III	11	14	18	29	72
Total	28	41	50	90	209

I, II, III represent the three hours of observation, and the total number of observations at these hours have been stated. In the single months no definite distribution of the precipitation over the different hours is seen, but in the seasons of the year a fairly regular distribution appears to be present. In the winter there is little precipitation in the morning. In the spring most of the precipitation seems to fall in the forenoon, somewhat less in the evening, and least in the afternoon. Also during the summer months there seems to be less precipitation in the afternoon than at the two other hours. In the autumn the precipitation appears to be fairly equally distributed, but a small decrease in frequency from morning to night is indicated. The year shows the same picture as the summer. The totals show a marked increase from winter to autumn, as seen from the figures of the lowest row. Total: 28, 41, 50, 90. The increase is greatest from summer to autumn, as also can be seen in the table for the months, where October has a pronounced maximum, while December has a distinct minimum. The smoothed figures indicate a secondary maximum in May and a secondary minimum in June. "Fram II" shows maxima in May and September and minima in January and July.

Duration of Precipitation in one Day of Precipitation, as calculated according to Køppen's method, is seen in the following table, where:

n is the total number of observations,
r » » » » » » with precipitation,
N » » » » » hours in the period,
d » » » » » days with precipitation at the hours of observation.

Hence we get that:

$\frac{r}{n}$ represents the probability of precipitation,

$\frac{r}{n}N$ the total duration of the period in hours,

$\frac{r\,N}{n\,d}$ the average duration of precipitation in a day of precipitation, expressed in hours.

Period	r	n	$\frac{r}{n}$	$N = 8n$	$\frac{r}{n}N = 8r$	d	$\frac{r}{n}\,\frac{N}{d}$
			pct.				
January	14	186	7.5	1488	112	9	12.44
February	11	171	6.5	1368	88	10	8.80
March	9	186	4.8	1488	72	6	12.00
April	19	180	10.6	1440	152	15	10.13
May	13	186	7.0	1488	104	10	10.40
June	14	180	7.8	1440	112	9	12.44
July	11	186	5.9	1488	88	10	8.80
August	25	126	19.8	1008	200	17	11.76
September	26	156	16.7	1248	208	16	13.00
October	43	186	23.1	1488	344	26	13.23
November	21	180	11.7	1440	168	13	12.92
December	3	186	1.6	1488	24	3	8.00
Year	209	2109	9.96	16 872	1672	144	11.611

In "Fram II" Professor Mohn (page 343) has introduced a method for the computation of the probable number of days with precipitation for the months which are incomplete. He calls the number of hours with precipitation in a day of precipitation h and puts $h = \frac{rN}{nd}$, from which he obtains $d = \frac{rN}{nh}$. In this value for d he introduces, instead of the given number of hours in the incomplete months, N, the normal number of hours for complete months, N_0. Thus he gets:

$$d_2 = \frac{r\,N_0}{n\,h} = \frac{r\,N_0}{n\,\frac{r\,N}{n\,d}} = d\,\frac{N_0}{N},$$

where d_2 indicates the number of days of precipitation for two years that is to be determined.

Applied to the incomplete months, August and September, with respectively 42 and 52 days for two years instead of 62 and 60, we find:

Month	Days of obs.	N	N_0	$\frac{N_0}{N}$	d	d_2	d_0
August	42	1008	1488	1.476	17	25.09	12.55
September	52	1248	1440	1.154	16	18.46	9.23

where $d_0 = {}^1/_2\, d_2$ indicates the computed number of days of precipitation for one year.

Introducing these figures, we get the following table, where D is the number of days with precipitation per year (equal to the half of the figures in the table on page 51, except for August and September) and where H represents hours of precipitation in a day of precipitation, $\frac{rN}{nd}$.

Period	D		H	
	Comp.	Sm.	Comp.	Sm.
January	4.5	3.88	12.44	10.42
February	5.0	4.37	8.80	10.51
March	3.0	4.63	12.00	10.73
April	7.5	5.75	10.13	10.66
May	5.0	5.50	10.40	10.84
June	4.5	4.75	12.44	11.02
July	5.0	6.75	8.80	10.45
August	12.5	9.80	11.76	11.33
September	9.2	10.97	13.00	12.75
October	13.0	10.43	13.23	13.10
November	6.5	6.87	12.92	11.52
December	1.5	3.50	8.00	10.34
Year	77.2	77.2	11.61	11.61

The number of days with precipitation, D, is according to the smoothed values greatest in September (11), and smallest in December (3.5) with indications of secondary maximum and minimum in April and June. The summer has more days of precipitation than has the winter, 43 against 34, or 56 against 44 per cent. of the 77 days in the year. In one year 21 per cent. of the days, or every fifth day, ought to have precipitation.

„Fram II" reported precipitation every third day, or 133 days with precipitation in the year, most in September, least in January.

The number of hours of precipitation during a day of precipitation appears to be somewhat great, the average for the year being 11.6. "Fram II" has only 7.3. The annual variation is characterized by a marked maximum in October of 13.1, a secondary maximum of 11.0 in June and minima in December or January, 10.3 and 10.4, and in July, 10.45. "Fram II" shows maxima in May and October and minima in February —March and in August.

Wind Roses for Precipitation. The following table gives for the whole period the total number of occasions in each month and in the year at which precipitation was recorded at calm or during wind from the different directions. According to this table of frequency, the least precipitation falls at calm and the most at southerly wind.

Number of Cases.

Period	N	NE	E	SE	S	SW	W	NW	C
January	1	4	3		4.5	1.5			
February					4.5	3	2.5		1
March	1		5		2		1		
April	2	0.5	0.5	6	4.5	0.5	3.5	1.5	
May	1	2	1	1	0.5	0.5	2.5	3.5	1
June	6	2	0.5	0.5	2.5	0.5		1	
July	2.5	3	0.5	1	3.5	0.5		1	
August	4	4	3.5	0.5	2	2	4	4	
September	6	2	9	1.5	2	0.5	2	1	2
October	1	5	10.5	4	7.5	4.5	4.5	2	4
November	1		3	2	10		1	2	1
December		0.5	0.5			1	0.5	0.5	
Year	25.5	23	37	16.5	43.5	14.5	21.5	16.5	9
Weighted Mean	0.045	0.136	0.270	0.210	0.191	0.092	0.121	0.049	0.039

The lowest row, Weighted Mean, shows that the *Probability of Precipitation* is greatest at E-wind, and smallest at calm.

Fog. — From the Summary, Table V, we extract:

Number of Days with Fog.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903									(0)	3	7	3
1904	0	1	0	0	1	5	0	1	1	8	4	0
1905	0	0	0	2	2	3	5	(2)				
Total	0	1	0	2	3	8	5	3	1	11	11	3

From the hour-observations we sum up:

Number of Cases of Fog.

Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
I	0	0	0	1	2	4	5	2	1	6	3	0
II	0	0	0	1	0	5	1	0	0	3	3	1
III	1	1	0	0	1	4	2	1	0	6	9	5
Total	1	1	0	2	3	13	8	3	1	15	15	6
Smoothed	2.2	0.8	0.8	1.8	5.2	9.2	8.0	3.7	5.0	11.5	12.8	7.0

A smoothed curve gives maximum in November and June and minimum in February and August. The total number of observations is 68 on 49 days. In this number one day in January, when haze was noted, is included.

The distribution during year is seen from the following table.

Seasons and Year.

Hour	Winter	Spring	Summer	Autumn	Year
I	0	3	11	10	24
II	1	1	6	6	14
III	7	1	7	15	30
Total	8	5	24	31	68

Least fog occurs in the spring, most during the autumn. Most fog occurs in the evening and the morning, least in the middle of the day. Of the two parts of the year the summer half-year shows fog on 30 occasions on 22 days, the winter half-year 38 on 26 days, or respectively 1.36 and 1.46 per day with fog.

Fog Wind Roses.

Period	N	NE	E	SE	S	SW	W	NW	C
January					1				
February							1		
March									
April				1		1			
May				1		1		1	
June	2.5	2.5			1.5	2	0.5		4
July		1		1	3	1			2
August		1							
September	1								
October	2.5	0.5	1	2.5	1	1	3	1.5	4
November	7	0.5	1.5		1	0.5	1	1.5	2
December	2.5					1	1.5	1	
Year	15.5	5.5	2.5	5.5	7.5	7.5	7	5	12
Weighted Mean	0.027	0.033	0.018	0.070	0.033	0.049	0.041	0.015	0.052

Fog is most frequent with wind from the N, followed by calm and by wind from the SW quadrant.

The Probability (Weighted Mean) *of Fog* is greatest with wind from the SE, next during calm air, followed by wind from the SW quadrant.

Wind. — From the Summary, Table V, we compile the following table for *Frequency of Wind.*

Frequency, Percentage.

Period	N	NE	E	SE	S	SW	W	NW	C
January	26	7	6	2	14	3	7	17	18
February	18	3	1	—	15	12	16	10	25
March	23	2	4	—	13	8	8	26	16
April	27	9	8	11	10	7	7	11	10
May	22	14	8	7	5	11	10	19	4
June	24	13	2	4	11	11	12	17	6
July	22	16	6	8	14	8	1	14	11
August	28	29	10	2	6	2	4	16	3
September	47	5	16	2	5	5	6	10	4
October	24	5	10	7	12	10	9	12	11
November	31	2	7	2	17	5	7	18	11
December	42	8	1	—	3	9	7	18	12
Year	28	9	6	4	11	7	8	16	11

Northwind is the most frequent in the year and also in the separate months, but for some few exceptions. Wind from NW follows next, with 16 against 28 per cent, while wind from S and calm have an average frequency of 11 per cent. In February calm is most frequent. Wind from SE is the least frequent, the average frequency being 4 per cent only. This wind-direction was not recorded in February, March and December.

"Fram II" has 32 per cent Calm and 26 per cent N, meaning that Calm is dominant. Professor Mohn remarks page 234, that this is due to Havnefjord, the winter quarters for 1899—1900, being quite different from the remaining three of the stations. Here they had 70 per cent of Calm and, when there was wind, the directions S and SE were dominant. Not counting this station, Calm is reduced to 20 per cent and the agreement with Gjøahavn becomes closer.

Velocity of Wind, m. p. s.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903.....									(2.4)	4.9	7.0	5.8
1904.....	5.7	3.4	4.6	5.4	8.4	4.6	6.2	6.1	5.9	5.8	6.8	4.9
1905.....	4.7	3.8	5.5	7.3	7.3	6.3	5.6	(7.2)				
Mean	5.2	3.6	5.0	6.4	7.8	5.5	5.9	6.4	4.4	5.3	6.9	5.4
Smoothed	4.9	4.3	5.0	6.4	6.9	6.2	5.9	5.8	5.1	5.5	6.1	5.7

The mean for the incomplete months August and September is weighted. The smoothed curve shows minimum in February and September, maximum in May and November. The range is 7.8 — 3.6 = 4.2 m. p. s. The mean for the year is 5.65 m. p. s. "Fram II" has a mean for the year of 3.67 with a range of 1.75. Here again Havnefjord affects the result with its divergent values. Disregarding this station, we get a mean for the three other winter quarters of 4.34 m. p. s. The two winter quarters at Gaasefjord alone give 5.02 m. p. s., in close agreement with the result in Gjøahavn.

No daily period can be established by means of three daily observations only, but it may be of interest to examine what the data show as to an average diurnal variation of the velocity of the wind. The following table contains the means of each hour for each month and combined into means for the seasons and for the year. The values for August and September are based on the days with observations and the values for seasons and year represent direct means of the months.

Months.

Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
I	4.80	3.45	5.10	6.40	8.05	5.45	6.25	6.95	4.63	4.70	6.50	5.10
II	5.20	3.80	5.30	6.75	8.20	5.85	6.55	6.61	4.53	5.30	6.95	5.55
III	5.45	3.75	4.75	7.10	7.30	5.05	5.05	5.57	3.92	5.20	7.20	5.40

Seasons and Year.

Hours	Winter	Spring	Summer	Autumn	Year
I	4.45	6.52	6.18	5.28	5.61
II	4.85	6.75	6.40	5.59	5.89
III	4.87	6.38	5.22	5.44	5.48
Mean	4.72	6.55	5.93	5.44	5.66

In the winter there is a suggestion of an increase in the velocity of the wind towards the evening, in the other seasons and the year the strongest wind occurs in the afternoon. "Fram II" gives for the year a daily period with maximum of 3.80 at $2^h\ 30^m$ p. m. and minimum of 3.52 at $0^h\ 30^m$ a. m., which seems to agree with Gjøahavn. The range appears to be greater here at Gjøahavn, $5.89 - 5.48 = 0.41$ against 0.28 from "Fram II."

Calm. From the Summary, Table V, we extract:

Calms. Number of Observations.

Year	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
1903									(2)	14	7	11
1904	8	22	14	11	3	8	8	2	4	6	13	11
1905	26	20	15	7	5	3	13	(1)				
Total	34	42	29	18	8	11	21	3	6	20	20	22

The greatest number of calms occurs in winter, the smallest in summer. Maximum in February, minimum in August and September, secondary maximum in July, secondary minimum in May. Summing up for each of the three hours in each month and taking the mean for each hour, we get an idea of the daily march:

Months.

Hours	Jan.	Feb.	March	April	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.
I	7.0	6.5	5.0	4.0	1.5	2.0	2.0	0.0	0.6	3.0	3.0	3.5
II	4.5	6.5	2.0	2.0	1.5	1.0	3.0	0.7	1.2	3.5	3.0	4.5
III	5.5	8.0	7.5	3.0	1.0	2.5	5.5	1.5	1.7	3.5	4.0	3.0
Mean	5.67	7.00	4.83	3.00	1.33	1.83	3.50	0.73	1.17	3.33	3.33	3.67
Smoothed	5.50	6.12	4.92	3.04	1.87	2.12	2.39	1.53	1.60	2.79	3.42	4.09

Seasons and Year.

Hours	Winter	Spring	Summer	Autumn	Year
I	5.67	3.50	1.33	2.20	3.175
II	5.17	1.87	1.57	2.57	2.783
III	5.50	3.83	3.17	3.07	3.892
Mean	5.45	3.07	2.02	2.61	3.283

The three daily observations suggest a minimum in the afternoon and a maximum during the night. Winter and spring show this variation, while summer and autumn show a rise from morning till night. The average for the year agrees with "Fram II," where the minimum occurs at 3 p. m. and the maximum at 3 a. m., with a range of 11.1 — 10.1 = 1.1.

Dynamic Wind Roses, m. p. s.

Period	N	NE	E	SE	S	SW	W	NW
January	6.5	7.0	7.4	6.2	5.9	6.2	5.8	6.0
February	5.4	4.9	3.0	—	5.0	4.5	4.3	5.0
March	7.5	6.8	4.6	6.4	6.4	5.3	5.8	7.1
April	8.7	7.1	5.3	6.8	6.9	5.8	5.4	8.2
May	8.7	8.6	8.4	7.8	7.6	7.5	7.8	8.5
June	6.0	5.4	5.0	5.6	5.5	5.3	6.0	6.5
July	6.6	7.0	6.7	5.3	4.8	4.2	5.9	6.5
August	7.5	6.3	4.5	4.2	5.3	4.2	5.9	7.4
September	4.6	4.4	4.3	4.9	5.4	4.5	4.7	4.8
October	5.7	6.2	6.4	5.7	5.2	5.3	6.0	5.8
November	7.5	7.8	6.9	8.0	8.0	6.9	5.2	6.4
December	5.8	5.4	4.3	—	5.1	5.0	5.1	5.7
Year	6.72	6.21	5.61	6.21	6.26	5.06	5.02	6.70

The strongest winds are N and NW, the weakest W and SW. The difference between the strongest and weakest amounts only to 6.72 — 5.02 = 1.70 m. p. s.

Number of Strong Winds, Velocity ≥ 10 m. p. s.

Wind	Jan.		Feb.		Mar.		April		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Total	p.ct.
	04	05	04	05	04	05	04	05	04	05	04	05	04	05	04	05	03	04	03	04	03	04	03	04		
N	1	8	1	1	1	9	2	18	1	3	–	1	3	5	6	5	–	8	–	7	9	11	12	3	115	31.8
NNE	–	1	–	–	–	–	–	1	4	–	–	1	4	1	1	–	–	1	–	–	–	–	–	–	14	3.9
NE	1	–	–	–	–	–	–	1	2	2	–	–	2	3	1	1	–	–	4	–	–	–	–	–	17	4.7
ENE	2	–	–	–	–	–	–	–	2	2	–	–	–	–	–	–	–	–	–	–	–	1	–	–	7	1.9
E	3	–	–	–	–	–	–	1	3	–	–	–	–	–	–	–	4	1	3	–	–	1	–	–	16	4.4
ESE	–	–	–	–	–	–	1	–	2	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	6	1.7
SE	–	–	–	–	–	–	2	1	1	–	1	–	–	–	–	–	–	–	1	–	1	1	–	–	8	2.2
SSE	–	–	–	–	–	–	–	–	–	2	2	–	1	–	–	–	–	–	1	–	–	–	–	–	6	1.7
S	–	2	–	2	5	2	2	3	–	2	1	–	–	–	–	–	1	–	–	3	9	7	–	–	39	10.8
SSW	–	–	–	1	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	2	1	1	–	–	8	2.2
SW	–	2	–	1	1	–	–	–	–	5	–	–	–	–	–	–	–	–	–	–	–	–	–	–	9	2.5
WSW	–	–	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	–	–	–	–	–	–	–	2	0.5
W	3	–	–	–	–	–	1	–	1	3	–	1	–	–	–	–	–	1	4	1	–	–	–	–	15	4.5
WNW	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	0.8
NW	2	–	1	1	1	–	1	1	5	2	–	3	3	2	1	–	–	–	1	–	–	–	–	2	26	7.2
NNW	5	–	2	–	4	6	9	2	7	2	3	4	4	–	7	1	1	1	–	5	–	2	3	3	71	19.6
Totals	17	13	4	6	12	17	18	28	31	27	8	10	17	11	16	(7)	(6)	12	17	18	20	24	15	8	362	100
	30		10		29		46		58		18		28		23		18		35		44		23			
Percentage	8.3		2.8		8.0		12.7		16.0		5.0		7.7		6.3		5.0		9.7		12.2		6.3		100	
Smoothed	6.4		5.5		7.9		12.3		12.4		8.4		6.7		6.3		6.5		9.2		10.1		8.3			

where 03, 04 and 05 stand for the years 1903, 1904 and 1905.

Number of Strong Winds, Velocity ≧ 15 m. p. s.

Wind	Jan.		Feb.		Mar.		April		May		June		July		Aug.		Sept.		Oct.		Nov.		Dec.		Total	p.ct.
	04	05	04	05	04	05	04	05	04	05	04	05	04	05	04	05	03	04	03	04	03	04	03	04		
N	1	3	–	–	–	–	–	7	1	–	–	–	–	2	–	1	–	3	–	1	1	3	3	2	28	30.4
NNE	–	–	–	–	–	–	–	–	2	–	–	1	–	1	–	–	–	1	–	–	–	–	–	–	5	5.4
NE	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	3	–	–	–	–	–	4	4.3
ENE	–	–	–	–	–	–	–	–	3	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	3.3
E	1	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	1	1	–	–	–	–	–	–	5	5.4
ESE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	1	1.1
SE	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1.1
SSE	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1.1
S	–	–	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	–	–	–	7	5	–	–	15	16.3
SSW	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1.1
SW	–	–	–	–	–	–	–	–	–	2	–	–	–	–	–	–	–	–	–	–	–	–	–	–	2	2.2
WSW	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	1	1.1
W	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	–	–	–	–	3	3.3
WNW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NW	1	–	–	–	–	–	–	–	1	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	3	3.3
NNW	2	–	–	–	–	–	3	–	6	2	2	1	–	–	2	–	–	–	–	–	–	1	–	–	19	20.6
Totals	5	3	–	–	–	2	4	8	15	5	4	3	–	4	2	(1)	(1)	5	7	1	8	9	3	2	92	100
	8		–		2		12		20		7		4		3		6		8		17		5			
Percentage	8.7		–		2.2		13.0		21.7		7.6		4.4		3.3		6.5		8.7		18.5		5.4		100	
Smoothed	5.7		2.7		4.3		12.5		16.0		10.3		4.9		4.4		6.3		10.6		12.8		9.5			

The Number of Strong Winds with a velocity equal to, or greater than, 10 m. p. s. and equal to, or greater than, 15 m. p. s. has been tabulated above, for each of the 16 directions for each month and each year. The totals for the incomplete months August and September have been placed in brackets. The total sum for each month is entered at the bottom of the tables and the total sums for each direction to the right. Percentages are given and the annual variation is smoothed. The annual variation is regular, with maxima in May and in November, and minima in February and in August, corresponding to the variation of the mean velocity of wind, except for the secondary minimum, which here occurs in September. During February the wind does not reach 15 m.

The percentages for the directions show that wind from N has the greatest velocity, forming 31.8 per cent of the cases with velocity above 10 m. p. s. and 30.4 per cent of the cases with velocity above 15 m. p. s. Next comes NNW with 19.6 and 20.6 per cent respectively. These two directions have thus more than half of the strong winds. Following these we have S with 10.8 and 16.3 per cent. Strong winds from E and W are rare.

Of 2109 measurements of velocity of wind 362, or 17.2 per cent, give velocities greater than 10 m. p. s., and 92, or 4.4 per cent, give velocities greater than 15 m. p. s. 20 m. p. s. and more was recorded 15 times:

in	1903,	Oct.	1	at	8 a. m.	with	N (5)
»	»	»	»	»	2 p. m.	»	N (5)
»	»	Nov.	25	»	9 a. m.	»	S 20
»	»	»	»	»	3 p. m.	»	S 26
»	»	»	»	»	9 p. m.	»	S 28
»	1904,	Apr.	16	»	3 p. m.	»	NNW 20
»	»	May	22	»	9 a. m.	»	NNE 20
»	»	»	»	»	9 p. m.	»	N 21
»	»	»	24	»	9 a. m.	»	NNW 28
»	»	»	»	»	3 p. m.	»	NNW 30
»	»	»	»	»	9 p. m.	»	NNW 31
»	»	»	25	»	3 p. m.	»	E 20
»	»	»	26	»	9 p. m.	»	ENE 21
»	1905,	Apr.	9	»	9 p. m.	»	N 20
»	»	Jul.	31	»	3 p. m.	»	N 20

On the 24th of May, 1904, the velocity of Wind exceeded 30 m. p. s. and reached in the evening 31 m. p. s., the maximum recorded. This happened in the middle of a period with gales and storm which commenced in the evening of the 21st, with NE 13 m. p. s., and closed on the 26th in the evening, with NE 11 m. p. s., or perhaps on the 28th in the evening, when ESE 10 m. p. s. was still blowing, because on the 27th ENE and NE 8 m. p. s. and 9 m. p. s. were observed. This period of strong wind was the longest and severest which was experienced. On the 22nd in the morning the entrance of the living-house was blocked with snow, for which reason the morning observation could not be taken before 11 a. m.

Other periods with strong wind with a duration of more than 24 hours are found in the following table:

1903,	Sep.	30	at	8 p. m.	—Oct.	2	at	8 a. m.
»	Nov.	24	»	9 p. m.	—Nov.	26	»	9 p. m.
»	Dec.	11	»	3 p. m.	—Dec.	13	»	9 p. m.
1904,	Jan.	10	»	9 a. m.	—Jan.	11	»	9 p. m.
»	Mar.	2	»	9 a. m.	—Mar.	3	»	3 p. m.
»	Apr.	15	»	3 p. m.	—Apr.	17	»	3 p. m.
»	Jul.	10	»	3 p. m.	—Jul.	11	»	9 p. m.
»	»	18	»	3 p. m.	—Jul.	20	»	3 p. m.
»	Aug.	4	»	9 a. m.	—Aug.	5	»	5 p. m.
»	»	16	»	9 a. m.	— »	17	»	9 p. m.
»	Nov.	23	»	3 p. m.	—Nov.	24	»	9 p. m.
»	»	26	»	9 p. m.	— »	28	»	9 p. m.
»	Dec.	2	»	3 p. m.	—Dec.	4	»	9 a. m.
1905,	Apr.	8	»	9 a. m.	—Apr.	10	»	3 p. m.
»	»	11	»	3 p. m.	— »	13	»	9 a. m.
»	»	15	»	9 a. m.	— »	16	»	9 p. m.
»	May	11	»	9 a. m.	—May	12	»	3 p. m.
»	»	16	»	3 p. m.	— »	17	»	9 p. m.
»	»	19	»	9 a. m.	— »	20	»	9 p. m.
»	Jul.	28	»	9 a. m.	—Jul.	29	»	9 p. m.
»	»	31	»	9 a. m.	—Aug.	2	»	9. a. m

Between several of these periods, in November 1904 and in April, May and July 1905, only short intervals of weaker winds occurred.

Great changes in the pressure were not always to be observed, especially during shorter gales, but during the long gale in May 1904 the pressure fell very much. The barometer, which in the morning of the 19th rose above 770 mm. fell during the evening and night. In the evening of the 21st, when the wind velocity increased, the barometer fell to 748 and the following forenoon to 746, but rose to 749 in the following night. After this the barometer again fell to 735.5 mm. in the morning of the 25th. In the preceding evening at 9 p. m. on the 24th a wind velocity of 31 m. p. s. was measured, the direction being NNW.

Aurora Borealis.

According to the Main List R. No. 80, a diary with records as to Aurora is entered as No. 10 in our meteorological list. (See page 16).

The records are communicated *in extenso*.

Observations of Aurora Borealis.

Years	Days	Hours	Aurora Borealis.
1903	November 4	5 30 p.m.	Streamers from SE to zenith.
»	» 8	6 »	Green, magnificent bands from SE to zenith.
»	» 10	5 30 » — 6 20 p.m.	Faint streamers and bands, frequently and briskly changing.
»	» 11	5 20 » — 6 30 »	Faint streamers, S—SW.
»	» 12	3 a.m.	Faint streamers and bands, SE, SW, hor. to zenith.
»	» 12	6 p.m.	Faint horizontal stripe at the south horizon.
»	» 12	11 »	Faint streamer in the south.
»	» 12	12 »	Faint stripe S to W ca. 30° above the horizon. Thick mass of clouds at the base.
»	» 13	12 »	Very faint streamers from the horizon, ca. 45° towards the zenith.
»	» 14	10 »	Cloudlike aurora in S and W, ca. 30° above the south horizon, ca. 10° above the W-horizon.
»	» 14	11 »	Aurora in S and SW, 20° above the horizon with dark clouds underneath, a single streamer 60° towards the zenith.
»	» 14	12 »	Bright stripe SE — N, at the highest 30° above the horizon.
»	» 17	8 20 »	When going from ship, we saw a luminous beam above our lodge, and believed that this was on fire, but reaching the top of the hill we saw the light to be an aurora in the S. It had the shape of a large fire on the ice between us and the horizon. Gradually the streamer lengthened along the ice as far as to the W. Then flickering streamers commenced to stretch towards the zenith. At 6h 15m p.m. growing fog hindered further observation.
»	» 17	10 »	Faint aurora in W, vague in form.
»	» 17	11 »	Very faint aurora in W.
»	» 17	12 »	Widely spreading aurora, but still faint, with its centre at the W-horizon, from there sending streamers towards the zenith. In the northern sky a faint aurora of vague form. Only in S the sky was clear.
»	» 20	8 30 » — 9 p.m.	Strong belt from the S hor. towards SW, altitude ca. 20°.
»	» 22	5 30 »	Faint stripe from S to W horizon.
»	» 23	6 »	Faint aurora as streamers from the S and SW hor. towards the zenith. Ca. 45° high.
»	December 8	9 »	Strong flashing zigzag beams from the SW hor. through the zenith to the E horizon.
»	» 8	11 »	Faint streamers in S.
»	» 9	3 30 »	Faint, bright streamers from the S hor. towards the zenith, ca. 30° high.
»	» 10	5 30 »	Aurora as a faintly flickering flare in the SW horizon.
»	» 15	5 » — 9 p.m.	Arch S—W in SW ca. 15° high.
»	» 17	4 30 »	Very strong aurora as streamers SW-NE through zenith.
»	» 17	5 30 »	Still strong streamers, but on the zenith several larger and smaller spots in lively motion.
»	» 17	9 »	Very faint, hardly visible pavilion in the zenith.
»	» 18	5 » — 9 p.m.	Stripe SW-WNW. Some faint and frequently shifting points at zenith.
»	» 21	5 30 » — 8 40 »	Bands through zenith all around the horizon.
»	» 24	1 a.m.	Very strong band S-WNW ca. 30° above the horizon. From SW a streamer to zenith, fading away towards the zenith, where it wholly disappeared.
»	» 26	11 30 p.m.	Faint streamer from N to zenith, where it entirely went out.
»	» 30	8 a.m.	Strong zigzag band from N hor. to zenith, frequently changing to flickering streamers that rapidly died away.
1904	January 5	5 p.m. — 6 p.m.	At hor. S-W. On the SW a faint streamer to the zenith.
»	» 5	10 »	Strong flickering streamers SE-WNW, stretching from the hor. to zenith, there forming a pavilion (aur. corona).
»	» 6	4 30 » — 9 »	Bands and zigzag streamers at the hor. ESE-NW stretching to zenith, rapidly shifting in power and colour. Greatest intensity between 5h and 5h 30m.

Observations of Aurora Borealis (continued).

Years	Days		Hours		Aurora Borealis
1904	January	13	4 20 p.m.	— 8 p.m.	Flickering, fairly strong aurora over the entire sky in SSE-NW. $6^h\ 30^m$ a broad band S-W through zenith separated from the other by a deeper reddish yellow-coloured band.
»	»	16	5 30 »	— 6 »	Faint zigzag band from S and W horizon to the zenith.
»	»	21	5 »	—11 »	A faint streak S-W with its summit 20° above the horizon.
»	»	22	4 30 »	— 9 »	Faint streak in the S.
»	»	23	5 40 »	.....	A faint streak from zenith towards the N-horizon.
»	February	2	6 »	— 8 30 »	Faint streak S-SW.
»	»	5	10 »	.....	Streamers from N hor. 15° up towards the zenith.
»	»	6	5 »	.....	Faint, detached aurora ESE-SW from the zenith towards the horizon.
»	»	6	8 40 »	.....	A streamer at the horizon in E-SW, from which in ESE a strongly luminous zigzag band went to zenith.
»	»	7	5 »	— 9 »	Very faint aurora over the entire sky.
»	»	8	6 »	.....	Faint light in SSW.
»	»		6 30 »	.....	Bright arch S-W with its summit in SW ca. 15° in height.
»	»	15	8 30 »	.....	Of a sudden from the S-horizon a streamer, at first fairly faint but successively increasing in intensity of colour and stretching right up to zenith.
»	»	15	9 »		Strongly flickering aurora over the entire sky, the NE quadrant excepted.
»	»	15	10 »	.....	Over the entire sky
»	March	7	9 »	.....	Band S-NW.
	»	12	8 »	.....	Strong band stretching E-SW, in ESE ca. 15° high.
»	October	9	9 »	.....	Streamer S-W, ca. 10° broad, 15° from the horizon and parallel to it, perpendicular to the belt and going out from it in SW a streamer ca. 5° wide.
»	»	12	10 »	.....	Band-shaped aurora in SW at a height of 30°, some very faint streamers.
»	»	27	6 »	.....	Very faint, detached aurora in zenith.
»	»	28	6 »	.....	Faint bands from N-horizon to zenith.
»	»	30	6 »	— 9 p.m.	Faint band S-SW ca. 2° from and parallel to the horizon.
»	»	30	10 »	.....	Strongly bright and undulating band SE-S, below well defined, above sending out constantly changing branches. The band lowest in SE, height of the lower edge ca. 30°, breadth of band ca. 5°. In S a luminous cloud beneath in intense oscillating motion, diameter ca. 10° S-W. From underneath this cloud a bright band of the same nature as the first raising its western lower edge to a height of 20°, rapidly fading.
»	November	3	10 »	.....	Very faint aurora ca. 45° above the horizon, in N looking like a rather small cloud.
»	»	4	9 30	.....	Aurora in S like that of yesterday.
»	»	7	8 30 »	— 10 p.m.	An auroralike, very slightly luminous cloud SW-W.
»	»	8	9 »	.....	Band S-SW, parallel to the horizon and 20° over it.
»	»	13	8 30 »	— 9 »	Very slightly bright band stretching from the horizon in S towards SW, where its altitude was ca. 15° above the horizon.
»	»	15	6 20 »	— 10 p.m.	Aurora SSE-NW from horizon to zenith, here forming a magnificent pavilion $9^h\ 10^m - 9^h\ 30^m$. Deep colours and very vivacious motions.
»	»	16	10 »	.....	Band from SE through zenith towards NW, slightly bright.
»	»	26	6 »	.....	Strongly luminous, detached streamers S-SW from horizon towards zenith.
»	»	27	8 »	.....	Slightly luminous band from zenith down towards horizon in NW.
»	»	30	4 30 p.m.	— 10 15 pm.	Slightly luminous band as an arc SE-NW with an altitude in SW of 40° above the horizon.
»	December	6	a.m.	.....	Slight bright patch, with the appearance of a cloud in SW, 60° from the horizon.
»	»	6	6 15 p.m.	.....	Very faint band in W stretching from the zenith down towards the horizon.

Observations of Aurora Borealis (continued).

Years	Days	Hours	Aurora Borealis
1904	December 9	6 p.m. —10 p.m.	Faint aurora in patches dispersed over the entire sky, frequently disappearing at one place and appearing at another. $7^h\ 40^m$—8^h strongly bright streamer from SE horizon through zenith down towards NW, briskly moving.
»	» 26	9 »	Faint streak at the horizon S-NW.
»	» 27	8 »	Strong streamer from SE horizon through zenith towards NW horizon.
»	» 29	6 30 » — 10 p.m.	Band S-NW stretching as a bow, summit 10° above the horizon. Colour green. No motion.
»	» 31	7 30 »	Very faint light at the horizon S-W.
1905	January 1	10 »	Faint light at the horizon S-W.
»	» 2	6 » —10 p.m.	Slightly luminous arch S-W, height-above the horizon in W. ca. 15°.
»	» 6	7 30 »	Arch SSE-SW, slightly bright and little motion, height at the horizon in SSW ca. 10°.
»	» 7	6 » —10 30 p.m.	As yesterday.
»	» 10	6 » —10 »	Aurora SE-NW, brisk motions, sometimes dispersed over the entire sky as a veil, at other times appearing in streamers arching SE-NW and with much deeper colours than the dispersed one.
»	» 25	6 » —10 »	Much dispersed and slightly luminous aurora S-NW. 9 p.m., a faint streamer from S towards the horizon.
»	» 27	6 » —10 »	Slightly bright and dispersed aurora in S.
»	February 1	6 30 » — 9 »	Slightly bright aurora dispersed over the entire sky.
»	» 2	7 »	Streamer SE through zenith towards W. At the same time a faint stripe in S, ca. 10° above the horizon.
»	» 5	6 » — 8 30 p.m.	Slightly luminous arch SE towards NW. In SW, ca. 10°, in NW ca. 5° above the horizon.
»	» 6	6 30 » — 9 »	As yesterday.
»	» 10	9 »	Streamer S, ca. 20° above the horizon, slightly luminous and of very small extension.
»	March 1	9 »	Faint streak above the horizon in S.
»	» 2	6 30 » — 9 15 p.m.	Aurora dispersed over the entire sky from a strongly bright pavilion in zenith.

On board the "Gjøa" one Aurora was observed in September 1903 and three in October. Counting these, we get the following summary of the distribution.

Number of Days with Aurora Borealis.

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March
1903	1	3	11	10			
1904	0	5	10	6	7	6	2
1905	—	—	—	—	7	5	2
Totals	1	8	21	16	14	11	4

This gives 75 days with 94 observations.

During the months April—August no Aurorae were observed, in September one and in March four, while the greatest number were observed in November. These data indicate a rapid increase of the Aurora frequency during the autumn and a rapid decrease in the spring.

This distribution may partly be explained by the fact that the cloudiness was small in the winter, but the limitation of the Aurora-records to the period between the equinoxes is probably due to the circumstance that Aurora occurred when the observers were asleep, usually between 10 p. m. and 6 a. m. It is characteristic that the only observation after midnight was made on the first Christmas Eve, 1903, at 1 a. m. On December 26th in the same year, an observation is recorded at 11.30 p. m., but later there is only one observation after 11 p. m., namely on the 21st of January 1904. On earlier occasions 4 observations were taken at about 11 p. m., 3 at about 12 p. m. and one at 3 a. m. The sun was continuously above the horizon from May 24 to July 19.

Optical Phenomena.

The Main List R. No. 84, here No. 14 (page 16), Supplementary Remarks, contains almost exclusively Optical Phenomena, partly supplemented with drawings. These observations have been entered in the following table:

Optical Phenomena.

Year	Day	Hours	Phenomena.
1903	October 23	9 a.m.	Rainbow-like reflex on each side of the sun at a distance of ca. 20°. The breadth of the reflex is ca. 2°, height ca. 12°.
»	» 25	9 »	Sun reflex like that of the 23rd.
»	November 1	Noon	Cirrus clouds as bands from N through the zenith to the S horizon.
»	» 7	6 p.m. — 7 p.m. ...	At nearly full of the moon mock-moons on each side, at a distance from the moon of ca. 15°, besides pillar through the moon with height of 25°. The air was hazy.
»	» 19	3 »	Cirrus-like high clouds in parallel stripes from N through zenith to S.
»	December 3	3 »	As the foregoing.
		9 »	Lunar halo.
1904	January 23	3 »	A dark, cirrus-like cloud from S horizon towards E horizon.
»	» 27	9 »	Lunar corona. The air a little hazy.
»	» 28	4 30 »	Lunar Corona.
»	» 29	9 »	Lunar halo.
»	February 11	9 a.m.	A high, band-shaped stratum of cloud N-S through the zenith.
»	» 26	9 p.m.	Lunar halo.
»	» 28	9 »	Lunar corona.
»	March 29	3 »	Sun reflexes on each side at a distance of ca. 15°. At zenith a rainbow-like ring.
»	April 1	6 20 »	Reflex on each side of the sun.
»	October 13	10 a.m.	3 reflexes round the sun, one on each side and one above, extending 10°. Besides the side reflexese each had a reflex at a distance of ca. 180°, these reflexes were rather small.
»	»	3 p.m.	Reflexes on each side of the sun.
»	» 22	10 a.m.	Rainbow in north.
»	» 23	3 p.m.	A reflex on each side of the sun at a distance of ca. 10°.
»	» 24	10 a.m.	Idem.
»	» 25	10 »	Reflex on each side of the sun and above, distance ca. 10°. The reflex at the height of 8°.
»	» 28	8 »	A vertical reflex (pillar) through the sun, height ca. 20°.
»	» 29	8 30 »	Reflex on each side of the sun and above, distance ca. 10°, height ca. 10°.
»	» 30	2 30 p.m.	Side reflex of the sun.
»	November 3	Noon	Fog rainbow in N.
»	» 13	Noon	Side reflexes at the sun.
»	» 14	8 30 p.m.	Reflex on each side of the moon and a pillar through it.
»	» 16	9 »	Idem.
»	» 27	9 30 »	Lunar halo.

Optical Phenomena (continued).

Year	Day	Hours	Phenomena.
1904	December 22	8 a.m.	Pillar through the moon.
»	» 23	8 »	Lunar corona together with a pillar.
		6 20 p.m.	Lunar halo.
»	» 25	11 »	Lunar halo.
»	» 26	9 »	Moon-pillar.
1905	January 20	9 »	Lunar halo.
»	» 21	9 »	Lunar halo.
»	» 22	9 »	Lunar halo, very faintly luminous.
»	February 16	3 »	Side reflexes of the sun.
»	» 17	10 a.m.	Reflex on each side of the sun and above.
»	March 15	Noon — 1 p.m.	Lunar halo with mock-moons and a reflex above.
»	» 31	4 30 p.m.	Double solar halos with a bow above the sun tangent to the inner halo and with horizontal and vertical circles. Opposite at a distance of 180° a faint pillar.

III. THE VOYAGE GJØAHAVN — KING POINT

On the 13th of August 1905, the "Gjøa" weighed anchor in order to proceed on her voyage through the North-West-passage and on the 3rd of September she was moored to an ice-floe off King Point.

The arrangement of the meteorological work on board was the same as during the first voyage, Oslo—Gjøahavn, with the same set of observations (pressure, temperature of the air and of the sea, wind, clouds and precipitation) every two hours, day and night. The 24 hours were divided into six-hour watches, 8—2 and 2—8. The observers are not stated, but these were probably Ristvedt and Wiik, nor is any special information given as to the instruments which were used.

Barometers. The two aneroids, Krogh No. 153 and No. 154, were read and the numbers always recorded, as had been done the whole time since the departure from Oslo. Readings of "The Old," the ship barometer, had been discontinued already on the 19th of October 1903, but no reason is mentioned. The barometers read 8 or 9 mm. to high, but when controlling the readings only the differences were taken into account. When readings are taken every second hour, the changes are small and any considerable deviation between the two readings probably arises from mistakes, and from the general change in the pressure the mistake is found. By this method mistakes smaller than 2 mm. have been corrected. In some cases both aneroids were misread in the same direction, and in most instances the mistakes were so great that no doubt was left. However, possible small mistakes of this kind have not been altered.

In this way every reading during the voyage between Gjøahavn and King Point has been controlled, and, if necessary, changed, from the start at 8 a. m. of the 13th of August until 8 p. m. on the 30th of September, when the sea observations ceased. However, the actual sea observations with readings every two hours were discontinued at 8 p. m. on the 22nd, and from 8 a. m. on the 23rd term observations at 8, 2, 8, were taken and thus the control for the last week of September has been more difficult.

The corrected readings of aneroid No. 153 have been entered into Table VI. Treating the first voyage, the standard correction was found to depend primarily on the temperature. At Gjøahavn, as well as at King Point, both aneroids were read

regularly, together with the two mercury barometers. Thus a good material for comparison exists. The simultaneous readings of the aneroid No. 153 and the mercury barometer Adie No. 763 from the last month before the departure from Gjøahavn and from the first month at King Point have been examined. These readings give:

Jul.—Aug, 1905 . . . . .corr = — 0.088 (T — 7.56) — 1.179 = = 0.088 (T + 5.84)
October, 1905 . . . . . .corr = — 0.088 (T — 11.57) — 1.170 = — 0.088 (T + 8.54)

As will be seen, a small parallel displacement has taken place during the voyage, therefore the mean value has been used. A comparison with the corrections which were found in November 1903, (— 0.078 (T — 7.21) — 1.74), shows that the correction line has turned slightly.

Thermometers. The absence of information as to which thermometers were used appears more serious, but there can be question about very few numbers only. During the first voyage two sling thermometers were used, toluol No. 892, until August 1903, when it was exchanged for mercury No. 7. No reason is stated. At Gjøahavn No. 7 was interchanged with toluol No. 893 and No. 894. At King Point No. 7 was used during the first part of the stay and later, some time in the winter, replaced by No. 887, No. 892 cannot be seen to have been used later on, although it was returned undamaged from the Expedition together with No. 887 and No. 12. Considering these circumstances, it has been assumed that No. 7 was used during the voyage. The correction of this thermometer was 0.0° at zero, and it is supposed to have been 0.0° also at other values of temperature.

Sea Thermometer. The measurements of the temperature of the sea have probably been undertaken by means of the thermometer which was used during the first voyage, $^1/_5°$ mercury, Küchler No. 933.

As to the rest of the observations, I refer to the first voyage. (The material is to be found in the Main List, page 16, as No. 8 and No. 9 according to the numbers used for meteorology).

The table of observations, Table VI, corresponds exactly with the table of observations from the first voyage.

When going westward through the narrow passages no dead reckoning was undertaken, but the noon position of every day was taken out from the maps and entered in the meteorological diary. The log-book contains some observations of latitude and longitude, and as they after the passage proceeded towards the Herschel Island the course is entered. Furthermore, the log-book gives many notes as to the land they passed. These notes have been placed at the foot of the tables with reference numbers in the column for longitude.

About noon on the 3rd of September the "Gjøa" was moored to an ice-floe off King Point, and on the 5th, in the forenoon, they had to shift her around to the inside of the floe, on account of a fresh breeze from the NW. Expecting the ice to slacken, they carried on the observations every two hours until the 22nd, at 8 p. m. Already on the 9th the ice was strong enough to bear a man and they had to face a new winter Consequently they commenced to make preparations for wintering and already on the 1st of October the ordinary station observations were started. The observations were continued on board with the sea instruments, but at the hours 8^h, 2^h, 8^h, from the 23rd of September until the end of the month and from the 1st of October with station instruments, thermometers and hygrometer in a screen on the ice. All observations from September are therefore placed in the sea tables.

IV. KING POINT

At King Point the construction of a living-house ashore was begun on the 11th and the 15th of September it was roofed.

During the greater part of the stay at King Point, the meteorological observatory was arranged on board the "Gjøa," where Lieutenant Hansen was in charge of the observations as well as the astronomical work. When the ice became unsafe and because the cabin of the "Gjøa" was to be painted, the observatory was on the 28th of May 1906 transferred to the living-house on shore. No direct information is given as to how the meteorological observatory was arranged, but from a letter which Ristvedt wrote to Amundsen when the latter paid a visit to Herschel Island, and from Amundsen's report from this excursion, we are able to get an idea of how the arrangement was. The barograph and the four barometers were placed in the stern-cabin of the "Gjøa." On the ice, near the ship, a new meteorological screen with the thermograph, the thermometers and the hygrograph was placed. Near by was placed the precipitation gauge.

As long as the observations were taken on board the "Gjøa" the height of the instruments above sea level may be put at 0, but at the shore station the height is uncertain, and has probably never been measured. From some photographs of the station at King Point the height has been estimated at between 5 and 10 metres.

The Geographical Position of the Station at King Point was, according to the astronomical observations:

$$\varphi = 69^\circ\ 6'\ 40''\ \text{N},\quad \lambda = 138^\circ\ 8'\ 2\ \text{W}.$$

Nothing is stated as to what locality these co-ordinates refer to, but as only three localities can be considered, the ship, the living-house or the variation house (as to this last place, it is only stated that it was built on a small hill about 200 metres from the living-house), distributed over a distance of 150 metres in a north-south direction, the uncertainty of the latitude should amount to about five seconds. The co-ordinates are, therefore, taken as:

$$\varphi = 69^\circ\ 7'\ \text{N},\quad \lambda = 138^\circ\ 8'\ \text{W}.$$

The Observations.

As at Gjøahavn, all efforts had to be directed towards preparations for the winter, as soon it became evident that another wintering was necessary, but the observations were continued in order to avoid gaps. Observations were as already mentioned taken every second hour until the 22nd of September, at 8 p. m., when term-observations at 8^h, 2^h, 8^h began. On the 1st of October all the instruments which were to be used during the following months had been mounted, but on the 28th of May they were removed to the living-house ashore, where they remained until the 30th of June, after the evening observation. The continuous records of pressure and temperature commenced on the 2nd of October, at 8 a. m., and continued until the 30th of June at 8 p. m. The values at the last four hours of this day and the values on the 1st of October and the following seven hours of the 2nd have been extrapolated in order to obtain full months.

The King Point Station must be considered as a station of II order, with records of pressure and temperature.

Instruments and Observations. — *Pressure.* The two aneroids, Krogh No. 153 and No. 154, and the two mercury Adie C. 763 and C. 764, were always read three times daily. The tables are based on the readings of No. 763, and the three other

readings have been used as a control. The readings of 763 have been corrected for errors of stand according to the formula:

$$\text{Corr.} = -0.11 + 0.0179\,(b - 755),\ \text{M E} = \pm 0.11\ \text{mm}.$$

and have in the usual way been reduced to the temperature 0° C, to 45° of latitude, and to sea level, assuming the height above sea level to be 0 meter, until the 28th of May in the evening. From this date the reduced values are perhaps half a millimeter too low as compared with the values from the preceding months.

The Barograph functioned fairly well. Only some days in January and a few hours in October, February and March had to be interpolated, and also 5 and 6 p. m. on the 28th of May, when the barograph was moved ashore. The clock lost or gained irregularly, as in Gjøahavn. The paper was not always changed at the exact hour and now and then the curves overlap on account of a too late change of paper. The time for change of paper was on the 23rd of October altered from 8 p. m. to 9 p. m. Hour-marks were put on the paper at 2 p. m., and afterwards strengthened by ordinary ink, adding "2 p. m." These marks were occasionally misplaced. Some of the diagrams appear to have been marked more often than at 2 p. m.

The Thermograph Screen (the meteorological screen) has not been described, but Ristvedt states that it was placed on the ice, on posts of one metre in height, and Amundsen states, in the before-mentioned report, that Lund had constructed the screen thus in order that drifting snow should not accumulate in it. However, it appears to have been almost airtight, because the temperature in the screen rose excessively during sunshine. According to a note in the Journal on the 6th of March at 2 p. m. a new screen was put up. This screen did not protect against drifting snow, as the hair hygrometer on the 2nd of April in the morning was full of snow.

In the screen the thermograph, the dry and wet thermometer, the maximum and minimum thermometers and the hair-hygrometer were placed.

The Thermograph is probably the same as the one which was used at Gjøahavn. Some trouble was experienced, but the stops were not so frequent as before, probably because of the experiences of the two preceding years.

The Thermometers of the psychrometer were also the same, except that the dry and wet thermometers were interchanged. No. 929 was now wet and No. 932 dry. These were used until the 7th of December 1905, and from the 28th of March 1906. As maximum thermometer they used a half-degree mercury one, No. 910, and as minimum thermometer a full-degree toluol, No. 917. As sling thermometer the full-degree mercury thermometer No. 7 was used until 7th of December and after the 28th of March. Between these dates the toluol sling thermometer No. 887 was used. In the Journal for Meteorological Phenomena and Thermometer Corrections, Main List No. 83[1]), these thermometers were several times tested in melting snow. At these tests the following readings were obtained:

Thermometer Küchler	Merc. $^1/_5°$		Merc. $^1/_1°$		Toluol $^1/_1°$		Date
	wet 929	dry 932	Max. 910	Sling 7	Min. 917	Sling 887	
In melting snow.	0.00	+ 0.05	− 0.1	0.0	0.0	—	$^1/_{11}$ 05
	—	—	− 0.1	0.0	0.0	0.0	$^7/_{12}$ 05
	—	—	− 0.1	—	0.0	0.0	$^{12}/_1$ 06
	—	—	− 0.1	—	0.0	0.0	$^{20}/_2$ 06
	+ 0.05	+ 0.05	− 0.1	0.0	+ 0.4	—	$^{28}/_3$ 06
	+ 0.05	+ 0.05	0.0	0.0	+ 0.4	—	$^7/_5$ 06
	+ 0.01	+ 0.01	0.0	0.0	+ 0.4	—	$^{20}/_6$ 06

[1]) Page 16. Met. List No. 13.

The corrections are thus the above figures with opposite signs. The toluol sling thermometer No. 887 was together with other thermometers tested at — 19° C in March 1903, and had, according to the "The Corr. Protocol of the Institute," a correction of + 0.5°, while the correction at zero was 0.0°. As, according to the above cited examination at King Point, the zero point has remained unaltered, one may expect that the correction at — 19° also has remained unaltered, in spite of the fact, that a test of the zero point at the Institute in May 1907 gave — 0.65°. Since the tables have been based on the readings of the sling thermometers, which are the most reliable, the corrections of 887 has to be taken into account. As at Gjøahavn (page 40), the correction + 0.5° has been applied to reading below — 15.0°, and 0.0° to readings above — 15.0°, the readings of the other thermometers were used as control when doubt arose, or when supplementary values were needed. Maximum and minimum values were read from the thermograms.

The Hair-Hygrometer is probably also the same as the one used at Gjøahavn. The psychrometer was not used during the winter. The readings of the hygrometer, therefore, are entered in the tables and the psychrometer has only been used as control, and for supplements when it was possible to use it. The hygrometer has frequently failed, and 26 lacking data have been interpolated. On the 16th of December the hygrometer showed 50 per cent at 2 p. m. The observer thought this reading suspicious, as the morning reading was 84. He took it into the house for examination, but found nothing wrong. It was placed back in the screen on the 17th and at 8 p. m. it showed 55 per cent. Since the 15th the wind had blown from SSE (5 to 9 m. p. s.). This means wind from the land towards the sea, which had brought clear sky. On another occassion, on the 2nd of April, at 8 a. m., the instrument was filled with snow and had to be cleaned. The hygrometer was tested on several occasions and was always found correct. Hence no correction has been applied, except that half per cents have been left out.

The Absolute Humidity is computed by means of the relative humidity and the temperature. The month September has no measurements of the humidity.

The Direction of Wind was taken as true, using 16 directions. The velocity was measured in metres per second by the hand anemometer. During September the force was estimated according to a scale, 0—6, where 0 means calm and 6 storm.

Amount of Clouds was recorded according to the scale 0—10.

Form of Clouds was recorded, using international abbreviations.

Kind of Precipitation is in the tables entered with international signs.

Amount of Precipitation was measured in millimetres, whole and tenths. September has no measurements of precipitation. On the whole these measurements are rather incomplete.

Aurorae were entered in a separate journal, where 77 observations are recorded, often several on the same day. They are entered with short descriptions and partly an estimated height is added.

Halos of Sun and Moon, and other optical phenomena were entered in the book containing temperature corrections. Otherwise I may refer to the remarks in the Introduction to the observations at Gjøahavn.

The Material is contained under following numbers in the List in the Introduction, 3, 4, 9, 11, 13, 19 and 20. No. 3 and 4 are barograms and thermograms. No. 9 is a copy of No. 19 and No. 20, containing the original observations during the last part of the stay at Gjøahavn, on the voyage to King Point, and during the stay there. The copies have been compared with the originals and during the discussion both have been corrected when obvious mistakes occurred. Thus two sets of controlled observations

are available. No. 11 is the Aurora Journal, and No. 13 the Journal for Optical Phenomena and Thermometer Corrections. In the tables interpolated and corrected values are printed in italics.

Continuous Records of Pressure and Temperature.

Before dealing with the records, we shall discuss the three-weeks long series of direct readings, which were taken every second hour in September on board the "Gjøa", from the 3rd to the 22nd of September, when they were occupied with arrangements for the coming winter (TableVII). Unfortunately they exchanged these for three term observations on the 22nd at 8 p. m. but the missing 10 p. m. and midnight of the 22nd have been interpolated. The readings of the 1st and the 2nd and the forenoon of the 3rd shall also be included in the following discussion. The "Gjøa" was rather far away from King Point during the greater part of this time, but the meteorological conditions cannot have differed very much.

The following table contains the *Daily Period* for each of the four elements, *Pressure, Temperature, Wind Force and Amount of Clouds*, as computed from the data in Table VII and entered as deviation from mean after application of correction for non-cyclic change. The observed values are entered in the first lines under each element and indicated by o. The second line, c, gives the smoothed values, according to the formula 1/4 (a + 2 b + c), while the lowest line, d, gives the difference, o — c.

King Point.
1905. **September** *1—22.*
Deviation.

Observed (o) and computed (c) mean values, and their difference (d = o—c).

Daily Period.

Element	2	4	6	8	10	Noon	2	4	6	8	10	Midt.	
Pressure 0.01 mm.	− 4	−18	− 5	−24	+12	+ 3	+ 12	+10	− 2	− 1	+ 4	+17	o
	− 2	−11	−13	−10	+ 1	+ 8	+ 9	+ 7	+ 1	0	+ 6	+ 9	c
	− 2	− 7	+ 8	−14	+11	− 5	+ 3	+ 3	− 3	− 1	− 2	+ 8	d
Temperature 0.01°.....	−43	−62	−63	−54	+ 3	+54	+103	+50	+43	− 1	− 4	−29	o
	−44	−56	−61	−42	+ 2	+54	+ 78	+61	+34	+ 9	− 9	−26	c
	+ 1	− 6	− 2	−12	+ 1	0	+ 25	−11	+ 9	−10	+ 5	− 3	d
Wind-Force (0—6) $\frac{1}{100}$	+11	+ 8	+ 9	− 2	−11	−20	+ 3	0	+ 3	− 7	− 2	+13	o
	+11	+ 9	+ 6	− 2	−11	−12	− 3	+ 1	0	− 3	0	+ 9	c
	0	− 1	+ 3	0	0	− 8	+ 6	− 1	+ 3	− 4	− 2	+ 4	d
Cloud-Amount (0-10) $\frac{1}{100}$	+34	− 7	−12	− 7	+61	+29	+ 2	−30	−80	− 3	+38	−25	o
	+ 9	+ 2	−10	+ 9	+36	+30	+ 1	−34	−48	−12	+12	+ 5	c
	+25	− 9	− 2	−16	+25	− 1	+ 1	+ 4	−32	+ 9	+26	−30	d

In order to obtain a full month for September the hourly means for 30 days have been interpolated by the means of the three 30-day terms and the hourly means of 22 days. The following method was used.

First the difference between the 8 a. m., 2 p. m. and 8 p. m. observations of the 22 days and the 30 days were computed. The corresponding differences in the intervals between 8 a. m. and 2 p. m. and 2 p. m. and 8 p. m. were obtained by linear interpolation, the differences between 8 p. m. and midnight by extrapolation on the basis of the differences at 2 to 8 p. m. Thus the mean value at 24 o'clock could be found. The difference between the mean at this hour and the mean at 0 o'clock must be equal to the difference between the first and the last midnight of the month devided by the number of days in the month. The value at the last midnight in the month is unknown and is found by interpolation. The difference between the means at 24^h and 0^h can then be computed and adding this

difference to the mean at 24^h we find the mean at 0^h. The difference between this mean and the corresponding mean for 22 days gives a basis for interpolation between 0^h and 8 a. m.

This method is perhaps better explained by means of the following example. Using the pressure, we have for 22 days the following 12 hourly means, indicated by (22) while (30) represents the means for 30 days.

Sept.	0	2	4	6	8	10	MD	2	4	6	8	10	MN
(22)	61.27	61.08	60.96	61.12	60.95	61.33	61.26	61.37	61.37	61.27	61.31	61.38	61.53
(30)	—	—	—	—	60.55	—	—	60.79	—	—	60.70	—	—
(30)—(22)	—	—	—	—	— 0.40	—	—	— 0.58	—	—	— 0.61	—	—
	— 32	— 34	— 36	— 38		— 46	— 52		— 59	— 60		— 62	— 63
(30)	60.95	60.74	60.60	60.74	60.55	60.87	60.74	60.79	60.78	60.67	60.70	60.76	60.90 + 0.05

At the first midnight of the month, 0 o'clock between $^{31}/_{8}$ and $^{1}/_{9}$, the pressure was 56.6 while at the last midnight, MN between $^{30}/_{9}$ and $^{1}/_{10}$, the interpolated value is *55.0*. The difference, 56.6 — *55.0* = + 1.6, divided by 30 gives + 0.05. This difference is equal to the difference between $0_{(30)}$ and $MN_{(30)}$ or:

$$0_{(30)} = MN_{(30)} + 0.05 = 60.90 + 0.05 = 60.95$$

With this value for $0_{(30)}$ we find:

$$0_{(30)} - 0_{(22)} = 60.95 - 61.27 = -0.32,$$

and by linear interpolation between — 0.32 and — 0.40 we find the corrections between 0^h and 8^h a. m. Thus we obtain the means (30).

A similar reduction to (30) has been undertaken also for the three other elements, giving the following 30 days' hourly mean values, as well as corrected means and deviation:

Elements		0	2	4	6	8	10	Noon	2	4	6	8	10	Midt.	Mean
Pressure	Mean	60.95	60.74	60.60	60.74	60.55	60.87	60.74	60.79	60.78	60.67	60.70	60.76	60.90	60.74
	Corr. M.	60.92	60.72	60.58	60.73	60.54	60.86	60.74	60.80	60.79	60.68	60.72	60.78	60.92	60.74
	Dev.	+ 0.18	— 2	— 16	— 1	— 20	+ 12	0	+ 6	+ 5	— 6	— 2	+ 4	+ 18	
Temperature	Mean	— 4.69	— 4.83	— 5.00	— 4.98	— 4.88	— 4.34	— 3.86	— 3.40	— 4.06	— 4.28	— 4.86	— 5.04	— 5.43	— 4.58
	Corr. M.	— 5.06	— 5.14	— 5.25	— 5.17	— 5.00	— 4.40	— 3.86	— 3.34	— 3.94	— 4.09	— 4.61	— 4.73	— 5.06	— 4.55
	Dev.	— 0.51	— 59	— 70	— 62	— 45	+ 15	+ 69	+ 1.21	+ 0.61	+ 46	— 6	— 18	— 51	
Wind Force	Mean	1.16	1.15	1.11	1.13	1.03	0.89	0.77	0.97	0.93	0.97	0.87	0.92	1.07	0.98
	Corr. M.	1.11	1.11	1.09	1.11	1.02	0.88	0.77	0.97	0.95	0.99	0.89	0.96	1.11	0.99
	Dev.	+ 0.12	+ 12	+ 10	+ 12	+ 3	— 11	— 22	— 2	— 4	0	— 10	— 3	+ 12	
Cloud Amount	Mean	8.93	9.28	8.63	8.35	8.16	8.82	8.39	8.20	8.00	7.66	8.56	9.11	8.60	8.48
	Corr. M.	8.76	9.14	8.52	8.27	8.10	8.79	8.39	8.23	8.06	7.74	8.67	9.25	8.76	8.49
	Dev.	+ 0.27	+ 65	+ 3	— 22	— 39	+ 30	— 10	— 26	— 43	— 75	+ 18	+ 76	+ 27	

Pressure. — The hourly mean values, which were read from barograms, have been reduced to the corrected readings of the Kew Station Barometer, Adie C. 763. As to the correction and stand of this barometer see page 37.

King Point.
Pressure. 0.01 mm. Deviation.

Daily Period.

Observed (o) and computed (c) mean values, and their difference (d = o—c).

	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midt.
September:																								
o		— 2		— 16		— 1		— 20		12		0		6		— 5		— 6		— 2		4		18
c		3		— 8		— 13		— 9		2		8		5		— 1		— 4		0		7		9
d		— 5		— 8		+ 12		— 11		+ 10		— 8		+ 1		+ 6		— 2		— 2		— 3		+ 9
October.																								
o	1	— 14	— 26	— 38	— 43	— 40	— 48	— 37	— 33	— 19	— 3	9	12	23	25	31	27	29	32	30	26	23	18	11
c	0	— 11	— 22	— 35	— 43	— 46	— 45	— 41	— 32	— 17	— 5	6	16	24	29	29	30	30	29	27	25	24	18	10
d	+ 1	— 3	— 4	— 3	0	+ 6	— 3	+ 4	— 1	— 2	+ 2	+ 3	— 4	— 1	— 4	+ 2	— 3	— 1	+ 3	+ 3	+ 1	— 1	0	+ 1
November.																								
o	— 9	0	0	— 3	— 10	— 1	— 2	4	7	12	20	24	29	25	14	4	— 4	— 8	— 12	— 13	— 19	— 20	— 20	— 13
c	— 8	— 7	— 4	— 4	— 4	— 3	— 1	4	8	14	20	23	24	20	16	8	0	— 9	— 15	— 18	— 20	— 18	— 15	— 11
d	— 1	+ 7	+ 4	+ 1	— 6	+ 2	— 1	0	— 1	— 2	0	+ 1	+ 5	+ 5	— 2	— 4	— 4	+ 1	+ 3	+ 5	+ 1	— 2	— 5	— 2
December.																								
o	7	4	0	— 11	— 13	— 21	— 26	— 29	— 27	— 12	2	10	16	18	15	10	9	11	9	11	7	4	9	8
c	8	4	— 3	— 11	— 18	— 24	— 26	— 25	— 20	— 12	— 3	6	13	16	17	15	12	8	6	5	6	7	9	10
d	— 1	0	+ 3	0	+ 5	+ 3	0	— 4	— 7	0	+ 5	+ 4	+ 3	+ 2	— 2	— 5	— 3	+ 3	+ 3	+ 6	+ 1	— 3	0	— 2
January.																								
o	13	19	13	— 1	— 11	— 15	— 18	— 17	— 16	— 10	— 3	— 5	1	7	1	0	— 3	— 1	1	5	4	8	6	14
c	16	13	8	1	— 7	— 13	— 17	— 17	— 16	— 11	— 6	— 1	2	4	4	2	0	— 1	— 1	1	4	9	13	15
d	— 3	+ 6	+ 5	— 2	— 4	— 2	— 1	0	0	+ 1	+ 3	— 4	— 1	+ 3	— 3	— 2	— 3	0	+ 2	+ 4	0	— 1	— 7	— 1
February.																								
o	— 1	— 3	— 11	— 19	— 27	— 31	— 40	— 38	— 34	— 15	— 14	— 2	— 1	12	20	33	35	35	35	22	17	9	4	3
c	— 2	— 7	— 12	— 18	— 25	— 30	— 33	— 34	— 31	— 25	— 16	— 5	6	16	25	30	33	32	29	24	18	13	8	3
d	+ 1	+ 4	+ 1	— 1	— 2	— 1	— 7	— 4	— 3	+ 10	+ 2	+ 3	— 7	— 4	— 5	+ 3	+ 2	+ 3	+ 6	— 2	— 1	— 4	— 4	0

March.

o	— 3	0	— 3	3	8	8	3	4	6	4	5	14	11	13	2	— 3	— 12	— 15	— 14	— 12	— 9	— 8	— 4	— 4				
c	0	2	3	3	3	3	4	5	7	9	10	11	9	6	2	— 2	— 7	— 11	— 13	— 13	— 12	— 9	— 6	— 3				
d	— 3	— 2	— 6	0	+ 5	+ 5	— 1	— 1	— 1	— 5	— 5	+ 3	+ 2	+ 7	0	— 1	— 5	— 4	— 1	+ 1	+ 3	+ 1	+ 2	— 1				

April.

o	— 8	— 7	— 6	— 12	— 11	— 8	— 6	1	1	3	5	7	3	16	17	12	6	1	2	3	3	— 3	— 5	— 9				
c	— 8	— 9	— 9	— 10	— 9	— 8	— 6	— 3	0	3	6	8	10	11	11	10	8	6	4	1	— 1	— 3	— 5	— 7				
d	0	+ 2	+ 3	— 2	— 2	0	0	+ 4	+ 1	0	— 1	— 1	— 7	+ 5	+ 6	+ 2	— 2	— 5	— 2	+ 2	+ 4	0	0	— 2				

May.

o	— 4	— 7	— 6	— 7	— 6	— 2	1	4	3	6	9	10	8	12	12	4	— 2	— 9	— 11	— 7	— 5	— 3	1	1				
c	— 3	— 3	— 4	— 5	— 6	— 5	— 2	1	5	8	11	12	11	9	6	2	— 2	— 5	— 6	— 7	— 6	— 4	— 3	— 2				
d	— 1	— 4	— 2	— 2	0	+ 3	+ 3	+ 3	— 2	— 2	— 2	— 2	— 3	+ 3	+ 6	+ 2	0	— 4	— 5	0	+ 1	+ 1	+ 4	+ 3				

June.

o	— 3	— 6	— 7	— 8	— 9	— 6	— 3	5	10	14	16	18	21	21	10	2	— 4	— 11	— 16	— 13	— 13	— 9	— 3	0				
c	— 3	— 4	— 6	— 8	— 8	— 7	— 4	2	8	15	19	21	20	16	9	2	— 5	— 11	— 13	— 14	— 12	— 9	— 6	— 4				
d	0	— 2	— 1	0	— 1	+ 1	+ 1	+ 1	+ 3	+ 2	— 1	— 3	— 3	+ 1	+ 5	+ 1	0	+ 1	0	— 3	+ 1	— 1	0	+ 3	+ 4			

Autumn.

o	— 5	— 19	— 14	— 18	2	11	18	13	5	5	2	5																
c	— 5	— 15	— 20	— 14	0	12	17	12	6	3	4	2																
d	0	— 4	+ 6	— 4	+ 2	— 1	+ 1	+ 1	— 1	+ 2	— 2	+ 3																

Winter.

o	6	7	1	— 10	— 17	— 22	— 28	— 28	— 25	— 12	— 5	1	6	12	12	14	14	15	15	13	10	7	6	8				
c	7	3	— 3	— 10	— 17	— 22	— 25	— 25	— 22	— 16	— 8	— 4	7	12	15	16	15	13	11	10	9	10	10	9				
d	— 1	+ 4	+ 4	0	0	0	— 3	— 3	— 3	+ 4	+ 3	+ 5	— 1	0	— 3	— 2	— 1	+ 2	+ 4	+ 3	+ 1	— 3	— 4	— 1				

Spring.

o	— 5	— 4	— 5	— 5	— 3	— 1	0	3	4	5	6	10	7	14	10	4	— 3	— 8	— 8	— 5	— 4	— 5	— 3	— 4				
c	— 3	— 3	— 4	— 4	— 4	— 3	— 1	1	4	7	9	10	10	9	6	3	— 1	— 3	— 6	— 7	— 7	— 6	— 5	— 4				
d	— 2	— 1	— 1	— 1	+ 1	+ 2	+ 1	+ 2	0	— 2	— 3	0	— 3	+ 5	+ 4	+ 1	— 2	— 5	— 2	+ 2	+ 3	+ 1	+ 2	0				

The hourly values in Table VIII are reduced to the correct stand, to the temperature 0° C. and to the latitude of 45°. No reduction to sea level has been necessary, as the barometer, when placed on board, was practically at sea level. As to the readings ashore the height above sea level is unknown, but the reduction would probably not amount to more than between $^1/_2$ and 1 millimeter. The arrangement of the tables is the same as for Gjøahavn, with daily means in the last vertical column to the right, and hourly means in the second last line. The last line contains the hourly means reduced to noon in the usual way.

All interpolated and corrected values are printed in italics.

Daily Period. The deviations of each of the 24 hourly means from their common mean have been computed and collated in the tables above, expressed in hundredths of a millimeter. Plus values are higher, minus lower than the mean. The hourly values for September, as computed above, have been added.

The Harmonic Constants are:

Months	a_1	A_1	a_2	A_2
	mm.	° ′	mm.	° ′
September	0.048	174 50	0.088	90 59
October	0.382	177 5	0.081	84 30
November	0.174	278 51	0.087	45 21
December	0.163	172 54	0.106	46 14
January	0.102	123 52	0.090	51 52
February	0.310	172 1	0.064	349 52
March	0.096	316 1	0.046	56 27
April	0.101	227 26	0.011	52 58
May	0.072	271 4	0.048	82 16
June	0.126	277 48	0.091	78 23
Autumn	0.140	201 16	0.075	72 5
Winter	0.183	164 38	0.077	35 18
Spring	0.071	272 45	0.034	68 28

The *Extremes* of the daily period of the pressure are computed according to the parabolic formula (p. 50), giving:

Months and Seasons	1st Minimum		1st Maximum		2nd Minimum		2nd Maximum	
	mm.	h m	mm.	h m	mm.	h m	mm.	h m
September	− 0.135	6 2 a.m.	+ 0.086	12 11 p.m.	− 0.041	5 55 p.m.	+ 0.095	9 44 p.m.
October	− 0.463	6 9 «	+ 0.301	5 48 »				
November	− 0.200	9 6 »	+ 0.246	12 41 »				
December	− 0.265	7 11 »	+ 0.173	2 48 »	+ 0.048	8 5 »	+ 0.098	11 46 »
January	− 0.175	7 50 »	+ 0.040	2 21 »	− 0.015	6 26 »	+ 0.159	12 32 a.m.
February	− 0.338	7 43 »	+ 0.328	5 13 »				
March	—	—	+ 0.107	11 41 a.m.	− 0.135	7 45 »		
April	− 0.096	3 43 »	+ 0.111	2 19 p.m.				
May	− 0.056	4 41 »	+ 0.119	12 9 »	− 0.066	7 42 »	− 0.024	12 30 a.m.
June	− 0.084	4 56 »	+ 0.214	12 8 »	− 0.139	7 36 »	− 0.029	12 53 »
Autumn	− 0.202	5 57 a.m.	+ 0.165	2 0 p.m.	+ 0.029	8 19 p.m.	+ 0.038	9 46 p.m.
Winter	− 0.258	7 32 »	+ 0.166	3 56 »	+ 0.095	9 20 »	+ 0.097	10 45 »
Spring	− 0.038	4 0 »	+ 0.104	12 30 »	− 0.066	7 56 »	− 0.033	1 45 a.m.

In several months the double period is not seen.

Annual Period. The following table contains the *Mean Pressure of each month:*

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1905, 1906	60.70	62.51	55.91	61.12	65.52	67.22	64.24	62.70	64.31	60.56
Smoothed .	60.88	60.41	58.86	60.92	64.87	66.10	64.13	63.49	63.49	61.81

The smoothed values in the last line have been computed by means of the formula: $m = {}^1/_4 (a + 2\,b + c)$, but for June the formula: $m = {}^1/_3 (a + 2\,b)$ and for September the formula: $m = {}^1/_3 (2\,b + c)$ have been used. The smoothed values show a minimum in November and a maximum in February.

Gjøahavn had maximum in April, and minimum in August.

The Lowest Recorded Pressures are:

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1905, 1906	49.6	49.5	41.7	43.7	46.7	55.7	43.8	52.0	54.8	52.7
Smoothed .	49.6	47.6	44.2	43.9	48.2	50.5	48.8	50.6	53.6	53.4

The variation is irregular, but the main features correspond to those of the mean values. The lowest pressure, 741.7, was recorded on the 14th of November 1905, at 9 p. m. Earlier in the day snow fell during an increasing NW, which at 8 p. m. had a velocity of 8 m. p. s., the temperature being — 9.0°. The sky remained overcast, but the wind gradually decreased down to calm in the next morning.

The Highest Recorded Pressures are:

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1905, 1906	69.8	80.1	79.2	74.2	78.4	78.3	95.2	74.6	71.2	70.8
Smoothed .	73.2	77.3	78.2	76.5	77.3	82.5	85.8	78.9	73.0	70.9

The smoothed curve shows maxima in November and March, minima in December and June. The highest recorded pressure is 795.2, at 2 p. m. on the 9th of March 1906. The wind was NW with a clear sky and a temperature of — 21.3 degrees.

The Difference between the Highest and Lowest Pressure of each month are:

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1905, 1906	20.2	30.6	38.5	30.5	31.7	22.6	51.4	22.6	16.4	18.1

The absolute range of the pressure variation is greatest in March, least in May.

King Point.
Temperature. 0.01° Deviation

Daily Period.

Observed (o) and computed (c) mean values, and their difference (d = o−c)

	1	2	3	4	5	6	7	8	9	10	11	Noon	1	2	3	4	5	6	7	8	9	10	11	Midt.
September.																								
o		− 59		− 70		− 62		− 45		15		69		121		61		46		− 6		− 18		− 51
c		− 57		− 71		− 70		− 39		18		74		99		82		39		− 3		− 29		− 43
d		− 2		+ 1		+ 8		− 6		− 3		− 5		+ 22		− 21		+ 7		− 3		+ 11		− 8
October.																								
o	− 44	− 48	− 54	− 57	− 63	− 61	− 53	− 28	11	37	57	74	82	81	62	39	15	− 5	− 3	21	7	− 13	− 21	− 38
c	− 35	− 48	− 60	− 67	− 67	− 59	− 41	− 16	9	37	59	73	77	72	59	41	24	9	− 2	− 8	− 8	− 11	− 15	− 24
d	− 9	0	+ 6	+ 10	+ 4	− 2	− 12	− 12	+ 2	0	− 2	+ 1	+ 5	+ 9	+ 3	− 2	− 9	− 14	− 1	+ 29	+ 15	− 2	− 6	− 14
November.																								
o	− 12	− 19	− 24	− 29	− 29	− 18	− 16	− 9	− 6	− 13	− 9	0	13	8	12	18	12	12	16	26	24	21	14	8
c	− 6	− 14	− 20	− 24	− 25	− 24	− 21	− 16	− 10	− 5	− 1	3	6	8	10	13	16	19	21	22	20	16	10	2
d	− 6	− 5	− 4	− 5	− 4	+ 6	+ 5	+ 7	+ 4	− 8	− 8	− 3	+ 7	0	+ 2	+ 5	− 4	− 7	− 5	+ 4	+ 4	+ 5	+ 4	+ 6
December.																								
o	7	4	9	15	15	10	19	29	44	43	29	15	− 1	− 19	− 26	− 32	− 28	− 23	− 27	− 24	− 24	− 13	− 10	0
c	0	2	5	9	14	21	27	32	34	32	26	15	2	− 11	− 22	− 31	− 35	− 34	− 30	− 24	− 17	− 10	− 5	− 2
d	+ 7	+ 2	+ 4	+ 6	+ 1	− 11	− 8	− 3	+ 10	+ 11	+ 3	0	− 3	− 8	− 4	− 1	+ 7	+ 11	+ 3	0	− 7	− 3	− 5	+ 2
January.																								
o	4	− 4	6	3	− 1	− 5	− 22	− 34	− 36	− 28	− 21	− 3	5	8	2	4	9	13	14	23	18	14	12	6
c	12	8	3	− 3	− 11	− 17	− 22	− 25	− 24	− 22	− 17	− 10	− 3	3	7	11	13	14	14	14	14	15	15	14
d	− 8	− 12	+ 3	+ 6	+ 10	+ 12	0	− 9	− 12	− 6	− 4	+ 7	+ 8	+ 5	− 5	− 7	− 4	− 1	0	+ 9	+ 4	− 1	− 3	− 8
February.																								
o	− 45	− 38	− 34	− 19	− 22	− 41	− 35	6	9	32	110	156	165	129	68	10	− 38	− 63	− 69	− 53	− 53	− 61	− 59	− 54
c	− 25	− 26	− 33	− 42	− 48	− 45	− 29	− 1	35	74	107	126	128	111	78	35	− 10	− 48	− 74	− 84	− 80	− 67	− 49	− 34
d	− 20	− 12	− 1	+ 23	+ 26	+ 4	− 6	+ 7	− 26	− 42	+ 3	+ 30	+ 37	+ 18	− 10	− 25	− 28	− 15	+ 5	+ 31	+ 27	+ 6	− 10	− 20

Temperature of the Air. — The hourly means in Tables IX are based on the term readings of the sling thermometers. The Tables are arranged as previously with daily means, maxima and minima and their differences in the six last columns to the right,

while the monthly means of each hour, the maxima and minima of each hour and their differences are entered at the bottom.

Interpolated and corrected values are printed in italics.

March.

o	−117	−113	−88	−61	−76	−81	−65	−57	−15	22	79	125	173	203	179	140	86	37	−6	−45	−73	−84	−82	−99
c	−92	−86	−84	−84	−86	−83	−71	−47	−11	35	85	131	164	180	173	146	103	50	−2	−47	−79	−96	−102	−98
d	−25	−27	−4	+23	+10	+2	+6	−10	−4	−13	−6	−6	+9	+23	+6	−6	−17	−13	−4	+2	+6	+12	+20	−1

April.

o	−265	−270	−290	−288	−266	−224	−157	−99	−41	64	158	246	320	361	327	321	304	249	153	28	−75	−154	−184	−219
c	−261	−280	−286	−281	−263	−230	−182	−117	−38	52	145	231	302	347	363	346	299	228	142	50	−39	−117	−181	−228
d	−4	+10	−4	−7	−3	+6	+25	+18	−3	+12	+13	+15	+18	+14	−36	−25	+5	+21	+11	−22	−36	−37	−3	+9

May.

o	−191	−218	−219	−228	−185	−160	−115	−39	36	95	134	169	195	209	204	214	186	149	105	36	−17	−74	−118	−159
c	−206	−227	−233	−222	−194	−151	−97	−36	26	86	139	180	209	222	221	207	179	141	94	41	−15	−71	−124	−170
d	+15	+9	+14	−6	+9	−9	−18	−3	+10	+9	−5	−11	−14	−13	−17	+7	+7	+8	+11	−5	−2	−3	+6	+11

June.

o	−149	−162	−134	−110	−87	−38	−23	5	32	46	59	87	116	135	121	102	95	86	67	24	−12	−47	−91	−131
c	−143	−146	−136	−115	−86	−54	−22	8	34	55	74	89	102	112	118	118	109	90	62	26	−16	−58	−96	−126
d	−6	−16	+2	+5	−1	+16	−1	−3	−2	−9	−15	−2	+14	+23	+3	−16	−14	−4	+5	−2	+4	+11	+5	−5

Autumn.

o		−42		−52		−47		−27		13		47		70		39		17		12		−3		−27
c		−40		−54		−51		−24		16		49		59		46		24		5		−7		−21
d		−2		+2		+4		−3		−3		−2		+11		−7		−7		+7		+4		−6

Winter.

o	−11	−13	−6	0	−3	−12	−13	0	5	16	39	56	57	39	15	−6	−19	−24	−27	−18	−20	−20	−19	−16
c	−5	−5	−8	−12	−14	−13	−8	2	14	27	38	43	42	35	22	6	−9	−22	−30	−31	−28	−22	−14	−8
d	−6	−8	+2	+12	+11	+1	−5	−2	−9	−11	+1	+13	+15	+4	−7	−12	−10	−2	+3	+13	+8	+2	−5	−8

Spring.

o	−191	−200	−199	−192	−175	−155	−112	−65	6	60	124	180	229	257	238	225	192	145	84	7	−55	−104	−128	−159
c	−186	−197	−199	−193	−178	−152	−114	−64	5	60	124	181	225	249	251	230	191	137	75	12	−47	−97	−137	−166
d	−5	−3	0	+1	+3	−3	+2	−1	1	0	0	−1	+4	+8	−13	−5	+1	+8	+9	−5	−8	−7	+9	+7

Daily Period. The preceding table contains the deviations in hundredth parts of a degree (0.01°), from the mean of the month as derived from the last line, Corr. M., of Tables IX. Plus means above and minus below the mean. For September the interpolated values on page 71 are entered.

The Harmonic Constants are:

Months. Seasons	a_1	A_1	a_2	A_2
	mm.	° ′	mm.	° ′
September	0.801	226 50	0.219	48 15
October	0.605	233 2	0.249	91 17
November	0.215	180 24	0.054	151 47
December	0.288	343 3	0.110	141 59
January	0.196	142 18	0.053	19 34
February	0.801	271 13	0.515	63 57
March	1.327	239 45	0.476	19 52
April	3.245	225 6	0.385	1 55
May	2.282	230 12	0.077	139 7
June	1.294	236 2	0.202	244 2
Autumn	0.513	223 11	0.141	78 14
Winter	0.261	279 57	0.188	68 33
Spring	2.260	230 18	0.269	16 2

The Computed Extremes are:

Months and Seasons	Minimum		Maximum		Range	M. O.
	°	h m	°	h m		
September	− 0.726	4 27 a.m.	+ 0.994	2 6 p.m.	1.720	0.5205
October	− 0.684	4 31 »	+ 0.773	12 56 »	1.457	0.384
November	− 0.254	5 0 »	+ 0.216	7 44 »	0.470	0.138
December	− 0.350	5 25 p.m.	+ 0.341	8 59 a.m.	0.691	0.1825
January	− 0.248	8 25 a.m.	+ 0.146	10 30 p.m.	0.394	0.129
February	− 0.480	5 8 »	+ 1.308	12 36 »	1.788	0.579
	− 0.846	8 14 p.m.	− 0.246	1 28 a.m.		
March	− 0.859	4 49 a.m.	+ 1.799	2 12 p.m.	2.658	0.889
	− 1.018	9 6 p.m.	− 0.836	3 11 a.m.		
April	− 2.861	3 3 a.m.	+ 3.629	3 2 p.m.	6.490	2.094
May	− 2.335	2 50 »	+ 2.238	2 26 »	4.573	1.464
June	− 1.462	1 45 »	+ 1.189	3 25 »	2.651	0.8315
Autumn	− 0.553	4 19 a.m.	+ 0.591	1 56 p.m.	1.144	0.330
Winter	− 0.141	5 12 »	+ 0.436	12 20 »	0.577	1.191
	− 0.314	7 52 p.m.	− 0.047	1 25 a.m.		
Spring	− 1.994	2 48 a.m.	+ 2.527	2 35 p.m.	4.521	1.4455

In winter no well-defined period exists. Minimum occurs about 5 o'clock in the morning, while maximum falls about noon. The autumn, with minimum about 4 a. m. and maximum before 2 p. m., is very regular. September, however, has more similarity to June. The spring is the most regular, with a minimum between 2 and 3 in the morning and a maximum between 2 and 3 in the afternoon.

The Smoothed Range varies regularly with minimum in December and maximum in April. The *Mean Ordinate* (M. O.) shows the same variation as the range, but is three to four times smaller.

Annual Period. The following tables contain the mean temperature and the mean maxima, minima and ranges for each month as derived from the second last lines of Table IX.

Monthly Mean Temperature.

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1905, 1906	— 4.58	— 11.93	— 17.06	— 29.77	— 32.87	— 24.72	— 15.86	— 15.66	— 3.10	2.11
Red.	(— 4.58)	— 11.99	— 16.74	— 30.17	— 33.34	— 24.75	— 15.50	— 16.18	— 3.42	(2.32)

Highest temperature near the middle of the summer, probably in July, lowest in January. The last line (Red.) gives the means reduced to the middle day of each month. Interpolated values for July and August, 3.0 and 2.4 respectively, are taken into account. As to September, the interpolated 30-day mean on page 99 has been used.

Mean Extremes and Ranges.

	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Maximum	— 8.97	— 14.54	— 26.90	— 30.06	— 21.13	— 12.10	— 10.66	— 0.02	4.90
Minimum	— 15.12	— 19.60	— 32.57	— 35.65	— 28.32	— 20.32	— 20.73	— 6.31	— 0.71
Range	6.15	5.06	5.67	5.59	7.19	8.22	10.07	6.29	5.61
Sm. R.	6.0	3.4	5.5	5.8	7.1	8.4	9.5	7.0	5.7

A freehand smoothing of the range (Sm. R.) gives a minimum in November and a maximum in April. A secondary minimum appears to be present in June and a secondary maximum in September.

Using the above mentioned interpolated values for July and August, the *Mean for the Year* is equal to—12.4 degrees. This mean temperature occurs on the 1st of October and the 5th of May. Thus we have 215 days with *Temperature below — 12.4°*, and 148 days with *Temperature above this mean.* By means of the parabolic formula the *Coldest Day* is found to be the 1st of January with a temperature of — 33.66°, and the *Warmest Day* the 21st of July with 3.0°. The *Temperature passes zero,* when decreasing on the 2nd of September and when increasing on the 14th of June. The sun is below the horizon during 24 hours from about the 30th of November to the 13th of January, and above the horizon from the 22nd of May to the 21st of July. Hence the *Dark Season* comprises 45 days and the *Sunny Season* 61 days, *Equinoxes* 259 days.

The *Absolute Extremes* are:

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Maximum	6.5	— 2.5	— 2.7	— 11.2	— 21.2	— 3.9	— 0.4	4.9	7.0	17.1
Minimum	*— 21.0*	— 28.2	— 33.9	— 39.5	— 47.5	— 37.3	— 37.1	— 29.9	— 18.0	— 4.5
Range	27.5	25.7	31.2	28.3	26.3	33.4	36.7	34.8	25.0	21.6

The extremes show the same period as the means, with a minimum in January an a maximum about midsummer, probably in July. The absolute minimum, — 47.5°, was observed on the 26th of January at 2 p. m. in a period of clear, calm weather. The wind was at 2 p. m. on this day recorded as SSE, 5 m. p. s., the amount of clouds being 4. The three preceding terms, from 2 p. m. on the preceding day, had clear sky and calm. On the evening of the 26th the sky was again clear, but the SSE wind has increased to 8 m. p. s. and increased further during the night, as the next morning had SSE, 11 m. p. s. with cloudiness 5. Next day again clear weather. The barometer fell from 772.0 mm. at 2 p. m. on the 26th to 762.4 at 8 a. m. on the 27th, when it again began to rise.

On the 30th of June at $6^h\ 36^m$ a. m. the temperature was 17.1°. At 8 a. m. the wind was NW, 4 m. p. s., but the terms before and after have calm. The weather was fair with a humidity of the air of 70—80 per cent.

Days with Minimum Temperature of 35°, or lower.

December		January		March		April	
	Days		Days		Days		Days
6—9	4	1, 2	2	19, 20	2	1	1
16—18	3	5—11	7	22—28	7		
21	1	19	1				
24	1	24—31	8				
29, 30	2						
	11		18		9		1

The total number is 39.

Days with Minimum Temperature of — 40°, or lower, are only four in number, namely, 24th to 27th of January, and of these four days only the 26th has a minimum temperature below — 45°. The mean temperature of the 26th is — 45.58° varying between of — 47.5° at 2 p. m. and — 42.9° at midnight between the 26th and 27th. The 25th also has a mean temperature below — 40°, namely — 42.90°.

Days with a Mean Temperature of 35°, or lower:

December		January		February	
	Days		Days		Days
17	1	6, 7	2	26	1
29	1	10, 11	2		
		25, 26	2		
		29, 30	2		
	2		8		1

A Maximum Temperature of 10°, or higher, was observed on the 29th and 30th of June, with 12.3° and 17.1° respectively, only the latter has a mean temperature above 10°, namely 10.73°.

The *Absolute Range* during these ten months is 17.1° + 47.7° = 64.6°. The absolute range of the temperature in a month is greatest in March, 36.7°, and least in June, 21.6°.

Interdiurnal Variability of the Temperature. The data in the following table show the average temperature difference from one day to the next day as derived from the daily means (Table IX). Rising and falling temperatures have been treated separately. In order to obtain a full month for September, 24 hourly means were computed for the last 8 days, which have readings only three times a day. For this purpose the empirical formula was used: $m = \frac{1}{4}(I + II + 2 \times III) + C$ where $8\,C = 30\,[\frac{1}{12}\,\Sigma\,(30) - \frac{1}{30}\,(\sum_{1}^{22}(12) + \sum_{23}^{30}(3),]$ and where (30) means the interpolated two-hourly means for the complete 30 days as previously computed (p. 99), (12) means the averages of the 12 two-hourly readings on each of the 22 first days and (3) means the 24-hourly means for the last 8 days as computed from the formula: $m = \frac{1}{4}(I + II + 2 \times III)$. These values are:

$\frac{1}{12}\,\Sigma\,(30) = -4.580$

$\frac{1}{30}\,(\sum_{1}^{22}(12) + \sum_{23}^{30}(3)] = \frac{1}{30}\,(-87.565 - 49.125) = -4.5563$

Diff. $= -0.0236$

$8\,C = -0.7099$

$C = -0.08875$

The 24-hourly means which are obtained in this way are exact enough for our purpose.

Months	1	2	3	4	5
	Temperature		Mean of 1 & 2	Temperature	
	rising	falling		rising	falling
	+	−	±		
September	1.64	2.05	1.84	13	17
October	2.83	2.32	2.57	13	18
November	2.26	2.90	2.53	17	13
December	2.95	3.84	3.40	15	16
January	2.99	3.09	3.04	16	15
February	3.65	3.48	3.56	13	15
March	4.11	4.35	4.23	17	14
April	3.33	2.51	2.92	16	14
May	1.64	1.61	1.63	17	14
June	1.72	1.48	1.60	15	15
Mean and Total	2.71	2.76	2.74	152	151
Weighted Mean	2.75	2.78	2.76	—	—

A smoothed curve shows maximum of the interdironal variability in March and minimum in the summer, thus a result similar to what was found at Gjøahavn. The rise is on the average for the 10 months somewhat greater than the fall, and takes one day more, which means that the fall proceeds a little more quickly than the rise, also in agreement with what was found at Gjøahavn.

Observations at Fixed Hours.

The term readings *in extenso* are given in Table X. They begin at 8 a. m. on the 3rd of September 1905, although King Point was not reached before noon on this day. At 8 a. m. the ship was to the east of King Point, at a distance which was covered in four hours by using the motor. However, no appreciable error is introduced when regarding the observations as taken at King Point.

The station work itself, with the instruments in their final positions, began on the 1st of October at 8 a. m. The observations of September represent a continuation of the series from the sea, with observations every two hours up to the 22nd at 8 p. m. and three times a day, 8 a. m., 2 p. m., 8 p. m., from 8 a. m. of the 23rd. At sea humidity was not observed, nor was any precipitation measured, therefore the columns for these elements are omitted in this month, which has special headings with somewhat divergent meaning. Aneroid was used, and accordingly no gravity correction has been applied. The height of the bulb of the thermometer has been put at 3.5 m., since the readings are referred to the fixed thermometer on board the "Gjøa," where it probably had a height of 1.5 m. above the deck, which again was 2 meter above the ice, to which all heights are referred. From the 1st of October, on the other hand, the readings are referred to the sling thermometer, for which a height of 1.25 metres has been assumed. The force and not the velocity of the wind is entered. The Summary, at the end, Table XI, has a common heading, and the force of the wind in September has been reduced to velocity.

Pressure and Temperature of the Air was treated under "Records" and here is dealt with only in case of disagreements. The Monthly Means remain unaltered except in September, when there is a slight difference in the mean temperature. The term observations began, as mentioned, on the 3rd, and no minimum temperatures were observed in September. The mean is therefore computed according to the formula $m = {}^1/_4 (I + II + 2 \times III)$, which, with — 5.3°, — 3.8°, — 5.3° for the three terms, gives — 4.925°, rounded off to — 5.0°, as a mean. The interpolated hourly means for 30 days on page 99 give — 4.6°, a difference of 0.4°, corresponding to the difference of the term, which here have the values: — 4.9°, — 3.4°, — 4.9° respectively.

The values of the absolute minima remain the same, as the values in the Summary are taken from the records.

The values for the absolute maxima are, on the contrary, derived from the term observations. Here, therefore, there is a disagreement, as shown by the following table:

Maximum, read.

Year	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
1905, 1906	6.0	— 2.7	— 6.0	— 12.5	— 21.7	— 6.2	— 0.4	2.6	3.6	12.5
Difference.	— 0.5	— 0.2	— 3.3	— 1.3	— 0.5	— 2.3	0.0	— 2.3	— 3.4	— 4.6

The maximum falls in March only at one of the terms, in the other months it falls at other hours. Accordingly we get lower values.

For King Point, as for Gjøahavn, wind roses for each element have been computed by means of the formula:

$$m = \frac{an + 2bp + cq}{n + 2p + q}$$ (cf. Gjøahavn page 67)

The weights, n, p, q, used in the months for each direction of the wind, are contained in the following table:

Weights for Wind Roses.

Months	N	NE	E	SE	S	SW	W	NW	C	Total
September	5.5	1	2.5	2	2	1.5	7	38.5	22	82
October ...	—	—	—	8	9.2	16.5	6	44	9	93
November	—	—	1	12.5	8	11.5	10	28	19	90
December .	4	—	—	12.5	14	3	16.5	33	10	93
January ..	—	—	2.5	7.5	7.5	16	8.5	38	13	93
February .	1	—	1	3	5	6.5	13	37.5	17	84
March.....	2	1	—	9	1.5	10.5	22	33	14	93
April	—	—	1	7	4	—	10.5	26.5	41	90
May	3	0.5	11.5	16.5	0.5	—	—	38	23	93
June	1.5	1	7	10	2	—	—	40.5	28	90
Sep.—June	17.0	3.5	26.5	88.0	54.0	65.5	93.5	357.0	196	901
Oct.—June	11.5	2.5	24.0	86.0	52.0	64.0	86.5	318.5	174	819

The humidity was not measured in September, consequently September is not represented in the totals of weights for the humidity, for which reason the totals for the period Oct.—June are entered in the lowest row. In the wind roses the last line contains the means for the ten months which are represented. These means indicate the distribution in the year.

Baric Wind Roses.

Months	N	NE	E	SE	S	SW	W	NW	C
September	760.6	762.6	760.0	760.1	756.6	756.8	759.8	760.0	761.5
October	—	—	—	65.4	64.1	61.0	61.8	60.8	65.7
November	—	—	56.9	56.4	58.8	61.1	56.9	53.9	53.3
December	61.7	—	—	60.6	61.3	60.6	60.8	61.4	61.6
January	—	—	66.0	65.1	64.1	65.0	65.6	65.4	67.2
February	67.5	—	69.0	69.0	67.7	64.9	66.1	67.3	69.2
March	64.2	62.3	—	70.5	67.5	62.3	61.2	62.5	68.8
April	—	—	64.2	63.8	62.5	—	61.9	62.2	63.3
May	63.4	63.2	64.7	65.3	65.6	—	—	63.7	64.4
June	59.6	59.1	59.0	59.4	59.8	—	—	59.6	63.0
Mean	762.11	760.61	762.42	763.32	762.33	764.00	761.33	761.87	763.40

As in Gjøahavn, calms, southerly and northerly winds have maximum of pressure, easterly and westerly winds have minimum, and winter and spring have higher pressure than summer and autumn.

Thermal Wind Roses.

Months	N	NE	E	SE	S	SW	W	NW	C
September	— 5.3	— 3.9	— 2.0	— 2.0	— 1.9	— 3.6	— 5.3	— 5.4	— 4.5
October	—	—	—	— 18.5	— 15.1	— 10.9	— 9.8	— 9.3	— 15.0
November	—	—	— 21.6	— 20.7	— 19.6	— 17.4	— 15.5	— 14.8	— 16.6
December	— 28.9	—	—	— 31.2	— 31.4	— 29.9	— 29.2	— 29.2	— 30.5
January	—	—	— 33.3	— 34.0	— 33.7	— 32.8	— 31.6	— 31.0	— 37.9
February	— 26.1	—	— 23.5	— 27.7	— 22.5	— 18.6	— 23.0	— 25.4	— 26.9
March	— 21.4	— 20.8	—	— 15.5	— 10.7	— 8.3	— 13.5	— 18.3	— 17.3
April	—	—	— 12.6	— 12.3	— 10.2	—	— 15.5	— 15.9	— 14.7
May	— 2.1	— 2.6	— 2.8	— 3.1	— 3.3	—	—	— 2.0	— 2.3
June	2.1	0.3	0.7	0.9	1.5	—	—	2.3	4.6
Mean	— 13.42	— 6.98	— 6.00	— 16.05	— 23.13	— 16.44	— 18.07	— 14.63	— 13.12

The southwind blowing from the land is the coldest wind, followed by W, SW and SE. The mildest winds are E and NE. In June it was warmest at calm, followed by NW and N, in January it was coldest at calm.

Humidity of the Air was not measured in September, the measurement beginning on the 1st of October. As the psychrometer was not in use during the coldest part of the year, the computations here, as at Gjøahavn, are based on the readings of the hair hygrometer.

Tension of the Water Vapour is calculated from the relative humidity and the temperature. As to the computation of the means in the Summary, Table XI, we refer to Gjøahavn page 69. The arrangements are the same here as there.

Tension of the Water Vapour.

	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Mean	2.0	1.3	0.3	0.3	0.8	1.5	1.4	3.5	4.8
Maximum	3.8	2.9	1.6	1.1	2.9	4.0	4.3	5.1	8.5
Minimum	0.4	0.3	0.1	0.1	0.1	0.2	0.3	1.6	3.4
Range	3.4	2.6	1.5	1.0	2.8	3.8	4.0	3.5	5.1

The Annual Period, as represented in the line "Mean" of above table, is fairly regular, with minimum in December—January and maximum in the summer. *The Mean Range* of these nine months is 4.8 — 0.3 = 4.5, at Gjøahavn for the same interval, 4.2 — 0.1 = 4.1. The range is least in January, largest in June.

We obtain an idea of the *Daily Period* by computing the differences between the monthly means of noon (II) and morning and evening ($q = {}^1/_2 (I + III)$):

October	November	December	January	February	March	April	May	June
+ 0.15	0.0	— 0.05	0.0	+ 0.05	+ 0.25	+ 0.30	+ 0.25	+ 0.15

In the winter no definite period is present, but in April the difference reaches three-tenths of a millimeter. The annual march of the difference indicates a double period with a secondary minimum in summer and a secondary maximum in autumn. Gjøahavn has a single period with maximum in the summer and minimum in the winter.

The Wind Roses for the Tension of the Water Vapour show on the average for the nine months least humidity at south wind, and greatest at wind from E and NE, corresponding to the mean temperatures. The warmest winds bring the greatest amount of water vapour. The warmest months, May and June, are moist at all occurring wind directions and at calm, the tension varying between 3.8 and 3.3 in May and between 5.7 and 4.2 in June. The highest value, 5.7 mm., is found in June at calm. SW and W were not represented in these two months.

Atmic Wind Roses.

Months	N	NE	E	SE	S	SW	W	NW	C
October	—	—	—	1.0	1.5	1.9	2.2	2.3	1.4
November	—	—	0.9	1.0	1.1	1.3	1.4	1.5	1.3
December	0.4	—	—	0.3	0.3	0.4	0.4	0.4	0.3
January	—	—	0.3	0.3	0.3	0.3	0.3	0.3	0.3
February	0.6	—	0.7	0.5	1.0	1.3	0.9	0.7	0.6
March	1.0	0.8	—	1.5	2.0	2.2	1.7	1.3	1.4
April	—	—	1.6	1.6	1.9	—	1.4	1.3	1.3
May	3.8	3.4	3.3	3.3	3.3	—	—	3.8	3.3
June	4.6	4.3	4.3	4.2	4.2	—	—	4.7	5.7
Mean	1.77	2.46	3.09	1.70	0.94	1.54	1.25	1.88	2.03

Relative Humidity. As to the computation of the means in the Summary Table XI, by means of the formula $m = {}^1/_2 (I + III)$ we refer to Gjøahavn p. 70.

Humidity.

	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Mean	94	93	84	88	85	85	79	89	85
Maximum	100	100	93	92	98	100	95	100	100
Minimum	84	83	50	81	74	67	56	65	65
Range	16	17	43	11	24	33	39	35	35

A freehand smoothing of *The Annual March* shows a minimum in the spring, March—April, and a maximum in the autumn, October. There is a suggestion of a double period. The *Mean Range* is 94 — 79 = 15 per cent.

As to the *Extremes*, *Maximum* shows a minimum in January and a rise to both sides, while *Minimum* seems to fall from autumn to spring, and then to rise a little towards summer. *The Range*, Max — Min., seems to vary inversely to that of the minimum. The great irregularity of the minimum of December was discussed on page 69. The greatest absolute difference is 100 — 50 = 50 per cent.

A *Daily March* is indicated by the following grouping of the differences, II — q:

October	November	December	January	February	March	April	May	June
— 1.0	— 1.0	— 1.5	0.0	— 1.0	— 2.5	— 5.0	— 4.5	— 3.5

Wind Roses for Relative Humidity do not show any decided dry and wet side. Including calm we find the following irregular march of the relative humidity, starting at the lowest: S, W, C, NE, N, SE, NW, E, SW.

Wind Roses for Relative Humidity.

Month	N	NE	E	SE	S	SW	W	NW	C
October	—	—	—	89	91	89	95	95	91
November	—	—	91	91	91	91	91	94	93
December	87	—	—	81	81	81	85	87	84
January	—	—	89	88	87	87	88	88	87
February	83	—	83	84	86	87	87	87	86
March	84	84	—	91	89	83	82	83	87
April	—	—	82	81	79	—	80	82	77
May	94	90	88	88	88	—	—	94	82
June	86	90	89	86	81	—	—	86	84
Mean	86.9	86.6	89.0	87.2	83.0	89.1	83.5	88.8	84.1

The Range is 89 — 83 = 6 per cent. The mean humidity for the nine months is above 83 per cent.

Clouds. — *Amount of Clouds* was observed also in September, and thus in a period of ten months, beginning on the 3rd of September. The following table contains the means of the Summary, Table XI, computed arithmetically, m = n.

September	October	November	December	January	February	March	April	May	June
8.6	6.8	7.8	5.0	6.9	6.1	7.1	5.4	7.1	5.7

The Annual March is similar to that of the relative humidity, and a freehand smoothing indicates the same double period. The range is 8.6 — 5.0 = 3.6, greatest amount of clouds in September, smallest in December and April.

The Daily Variation, as computed from II — q, is inconsistent and very irregular.

Sep.	Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June
— 0.25	+ 0.10	+ 0.30	+ 0.70	+ 1.10	— 0.65	+ 0.05	+ 0.05	— 0.05	— 0.25

The combinations II — I and II — III show a similar variation as the combination II — q, but II — I gives a smaller range, namely + 0.7 in January and — 0.4 in February, against + 1.1 and — 0.6 and + 1.5 and — 0.9 in the same months by II — q and II — III. The great range of II — III indicates that the darkness influences the results also at King Point, but not so much as at Gjøahavn, (cf. page 73), perhaps because the evening term at King Point was one hour earlier, 8 p. m. instead of 9 p. m.

Nephic Wind Roses.

Months	N	NE	E	SE	S	SW	W	NW	C
September	9.0	8.9	8.7	6.6	4.2	5.7	8.6	9.0	8.0
October	—	—	—	5.0	3.4	3.6	7.8	9.2	5.4
November	—	—	6.7	7.0	6.1	5.6	7.6	8.7	9.3
December	7.5	—	—	4.5	3.3	2.5	4.6	6.2	4.4
January	—	—	6.7	6.5	6.2	6.3	7.7	8.4	3.1
February	6.6	—	8.8	6.5	5.7	6.1	6.3	6.4	5.1
March	8.2	9.5	—	6.9	7.4	6.9	7.1	7.4	5.3
April	—	—	3.6	2.6	2.9	—	6.7	7.0	4.3
May	9.0	9.3	7.3	5.8	4.5	—	—	8.9	4.7
June	5.5	7.6	6.1	5.2	4.5	—	—	5.3	6.2
Mean	9.15	9.57	8.01	5.74	3.84	5.32	5.87	7.91	5.51

Winds from the north, that is to say, wind from the sea, bring greatest amount of clouds. These winds are as a rule also the warmest and the moistest. Winds from land, southerly winds, are the dryest and coldest, and bring the clearest sky, especially due South wind. At calm, corresponding conditions prevail.

The *Form of Clouds* was recorded as previously.

The observations of the cloud forms have, as at Gjøahavn, been much influenced by the darkness, as is evident from the following grouping of the distribution over the terms and the months of all observations of cloud forms. Last column to the right, Total, contains the total number of observations in the ten months.

Clouds of all Kinds — Number of Cases.

Time	Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		March		April		May		June		Total	
		pct.		pct.		pct.		pct.		pct.		pct.		pct.		pct.		pct.		pct.		pct.
I	20	35	37	54	29	42	19	39	21	41	26	43	29	36	32	34	37	36	35	34	285	39
II	24	41	29	42	33	47	20	42	19	37	26	43	29	36	33	35	32	32	33	32	278	38
III	14	24	3	4	8	11	9	19	11	22	8	14	23	28	29	31	32	32	36	34	173	23
Total	58	100	69	100	70	100	48	100	51	100	60	100	81	100	94	100	101	100	104	100	736	100

The evening hour of all the ten months has 173 observations, or 23 per cent, while morning and afternoon have 285 and 278, or 39 and 38 per cent. The evening hour has few observations from September to March, but in April, May and June the observations are equally distributed over all hours. The Total number of observations is much smaller in September to March (average monthly total 62) than in April, May and June (average monthly total 100).

The Distribution of the Observed Cloud Forms over the months is seen from the following grouping, where the figures represent the number of cases.

Month	Ci	CiSt	CiCu	ASt	ACu	StCu	CuNi	Ni	Cu	St	FrSt	Total
September	3	4	2	5	5	4	1	19	4	11	—	58
October	3	6	6	2	15	2	—	—	—	34	1	69
November	3	14	—	7	5	5	—	—	—	35	1	70
December	4	12	—	7	6	—	—	—	—	19	—	48
January	1	16	—	13	—	1	—	—	—	20	—	51
February	7	13	4	12	1	1	—	—	—	22	—	60
March	3	13	4	5	15	—	—	3	1	37	—	81
April	3	—	9	2	20	—	—	—	8	51	1	94
May	4	1	10	—	21	1	—	—	7	57	—	101
June	13	1	9	—	22	2	4	6	19	27	1	104
Total	44	80	44	53	110	16	5	28	39	313	4	736

Placing the limit between high and low clouds between A-Cu and St-Cu, we find 331 observations of high and 405 observations of low clouds or 45 and 55 pct. The difference is not so pronounced as was the case at Gjøahavn with 368 against 1181, or 24 against 76 per cent for the whole stay at that station (p. 74). Among the higher clouds A-Cu is also at King Point the most frequent form, 110 of 331 cases, or 33 per cent. Among the lower St is quite dominant, 313 cases of 405, or 77 per cent. At Gjøahavn the frequency was more equal distributed over Ni, St-Cu, Cu and St, with Ni as the most frequent, 298 cases of 1181, or 25 per cent.

In the following *Wind Roses for Cloud Forms* the number of observations of each cloud form is given for each of the 8 directions of wind and for each month. The second last line gives the total number for all ten months, and the lowest line gives the weighted mean (cf. page 111), giving the probability of appearance.

Wind Roses for Form of Clouds.

Form	Month	N	NE	E	SE	S	SW	W	NW	C
Cirrus	September	1	—	—	—	0.5	0.5	—	—	1
	October	—	—	—	—	0.5	2.5	—	—	—
	November	—	—	—	1	—	—	—	—	2
	December	—	—	—	2	1	—	1	—	—
	January	—	—	—	—	—	—	0.5	0.5	—
	February	—	—	—	—	—	0.5	1.5	4	1
	March	—	—	—	—	—	0.5	2.5	—	—
	April	—	—	—	—	—	—	—	—	2
	May	—	—	—	0.5	0.5	—	—	—	3
	June	—	—	—	3	1	—	—	5	4
	Total	1	—	—	6.5	3.5	4	5.5	9.5	13
	Weighted Mean	0.06	—	—	0.07	0.07	0.06	0.06	0.03	0.07

Wind Roses for Form of Clouds (continued).

Form	Month	N	NE	E	SE	S	SW	W	NW	C
Cirro Stratus	September	—	—	—	—	0.5	0.5	1	1	1
	October	—	—	—	—	1	3	1	—	—
	November.....	—	—	—	2	—	2.5	3	3.5	3
	December	—	—	—	2.5	1.5	0.5	2.5	3	1
	January	—	—	1.5	1.5	1.5	1.5	1	5	4
	February.....	—	—	—	0.5	0.5	2	2.5	6.5	1
	March	0.5	—	—	2	—	2.5	2.5	4.5	1
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	1	—
	June	—	—	—	—	—	—	—	—	1
	Total	0.5	—	1.5	8.5	5	12.5	13.5	24.5	12
	Weighted Mean	0.03	—	0.06	0.10	0.09	0.19	0.14	0.07	0.06
Cirro Cumulus	September	—	—	—	—	—	—	1	1	—
	October	—	—	—	1	0.5	2.5	—	1	1
	November	—	—	—	—	—	—	—	—	—
	December	—	—	—	—	—	—	—	—	—
	January	—	—	—	—	—	—	—	—	—
	February	—	—	—	—	—	—	—	4	—
	March	—	—	—	—	—	—	2	1	1
	April	—	—	—	1	2	—	1	1	4
	May	—	—	1	3	—	—	—	3	3
	June	—	—	1	—	—	—	—	5	3
	Total	—	—	2	5	2.5	2.5	4	16	12
	Weighted Mean	—	—	0.08	0.06	0.05	0.04	0.04	0.05	0.06
Alto-Stratus	September	1	—	—	—	—	—	—	2	2
	October	—	—	—	—	—	—	1	—	1
	November.....	—	—	—	—	1	0.5	2	2.5	1
	December	1	—	—	1	1	1	3	1	—
	January	—	—	2	1.5	0.5	3	0.5	2.5	2
	February.....	1	—	—	1.5	0.5	0.5	1	2.5	5
	March	—	—	—	—	—	2.5	1.5	1	—
	April	—	—	—	—	—	—	—	—	2
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	—	—
	Total	3	—	2	4	3	7.5	9	11.5	13
	Weighted Mean	0.18	—	0.08	0.05	0.06	0.11	0.10	0.03	0.07
Alto-Cumulus	September	0.5	0.5	—	—	—	—	—	2	2
	October	—	—	—	—	—	6	1	7	1
	November	—	—	—	0.5	0.5	1	1	1	1
	December	1	—	—	1	1	—	1	—	1
	January	—	—	—	—	—	—	—	—	—
	February	—	—	—	—	1	—	—	—	—
	March	—	—	—	—	1	1	6	5	2
	April	—	—	—	—	—	—	2.5	5.5	12
	May	—	—	—	3	—	—	—	12	6
	June	—	—	5	2	1	—	—	9	5
	Total	1.5	0.5	5	6.5	4.5	8	11.5	41.5	30
	Weighted Mean	0.09	0.14	0.19	0.07	0.08	0.12	0.12	0. 12	0.15
Strato-Cumulus	September	—	—	—	—	—	—	—	1	3
	October	—	—	—	—	—	1	—	1	—
	November	—	—	—	1	1	1	—	—	2
	December	—	—	—	—	—	—	—	—	—
	January	—	—	—	—	—	—	1	—	—
	February	—	—	—	—	—	—	0.5	0.5	—
	March	—	—	—	—	—	—	—	—	—
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	—	1
	June	0.5	—	—	—	—	—	—	1.5	—
	Total	0.5	—	—	1	1	2	1.5	4	6
	Weighted Mean	0.03	—	—	0.01	0.02	0.03	0.02	0.01	0.03

Wind Roses for Form of Clouds (continued).

Form	Month	N	NE	E	SE	S	SW	W	NW	C
Cumulo-Nimbus	September	—	—	—	—	—	—	—	1	—
	October	—	—	—	—	—	—	—	—	—
	November	—	—	—	—	—	—	—	—	—
	December	—	—	—	—	—	—	—	—	—
	January	—	—	—	—	—	—	—	—	—
	February	—	—	—	—	—	—	—	—	—
	March	—	—	—	—	—	—	—	—	—
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	3	3
	Total	—	—	—	—	—	—	—	4	3
	Weighted Mean	—	—	—	—	—	—	—	0.01	0.02
Nimbus	September	1	—	2.5	0.5	—	—	1	7	7
	October	—	—	—	—	—	—	—	—	—
	November	—	—	—	—	—	—	—	—	—
	December	—	—	—	—	—	—	—	—	—
	January	—	—	—	—	—	—	—	—	—
	February	—	—	—	—	—	—	—	—	—
	March	—	—	—	—	1	0.5	1.5	—	—
	April	—	—	—	—	—	—	—	—	—
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	4	2
	Total	1	—	2.5	0.5	1	0.5	2.5	11	9
	Weighted Mean	0.06	—	0.09	0.01	0.02	0.01	0.03	0.03	0.05
Cumulus.	September	—	—	—	1	—	—	—	3	—
	October	—	—	—	—	—	—	—	—	—
	November	—	—	—	—	—	—	—	—	—
	December	—	—	—	—	—	—	—	—	—
	January	—	—	—	—	—	—	—	—	—
	February	—	—	—	—	—	—	—	—	—
	March	—	—	—	—	—	—	1	—	—
	April	—	—	—	—	1	—	1.5	2.5	3
	May	—	—	—	2	—	—	—	3	2
	June	—	—	2	1	—	—	—	8	6
	Total	—	—	2	4	1	—	2.5	16.5	11
	Weighted Mean	—	—	0.08	0.05	0.02	—	0.03	0.05	0.06
Stratus	September	1.5	—	—	—	—	—	—	5	4
	October	—	—	—	3	—	3	3	22	3
	November	—	—	1	5	1	3	3.5	14.5	8
	December	2	—	—	0.5	1.5	—	0.5	13.5	2
	January	—	—	—	0.5	1.5	2.5	3	14.5	1
	February	—	—	1	1.5	0.5	1.5	3	9.5	4
	March	1.5	—	—	1	1	2.5	8.5	16.5	6
	April	—	—	1	2	1	—	7.5	17.5	22
	May	1.5	—	8	8	—	—	—	30.5	9
	June	1	1	4	6	1	—	—	9	5
	Total	7.5	1	15	27.5	7.5	12.5	29	152.5	64
	Weighted Mean	0.44	0.29	0.57	0.31	0.14	0.19	0.31	0.43	0.32
Fracto-Stratus	September	—	—	—	—	—	—	—	—	—
	October	—	—	—	1	—	—	—	—	—
	November	—	—	—	—	—	—	—	—	1
	December	—	—	—	—	—	—	—	—	—
	January	—	—	—	—	—	—	—	—	—
	February	—	—	—	—	—	—	—	—	—
	March	—	—	—	—	—	—	—	—	—
	April	—	—	—	—	—	—	—	—	1
	May	—	—	—	—	—	—	—	—	—
	June	—	—	—	—	—	—	—	—	1
	Total	—	—	—	1	—	—	—	—	3
	Weighted Mean	—	—	—	0.01	—	—	—	—	0.02

Clear and Overcast Days from Summary. Table XI:

Number of Days.

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Clear Days (0—2) ...	0	5	2	11	4	3	2	8	5	5
Overcast Days (8—10)	16	15	19	11	14..	9	17	11	18	10

We get the same picture of the sky as when discussing the other data as to the clouds.

Precipitation. — The notations of precipitation seem to be even more incomplete than was the case at Gjøahavn. In September, when the observations were taken as at sea, no measurements of precipitation were carried out, but both February and June in the Summary, Table XI, show no measurement of precipitation, although precipitation was recorded, in February snow on one occasion and in June snow three times and rain once. As to the cold February, with only one day of snow, it is possible that no precipitation could be measured, although snow was recorded at all the three terms and had been falling since noon, on the preceding day, the last of January, but as to the comparatively warm June, it can hardly be maintained that the precipitation on each occasion was too small to be measured.

To give a review of the relation between the number of days of precipitation and the number of days with measurements the following table has been compiled.

Precipitation.

Months	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Number of Days with Precipitation, observed.....	9	8	3	7	1	10	8	5	4
Number of Days with Precipitation, measured	1	6	2	2	0	2	1	1	0
Amount, mm.....	6.3	19.9	2.0	8.5	—	8.6	5.5	2.7	—

As will be seen, the proportion is most reasonable in November, when only two of eight days of precipitation are noted with no amount measured. The measured quantity in November is 20 mm., or more than half of the sum of the amounts for the other months, 33.6 mm. The whole amount of measured precipitation for nine months is thus 53.5 mm. The number of days with precipitation is 55 and the precipitation per day therefore amounts to about 1 mm. (0.97). At Gjøahavn we had during the same nine months, October to June, 132.7 mm. on 117 days with measurements, which gives a little above 1 mm. (1.13) a day. The probability points strongly in the direction that the measurements at King Point have given too low values.

As the stay lasted from the autumn to the first part of the summer, naturally most of the precipitation fell as snow, as is seen from the following table.

Number of Days with Precipitation.

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Rain	—	—	—	—	—	—	—	—	2	1
Snow	11	9	8	3	7	1	10	8	3	3
Rain and Snow	11	9	8	3	7	1	10	8	5	4

Rain was observed on three days only, all other days had snow. Sleet is not noted, neither is hail.

Frequency of Precipitation. The following table gives a summary of the frequency, showing for each month the number of records of precipitation at each term. This summary is probably incomplete on account of the difficult circumstances, but it may serve as giving a picture of the distribution during the day.

Number of Cases of Precipitation. Months and Seasons.

Hour	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Autumn	Winter	Spring	Total
I	9	2	4	2	1	1	7	6	1	3	15	4	14	36
II	6	6	7	1	3	1	5	1	3	1	19	5	9	34
III	5	5	4	1	5	1	5	3	2	1	14	7	10	32
Total ...	20	13	15	4	9	3	17	10	6	5	48	16	33	102

According to the last column to the right, giving the total sum of observations at each term, no great difference between the terms occurs, only a slightly greater frequency in the morning. From the columns for the seasons we see that the order of the terms are: for the autumn II, I, III, for the winter III, II, I and for the spring I, III, II. This suggests no rule, and no rule can be derived from the columns for the individual months. There seems, on the other hand, to be a conspicuous rise from winter to spring, with twice as great frequency in spring as in winter, and the autumn has three times the number of the winter. This proportion is very similar to what was found at Gjøahavn in the two preceding years, when the figures for the seasons, beginning with the autumn, are: 90, 28, 41, 50, only that the autumn at Gjøahavn was still more dominant. A freehand smoothing of the figures of the months, I, II, III (Total) also gives an annual march similar to that seen at Gjøahavn, maximum in the Autumn, minimum in the winter, with a secondary maximum in the spring and minimum in the summer.

Duration of Precipitation on a Day of Precipitation, as computed according to Køppen's formula, is given in the following table. As to the significance of the notations we refer to p. 80.

Period	r	n	$\frac{r}{n}$	$N = 8n$	$\frac{r}{n} N = 8r$	d	$\frac{rN}{nd}$
			pct.				
September	20	84	23.8	672	160	11	14.55
October	13	93	14.0	744	104	9	10.44
November	15	90	16.7	720	120	8	15.00
December	4	93	4.3	744	32	3	10.67
January	9	93	9.7	744	72	7	10.29
February	3	84	3.6	672	24	1	24.03
March	17	93	18.3	744	136	10	13.60
April	10	90	11.1	720	80	8	10.00
May	6	93	6.5	744	48	5	9.60
June	5	90	5.6	720	40	4	10.00
Total	102	903	11.30	7224	816	66	12.36

A freehand smoothing of the figures in the last column and of the figures in the last line of the table page 118, Number of Days with Precipitation, gives:

Number of Days and Hours, smoothed.

	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
Days	10	9	7	5	4	4.5	7	7.5	6	5
Hours	13	13	12.5	11.5	14	16	15.5	13	11	10

The Number of Days is greatest in September, least in January, with a secondary maximum and minimum in April and June. The summer has probably more days of precipitation than the winter, an extrapolation gives 42.5 against 36.5 or 54 per cent against 46 per cent. Accordingly, 79 days of the year should have precipitation, or 22 per cent, which means every fifth day. This agrees well with Gjøahavn for the preceding years, 56 per cent against 44 per cent on 77 days.

The Number of Hours is probably too large, 12.4 as a mean for 10 months, being thus larger than it was at Gjøahavn, where the number 11.6 also seems too large, while "Fram II" had only 7.3. Pronounced maximum in February and minimum in June, a secondary maximum in Sep.—Oct. and minimum in December, deviating a little from Gjøahavn.

The Wind Roses for Precipitation, in the following table, show the total number of times in every month and in the ten months at which precipitation was recorded at the terms and with various directions of wind and during calm. According to this table no precipitation fell when S and SW were blowing, once with NE and E, respectively in March and May, three to four times with N, in the months of December, March and May, seven to eight times with W and nine times with SE. The rest of the 102 cases of precipitation were recorded 60 times with NW and 20 times during calm.

Wind Roses for Precipitati on. — Number of Cases.

Period	N	NE	E	SE	S	SW	W	NW	C
September	—	—	—	—	—	—	—	18	2
October	—	—	—	1	—	—	2	9	1
November	—	—	—	2	—	—	0.5	10.5	2
December	1	—	—	—	—	—	—	2	1
January	—	—	—	2	—	—	2	5	—
February	—	—	—	—	—	—	—	—	3
March	1.5	1	—	4	—	—	2	3.5	5
April	—	—	—	—	—	—	1	4	5
May	1	—	1	—	—	—	—	4	—
June	—	—	—	—	—	—	—	4	1
Total	3.5	1	1	9	—	—	7.5	60	20
Weighted Mean....	0.21	0.29	0.04	0.10	—	—	0.08	0.17	0.10

The last line, Weighted Mean, tells that the

Probability of Precipitation is greatest at NE, followed by N, then NW. The probability is smallest during easterly winds, then comes W, SE and calm.

It may be remarked that precipitation was recorded only three times at other hours, twice in December and once in January.

Fog. — From the Summary, Table XI, we extract:

Number of Days with Fog.

September	October	November	December	January	February	March	April	May	June
5	1	5	1	0	1	0	7	6	1

and from the term observations we find:

Number of Cases with Fog.

Hours	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June
I	2	1	2	0	0	1	0	4	3	1
II	1	1	4	1	0	0	0	1	2	0
III	2	1	0	0	0	0	0	3	4	1
Total	5	3	6	1	0	1	0	8	9	2
Smoothed	4.3	4.3	4.0	2.0	0.5	0.5	2.5	6.3	7.0	4.3

Season and Total.

Hours	Autumn	Winter	Spring	Total
I	5	1	7	14
II	6	1	3	10
III	3	0	7	11
Total	14	2	17	35

The smoothed curve shows maximum in May and Sept.—Oct., minimum in January — February and during the summer. The Total number of cases is 35 on 27 days. From the distribution over the seasons in the last table we see that there is least fog during the winter, most during the spring and autumn and, on the whole, most in the morning.

No records of fog are made at other hours.

Fog Wind Roses.

Period	N	NE	E	SE	S	SW	W	NW	C
September	0.5	0.5	—	0.5	0.5	—	2	1	—
October	—	—	—	—	—	—	—	2	1
November	—	—	—	0.5	0.5	1	—	1	3
December	—	—	—	1	—	—	—	—	—
January	—	—	—	—	—	—	—	—	—
February	—	—	—	—	1	—	—	—	—
March	—	—	—	—	—	—	—	—	—
April	—	—	—	1	—	—	1	4	2
May	—	0.5	0.5	1	—	—	—	6	1
June	—	—	—	—	—	—	—	1	1
Total	0.5	1	0.5	4	2	1	3	15	8
Weighted Mean	0.03	0.29	0.02	0.045	0.04	0.02	0.03	0.04	0.04

NW brings most fog, then comes calm followed by winds from SE. *The Probability for Fog* (Weighted Mean) is greatest with wind from NE, while other directions stand about equal.

Wind. — Summary, Table XI, gives the following table for *Frequency of Wind* expressed in per cent.

Frequency of Winds. — Percentage.

Period	N	NE	E	SE	S	SW	W	NW	C
September	7	1	2	2	3	3	9	46	27
October	—	—	—	9	11	17	6	47	10
November	—	—	1	14	9	13	11	31	21
December	4	—	—	13	15	4	15	38	11
January	—	—	2	7	9	17	10	41	14
February.....	1	—	1	4	6	7	16	45	20
March	2	1	—	10	2	11	24	35	15
April	—	—	1	8	4	—	11	30	46
May	3	1	12	18	—	—	—	41	25
June	2	1	8	11	2	—	—	45	31
Total	2	0	3	10	6	7	10	40	22

The NW is dominant in the average of the ten months and also in the individual months, except in April, when calm is most frequent. On the average, calm comes next as to frequency, standing 18 per cent behind NW, but 12 per cent ahead of W and SE, which occur with 10 per cent each. The rarest wind is NE, which has only 0.4 per cent, and has occurred only in the months September, March, May and June, with only 1 per cent in each. Only SE, NW and calm occur every month. At Gjøahavn the direction SE was least represented and was absent during some months (Feb., Mar. and Dec.). N-wind was the most prevalent, followed by NW and calm.

Velocity of Wind. The smoothed means in the following table show a regular march in the ten months, with maximum in January and minimum in June. The range is 9.5 — 1.9 = 7.6 m. p. s., being thus much greater than at Gjøahavn, where we found 4.2 m. p. s. The Mean for the ten months is 4.68 m. p. s. against 5.65 m. p. s. for twelve months at Gjøahavn.

Wind Velocity, m.p.s. — Months and Seasons.

Hours	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	Mars	April	May	June	Autumn	Wint.	Spring	Total
I	2.5	6.1	3.9	6.8	9.6	4.4	6.6	2.9	2.2	2.1	4.17	6.93	3.90	4.71
II	2.0	6.4	5.0	6.2	9.3	5.8	6.1	2.7	2.3	2.0	4.47	7.10	3.70	4.78
III	1.6	5.9	5.5	6.0	9.7	5.4	5.4	2.0	2.4	1.7	4.33	7.03	3.27	4.56
Mean ...	2.0	6.1	4.8	6.3	9.5	5.2	6.0	2.5	2.3	1.9	4.32	7.02	3.62	4.68
Smooth.	3.4	4.8	5.5	6.7	7.6	6.5	4.9	3.3	2.3	2.0	—	—	—	—

In order to get an idea of the daily period of the velocity of wind, the monthly means for each term are entered in the table, and, as far as possible, combined to means for the seasons.

The spring has the strongest wind in the morning and the weakest in the evening, but during autumn and winter the wind is strongest about noon, and weakest in the morning. The maximum occurs in winter, the minimum in spring. This result is the inverse of what we found at Gjøahavn.

Calm. From the Summary, Table XI, is extracted:

Calms. — Number of Observations. — Months and Seasons.

Hours	Sept.	Oct.	Nov.	Dec.	Jan.	Feb.	March	April	May	June	Aut.	Wint.	Spr.	Total
I	7	3	9	5	4	6	2	15	9	9	19	15	26	69
II	7	2	5	2	4	5	4	12	6	7	14	11	22	54
III	8	4	5	3	5	6	8	14	8	12	17	14	30	73
Total	22	9	19	10	13	17	14	41	23	28	50	40	78	196
Smoothed .	17.7	14.8	14.2	13	13.3	15.3	21.5	29.8	28.7	26.3				

In the seasons the smallest number of calms occurs at noon and this is also, with few exceptions, the case in each month. For all ten months the evening has the greatest number and the same applies to the spring, while the autumn and winter have the greatest number in the morning. The spring has the greatest number of calms, and winter the smallest. All these features agree with what was deduced when discussing the velocity of wind.

The Annual March, as represented by smoothed values, shows a slow decrease from autumn to mid-winter with minimum in December—January, then a slow increase till February, followed by a rapid increase until maximum in April—May, and from there probably by a rapid decrease during the summer to the autumn. This progress seems to be the inverse of that of Gjøahavn, where, however, the values indicated a double period.

Dynamic Wind Roses, m. p. s.

Period	N	NE	E	SE	S	SW	W	NW
September	4.2	1.1	1.1	1.3	1.4	0.9	3.9	4.5
October	—	—	—	4.8	6.9	8.4	7.1	6.4
November	—	—	5.1	4.9	5.9	8.1	7.2	5.7
December	8.2	—	—	5.6	5.1	5.5	7.7	8.6
January	—	—	4.9	6.5	10.2	11.6	11.7	12.4
February.....	6.6	—	4.2	3.8	5.3	7.1	7.0	6.8
March	5.7	5.6	—	4.6	8.9	10.3	7.7	6.3
April	—	—	2.4	2.5	2.3	—	5.3	5.6
May	3.6	2.0	2.1	2.2	2.3	—	—	3.7
June	3.0	2.0	2.2	2.3	2.4	—	—	3.1
Mean	2.30	2.46	2.01	0.46	4.31	11.17	6.08	6.52
Smoothed	3.40	2.31	1.74	1.81	4.96	8.18	7.46	5.46

The strongest wind blows from SW, the weakest from SE, with a difference of $11.17 - 0.46 = 10.71$ m. p. s. A smoothed curve shows a regular progress with maximum for SW and minimum for E.

Number of Strong Winds with velocities equal to or greater than 10 or 15 m. p. s. are tabulated belov. The totals for the 16 directions of the wind are entered to the right and the totals for the months at the bottom. May and June have no wind reaching 10 m. p. s., September and April have none with a velocity of 15 m. p. s. The second last line gives the percentage of cases in each month. The smoothed values in the last line show a maximum in January for both velocities, and most pronounced for the strongest. From January the curve falls to both sides in agreement with the usual curve for velocity.

Number of Strong Winds, Velocity ≥ 10 and 15 m.p.s.

Wind	Sept.		Oct.		Nov.		Dec.		Jan.		Feb.		March		April		May		June		Total		p.ct.	
	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10	15	10	15
N	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NNE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ENE	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
E	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
ESE	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	0.7	–
SE	–	–	–	–	2	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	3	–	2.1	–
SSE	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	–	–	–	–	1	–	0.7	–
S	–	–	1	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	1	–	0.7	–
SSW	–	–	–	–	–	–	1	–	4	4	–	–	1	–	–	–	–	–	–	–	6	4	4.1	6.9
SW	–	–	10	4	2	1	–	–	10	3	–	–	5	3	–	–	–	–	–	–	27	11	18.6	19.0
WSW	–	–	–	–	8	3	2	–	2	2	4	2	6	3	–	–	–	–	–	–	22	10	15.2	17.2
W	–	–	–	–	–	–	–	–	1	–	–	–	5	1	1	–	–	–	–	–	7	1	4.8	1.7
WNW	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–	–
NW	8	–	10	2	4	1	13	7	25	17	6	4	6	1	4	–	–	–	–	–	76	32	52.4	55.2
NNW	–	–	–	–	–	–	–	–	–	–	–	–	1	–	–	–	–	–	–	–	1	–	0.7	–
Total	8	–	21	6	16	5	17	7	44	26	10	6	24	8	5	–	–	–	–	–	145	58	100	100
pct.	5.5	–	14.5	10.3	11.0	8.6	11.7	12.1	30.4	44.8	6.9	10.4	16.6	13.8	3.4	–	–	–	–	–	100	100	–	–
Smooth.	7.2	–	11.4	9.8	12.0	10.0	16.2	19.5	19.8	28.1	15.2	19.9	10.4	12.7	7.8	–	–	–	–	–	–	–	–	–

The percentages for each direction of the wind, show that the East half of the rose had no wind velocity of 15 m. p. s. and in the NE quadrant no velocity of 10 m. p. s. occurs. High velocities are most frequent with wind from NW, above 50 per cent for both velocities, 52.4 % for 10 m. p. s. and 55.2 % for 15 m. p. s., then comes SW with 18.6 % and 19.0 % respectively, and WSW with 15.2 % and 17.2 %. Of 705 measured wind velocities 145, or 20.6 per cent, reach 10 p. m. s. or more, while 58, or 8.2 per cent, reach 15 m. p. s. or more. Velocities of 20 m. p. s. or more were measured 17 times:

1905,	Oct.	15, 8 a. m.	NW 22	1906,	Jan.	14, 8 p. m.	SSW 23
		15, 2 p. m.	NW 23			15, 8 a. m.	SSW 25
	Dec.	2, 2 p. m.	NW 23			15, 2 p. m.	SSW 23
1906,	Jan.	3, 2 p. m.	NW 20			22, 8 a. m.	NW 20
		3, 8 p. m.	NW 24			23, 8 a. m.	NW 25
		4, 8 a. m.	NW 20		Feb.	12, 2 p. m.	NW 21
		8, 8 a. m.	NW 24			13, 2 p. m.	NW 25
		9, 8 p. m.	WSW 20			13, 8 p. m.	NW 24
					Mar.	10, 8 p. m.	SW 21

The highest observed velocity was 25 m. p. s., which was recorded twice in January and once in February.

Periods with strong wind longer than 24 hours are found in the following compilation. Here as at Gjøahavn, it has been assumed that the velocity has remained 10 m. p. s. or more between the hours of observation, thus also during the night.

1905,	Oct.	25, 8 p. m.	—Oct.	27, 8 p. m.
	Nov.	25, 8 p. m.	—Nov.	27, 8 p. m.
	Nov.	30, 8 a. m.	—Dec.	1, 2 p. m.
	Dec.	2, 8 a. m.	—Dec.	4, 8 a. m.
	Dec.	26, 8 a. m.	—Dec.	27, 8 p. m.

1906, Jan. 3, 8 a. m.—Jan 4, 8 p. m.
Jan. 7, 8 p. m.—Jan 8, 8 p. m.
Jan. 11, 2 p. m.—Jan. 13, 8 a. m.
Jan. 13, 8 p. m.—Jan. 15, 2 p. m.
Jan. 17, 8 p. m.—Jan. 18, 8 p. m.
Jan. 21, 8 p. m.—Jan. 23, 2 p. m.
Feb. 12, 8 a. m.—Feb. 13, 8 p. m.
Mar. 10, 8 p. m.—Mar. 12, 8 a. m.
Mar. 17, 8 a. m.—Mar. 18, 8 a. m.

It is seen that January, for instance, has a period of gales from the 11th to the 22nd with only brief interruptions.

The pressure does not always exhibit any great disturbance during such periods. Especially, squalls of short duration are not accompanied by appreciable changes in the pressure. Even during the long period of gales in January no conspicuous pressure changes occurred except between the 13th and the 16th. During these days the pressure decreased from 773.2 mm. in the afternoon of the 13th to 747.0 mm. in the afternoon the 15th and then increased rapidly to 765.1 mm. in the afternoon the 16th. On the 13th in the evening the wind was SW 11, in the morning of the 14th SW 17, increasing to SSW 19 in the afternoon, and further to 23 in the evening and to 25 in the morning of the 15th.

Aurora Borealis.

In the register of the material of observation is entered as No. 11 an Aurora Journal (Main Register No. 81, page 16). The contents of this journal are given in translation.

Observations of Aurora Borealis.

Year	Day		Hour	Aurora Borealis
1905	October	22	8 p.m.	Two parallel bands, a degree or two broad, with a space of some two degrees between them, through the zenith NW-SE, fairly bright, tranquil, of an indistinct greenish-yellow colour.
»	»	24	6 »	An arched band NNW—NNE, shaped as a rainbow, greatest distance from horizon ca. 10°, colour indistinct greenish-yellow, tranquil.
»	»		7 »	Idem.
»	»		8 »	A curtain-shaped aurora in NNW from horizon to ca. 10° height, narrow, colour indistinct yellow, motion slight.
»	»	25	6 — 8 p.m.	Curtain-shaped aurora in festoons SE—NW through the zenith, at the horizon narrow, at the zenith ca. 10° broad, motion moderate, colour greenish-yellow, power strong, changing.
»	»	26	p.m.	Parallel bands, changing in number, covering the sky through the zenith. Near the horizon and up to a height of ca. 20° the aurora was narrower with vertically projecting streamers, which widened and flowed together, forming the parallel bands named above. Colour yellow, motion strong, not quivering, power changing, some bright luminosities, however, always to be seen at one place or another. Observed from beginning darkness, latest at 10 o'clock, the discontinuance not observed.
»	»	28	6 — 8 p.m.	Haze-like aurora above clouds in N, height ca. 20°. Colour grey, no motion, power faint.
»	»	29	6 p.m.....	Haze-like aurora as cloudlets shifting place in the northern half of the sky. Colour greyish, no motion, power faint.

Observations of Aurora Borealis (continued).

Year	Day	Hour	Aurora Borealis
1905	November 3	10 p.m.	Parallel arches over the northern horizon NNW—NNE, height in N ca. 20°. Colour yellow, motion steady, power strong.
»	» 4	6 »	Streamer-formed aurora NW—SE arching the southern horizon, greatest height ca. 70°. The streamers parallel and short (ca. 10° long) and nearly vertical. Colour yellow, motion strong, quivering, power strong.
»	» 4	7 30 p.m.	Aurora SE—SW commencing as streamers at the horizon, widening to two parallel foglike bands, ending in SW ca. 30° above the horizon.
»	» 4	10 p.m.	Narrow curtain-shaped aurora having streamers along folds through the zenith NW—SE, vividly flickering. Broad veil-like aurora over the sky NW—S, strongly bright.
»	» 5	10 »	Haze-like aurora in a single 5° broad band parallel to the horizon and 5° above it NNE—SSE, power faint. In SE, rising from the bands, more strongly luminous streamers. Colour reddish yellow, motion strong.
»	» 11	6 — 8 p.m.	Some stripes of haze-like aurora through the zenith NW—SE. Colour reddish, motion quiet.
»	» 21	10 p.m.	Aurora as brims on the upper edge of Stratus-clouds ENE—W, crossing the S. Colour greyish, no motion.
»	» 22	8 »	Faint gleam of light over a cloudless sky NW—NNE, commencing at a height above the horizon of ca. 5° stretching to ca. 30°.
»	» 23	8 »	Faint gleam of light over the sky NW—NNE, height ca. 30°.
	» 23	10 »	3—4 parallel bands near the zenith NNE—NNW. Faintly luminous, tranquil.
»	» 25	8 »	Faint gleam in N.
»	» 29	6 »	Aurora behind light clouds N—E 10°—30° above the horizon.
»	» 29	8 »	Idem.
»	» 30	8 »	Faint gleam in a narrow belt E—NNE 20° above horizon.
»	December 5	10 »	Faintly luminous haze-like band 3° broad, 20° above the horizon, stretching E—N. The band was broadest in E with effaced traces of folds as an approximation to the curtainform. No motion.
»	» 6	8 »	Some short, faint streamers of reddish colour in N. Visible only ca. a minute.
»	» 12	8 »	Aurora formed as Ci over the southern sky SE—W. Tranquil, faint, reddish.
»	» 13	6 — 10 p.m.	Ci-like aurora in parallel bands E—W near the zenith. Slight motion.
»	» 15	8 p.m.	Faint, haze-like aurora in a band N—NE 30° above the horizon, No motion.
»	» 16	8 »	As yesterday.
»	» 17	10 »	Curtain-shaped aurora dispersed over the sky. Power moderate.
»	» 18	10 »	Aurora as bands of Ci-clouds through zenith with main direction E—W. Strongly luminous.
»	» 19	8 a.m.	Some streamers shifting place in NE.
»	» 19	6 — 8 p.m.	Effaced curtain-shaped aurora arching the sky N—ENE. Greatest height ca. 30°, power moderate.
»	» 20	7 p.m.	Curtain-shaped aurora in N 5°—30° above the horizon. Motion and power moderate.
»	» 20	8 »	Some streamers in N.
»	» 20	10 »	Idem.
»	» 22	»	Aurora of form like Ci-clouds with longitudinal direction SE—NW through the zenith, stretching to ca. 30° on either side of this point and with a breadth of ca. 10°.
»	» 25	.....	Effaced curtain-chaped aurora in parallel bands through the zenith SE—NW from ca. 30° above the horizon on either side. Breadth ca. 10°. Strongly luminous. Steady.
»	» 28	6 p.m.	Faint, solitary streamers in NW.

Observations of Aurora Borealis (continued).

Year	Day	Hour	Aurora Borealis
1905	December 28	8 p.m.	A luminous arch from N to ENE, height at the middle ca. 30°, distance from the horizon on either hand ca. 10°. At the ends curtain-shaped with streamers along the folds in the middle as a bright haze. Slight motion, great power.
»	» 28	10 »	Aurora of same appearance as the preceding but going through the zenith SE—NW.
1906	January 9	10 »	Aurora as Ci-clouds at the zenith.
»	» 10	8 »	Faint haze-like aurora of small extent in SE.
»	» 13	10 »	Curtain-shaped aurora arching the sky E—NNW Faint, turbulent.
»	» 20	»	Effaced curtain-shaped aurora in arch E—NNW Quiet, faint.
»	» 24	8 »	Faint haze-like aurora, arch E—N.
»	» 24	10 »	Column perpendicular to the horizon in E, at 30° height, widening haze-like. Faintly luminous.
»	» 25	10 »	Narrow curtain-shaped aurora in E. In a belt ca. 20° broad north of the line E—W aurora formed as small luminous clouds or haze-masses. Tranquil.
»	» 26	6—7 p.m.	Streamers N—E from the horizon up to ca. 20° height.
»	» 26	8 p.m.	Ci-like aurora in a 10° broad belt SE—NW through the zenith. Quiet, faintly luminous.
»	» 26	10 »	Two parallel arches, the uppermost 5° broad, the undermost fairly narrow with a narrow non-luminous belt between. Direction NW—E from 10° above the horizon both ways. The light haze-like, quiet, moderately bright.
»	» 30	6—8 p.m.	Arch E—N from 10° above the horizon, greatest height ca. 20°. The light haze-like with distinct streamers vertically through the arch. Breadth of the arch ca. 5°.
»	» 30	10 p.m.	Curtain-shaped aurora in parallel bands commencing above the horizon between SE and E, that in SE going through the zenith. The bands reached different heights, decreasing in power of light east of the rhumb-line N.
»	February 2	6—10 p.m.	Curtain arching the sky E—N. Quiet, faint, reddish. From 10 p.m. a V-formed aurora in due N from the horizon to ca. 30°.
»	» 3	8 p.m.	Faint streamers at different places between E and N.
»	» 5	6—10 p.m.	Aurora as Ci-clouds at different places high in the sky, whith the direction E—N. At 8 p.m. a 5° broad winding band near the zenith SSE—WNW, reddish, strongly bright, quiet.
»	» 17	6.30 p.m.	Solitary effaced curtain in arch E—NNW, beginning and ending ca. 10° above the horizon, greatest height ca. 25°. The breadth of the band 5°, moderately luminous.
»	» 17	8 p.m.	Some streamers in N.
»	» 17	10 »	Two parallel bands of similar appearance to that at $6^h\ 30^m$ p.m.
»	» 18	8 »	Curtain and streamers in winding bands from 20° above the horizon in SE and NW through the zenith 10° broad on each side of the zenith. Turbulent.
»	» 22	»	Winding parallel bands, changing in number and power, in northern half of the sky at different heights above the horizon, in the western part mostly streamers, in the eastern more effaced cloud-like form. Breadth ca. 5°. Main direction E—W.
»	» 25	8 »	Strongly luminous arch S—WSW, covered by land at the ends. Greatest height ca. 20°, breadth ca. 5°. Quiet.
»	» 25	10 »	Ci-like aurora near zenith.
»	March 4	10 »	Ci-like aurora at the zenith. Lively motion.
»	» 5	8 »	Faint Ci-like aurora, longish, of small extent, near the zenith.

Observations of Aurora Borealis (continued).

Year	Day	Hour	Aurora Borealis
1906	March 6	8 p.m.	Haze-like aurora, shifting place, most strongly luminous near zenith. The form of haze-masses very variable, from much lengthened, winding to gathered clumps. The motion in the masses lively.
»	» 8	8 »	Ci-like aurora through the zenith SE—NW. Reddish, lively motion.
»	» 8	10 »	Idem.
»	» 13	8 »	Ci-like aurora in narrow arches NW—SE. Towards N some faintly luminous haze-patches.
»	» 16	8 »	Some faint streamers SE—NW.
»	» 16	9 »	Bands, a little stronger than at the preceding observation. Same direction.
»	» 23	9 »	Faint bands SSE—NNW.
»	» 24	9.30 p.m.	A single faint streamer SE—NW.
»	» 25	9.30 »	Faint bands SE—NW.
»	» 26	9.15 »	Strongly green-coloured, varying rapidly between streamers and bands. SE—NW.

According to this Journal the number of days with Aurora Borealis in every months was:

Number of Days with Aurora Borealis.

	Oct.	Nov.	Dec.	Jan.	Feb.	March
Days	6	10	13	8	7	10
Observations	8	15	18	12	10	13

Last line gives the number of Aurorae. The total number of days with Aurora was 54, and the number of Aurorae observed was 76. In September no Aurora was observed, nor in the months April to June. The sunny season, with the sun constantly above the horizon, begins on the 22nd May and ends on the 21st July. The fact that the observations do not reach much past the spring equinox is probably explained by the fact that, according to the notes, no observation was taken later than at 10 p. m. Only once, on the 19th December, is a morning observation recorded. At three observations, the 22nd and the 25th December, and the 20th January, no time is entered.

As to the frequency it should be noted that the number of days with Aurora increases in March. Otherwise the number is highest in December with decrease to each side. A similar frequency is found when considering the number of observed Aurorae.

Optical Phenomena,

No. 13 of the separate list (M. L. No. 83, page 16) has notes as to some observations of optical phenomena, which here shall be copied *in extenso*.

Optical Phenomena.

Year	Day	Hour	Phenomenon
1905	October 22	8 a.m.	Solar halo with mock-suns on the sides and above, pillar through the sun. Ca. 20° from the left mock-sun a luminous reflex near the horizon. The halo remained the whole day but was faintest at noon, increased in power towards sunset.

Optical Phenomena (continued).

Year	Day	Hour	Phenomenon
1905	November 10	9 a.m.	Pillar through the sun. To the left a mock-sun formed by a horizontal and a vertical light-ray as a cross, most strongly luminous in the section-point of the rays. Distance from the sun ca. 20°. The sky to the right of the sun and to the height thereof covered by land.
»	» 10	6 p.m.	Lunar halo, only $^3/_4$ of the circumference visible the sky being partly covered by ACu.
»	December 3	»	Circular haze-veil and cross through the moon, mock-moon on each side with fragments of a halo through each mock-moon, strongly luminous.
»	» 4	8 »	Faint lunar halo.
»	» 10	10 »	Lunar halo. CiSt.
»	» 11	8 »	Lunar halo resting on a bright parallelogram, the underside of which was formed by the horizon, the oblique sides inclined to the underside at an angle of ca. 45°. Hazy CiSt.
»	» 11	10 »	The parallelogram disappeared.
»	» 12	8 »	Luminous haze at the horizon underneath the moon.
»	» 15	»	Corona around the moon, faint halo.
»	» 17	8 a.m.	Halo round the moon.
»	» 17	11 p.m.	Two mock-moons, on each side of the moon, pillars through the moon and through the mock-moons.

From the end of October to the middle of December 1905 eleven cases are noted, mostly corona and halo phenomena.

TABLES

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