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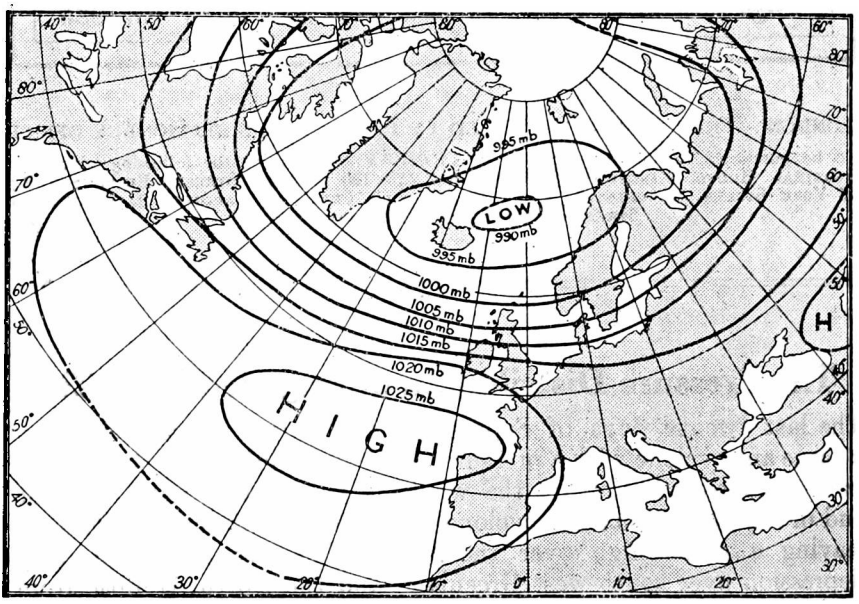
The Pressure Distribution during October, 1936

The last twenty days of September, 1936, were characterised by a large anticyclone with a pressure above 1020 mb. over the greater part of Europe, including the whole of the British Isles. At the end of September this anticyclone broke down over most of Europe, leaving a small high over the British Isles, separating a deep depression over south-west Greenland and the North Atlantic from a complex system of shallow lows over Europe. This type of distribution persisted with minor changes until October 10th; on the 11th the anticyclone over the British Isles receded towards the west-south-west while depressions south of Greenland and over Scandinavia began to unite across Iceland. This process was practically complete by the 14th, when a small secondary depression over Scotland definitely terminated the long regime of anticyclonic conditions.

The chart of average pressure for October 1st–13th shows an anticyclone covering the British Isles, where the pressure was everywhere above 1020 mb. and reached 1024 mb. at Lerwick. From here a long curved anticyclonic ridge extended across the Azores to Bermuda, partially enclosing a depression centred west of Cape Farewell, Greenland, with a minimum pressure of about 1002 mb.

By October 15th pressure had fallen below 980 mb. in Iceland and a steep gradient for westerly winds extended across the British Isles. This type of distribution continued with minor changes until the

end of October, giving a series of strong winds or gales on our western and northern coasts. There was a short interval of more anticyclonic conditions from the 20th to 22nd but on the 23rd another depression approached from the west, and from the 24th to 27th very low pressures were recorded north and north-east of Scotland, falling below 964 mb. on the 26th and 27th, with widespread gales, especially in Scotland and northern Ireland, where considerable damage was done and three lives were lost. The "Queen Mary" suffered a very rough crossing, eight passengers and four members of the crew being hurt, while several other ships were sunk with loss of life.



The average pressure distribution during the period October 14th to 31st is shown in the figure. The steep gradient from south to north over Scotland and northern England is especially notable. The distribution is very similar to, though less intense than, that for January 1st–15th, 1934, and the succession of changes during the whole period from September 11th to October 31st, 1936, follows fairly closely the development from December 1st, 1933, to January 15th, 1934, illustrated in the *Meteorological Magazine* for January and February, 1934. In that remarkable sequence a deep area of low pressure travelled from south-west of Greenland to Iceland, and in the succeeding half-month (January 16th–31st) passed on to Spitsbergen, while the anticyclone retreated from Europe across the British Isles to a position west of Spain. Whether the parallel will complete itself during the first half of November, 1936, is not known at the time of writing, though the daily charts for the first few days of November appear to indicate a trend in that direction.

The area of low pressure shown north-east of Iceland in the figure is to be regarded not as an active individual depression but as a focus of cyclonic activity through or about which a whole series of different depressions passed from west to east, reaching their greatest intensity as they passed through the focus.

The average pressure for the month shows a steady decrease from 1021 mb. at Scilly and Brest towards the east-north-east, falling to 1008 mb. at Riga. The greater part of Europe accordingly experienced a great influx of polar maritime air, which brought low temperatures and heavy rainfall. The broadcast monthly means show that in most parts of Germany temperature was 3–4° F. below normal and rainfall an inch or more above normal; further to the south-east, in Hungary, the deficit of temperature averaged 6–7° F. and the excess of rainfall 2–3 in. At high-level stations the abnormality of temperature was even greater, reaching −8·5° F. at the Zugspitze in the extreme south of Germany at a height of 9,720ft.

C. E. P. Brooks.

Weather Changes on the West African Air Route

The opening of new air routes nearly always leads to extension of and precision in our knowledge of meteorological conditions provided that the operating pilots are careful in the preparation of the weather section of their navigation reports. The navigation report of the Imperial Airways aircraft *Delia* (Capt. R. O. O. Taylor) Geneina–Kano on April 22nd, 1936, is interesting because it seems possible to connect changes of weather on the West African Air Route with the passage of depressions across the Mediterranean and the western desert of Egypt.

The prevailing wind between November and May over this route and for the greater part of the Sudan, Chad and French West Africa is NE.–E. being a circulation round the high pressure area of the Sahara; occasionally, however, this circulation is interrupted by the passage of depressions along the Mediterranean and on this particular occasion it seems that a well-marked cold front extended from southern Europe across the Mediterranean and the Sahara to the vicinity of Kano—a distance of at least 2,000 miles.

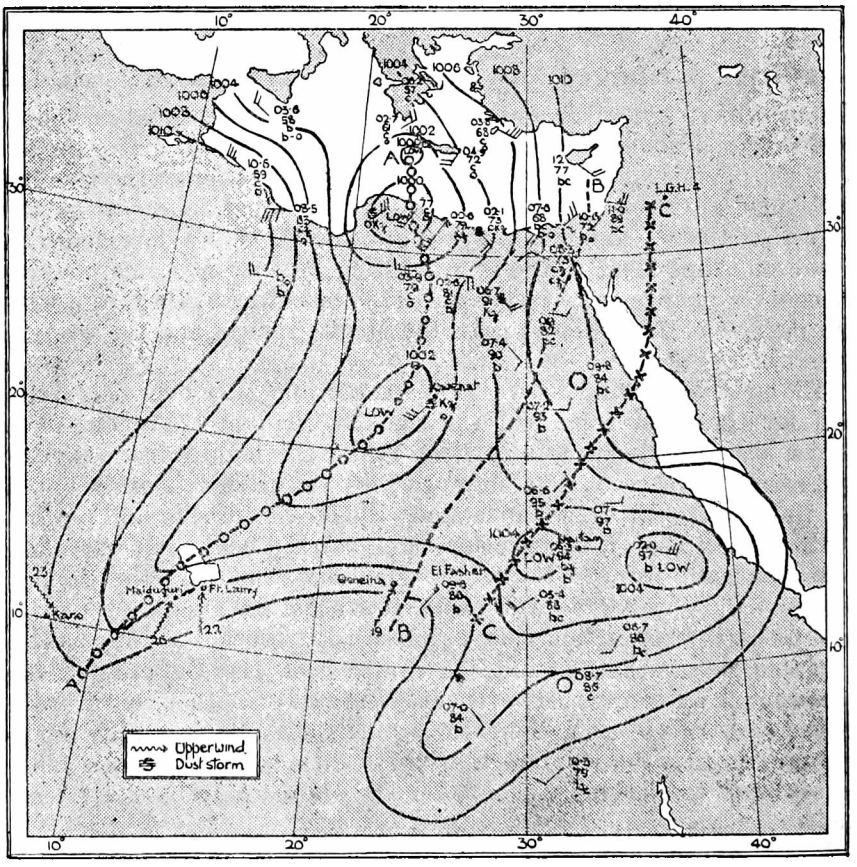
The chart on p. 228 shows the pressure distribution as fully as the available observations permit. A centre near the Egyptian coast is causing sandstorms there; there is probably another centre west of the oasis of Owenat where the wind is SW. force 6 with dust-storms. It may be recalled that these duststorms caused a temporary stop to the aerial search for the German Ambassador who was lost in the western desert.

No observations of pressure are available west of El Fasher (all efforts to obtain them have so far failed) but the normal NE.–E.

winds over the route Khartoum to Kano were replaced on the 22nd by wind from S.-SW. except near Kano where the wind was WNW.

TABLE I.—UPPER WINDS BETWEEN GENEINA AND KANO ON APRIL 22ND, 1936.

Height.	Geneina		Lamy		Maiduguri		Kano	
ft.	°	m.p.h.	°	m.p.h.	°	m.p.h.	°	m.p.h.
2,000	...	...	S	27	SSW	25	...	...
3,000	SW'S	10	S	22	SSW	26	WNW	23
4,000	SW	19	...	...	...	...	...	...
5,000	SW	22	...	...	SW'S	30	W	22
6,000	SW	13	...	...	...	...	...	...
7,000	SW	7	SW	12	SW'S	16	W'N	23
8,000	SW'W	7	...	...	...	...	...	...
10,000	SSE	4	NW	11	...	...	W'S	5



Capt. Taylor's remarks are as follows :—

April 22nd, 1936.

0430	Geneina	S. 5–8 m.p.h., 5 tenths stratocumulus, visibility good.
0530	Abeche	SW. 8–10 m.p.h., 7 tenths stratocumulus and altocumulus, visibility good.
0530–0955	Abeche–Lamy.	Cloud 10 tenths altostratus and altocumulus—rain showers, visibility good except in rain.
	Lamy–Maiduguri	10 tenths stratocumulus and altocumulus, visibility good.
1140	Maiduguri	SW. 20–25 m.p.h., 10 tenths stratocumulus and altocumulus—rain in west.
1145–1445	Maiduguri–Kano.	Continuous heavy rain over almost whole route from 10 tenths high nimbus. Areas of low stratus at about 500 ft. above ground, visibility poor in rain—thunder and lightning.

It is fairly certain from the weather experienced that the front was crossed between Maiduguri and Kano between 11h. 40m. and 14h. 45m. G.M.T. on April 22nd and that the front on that date was as indicated by the line AA. on the chart.

On the 23rd the front was as indicated by the line BB. Its position over Egypt and the northern Sudan is very well marked and the upper winds at Geneina at 5h. 45m. were :—

3,000 ft. W'N. 10 m.p.h.
4,000 ft. W'S. 9 m.p.h.

which would indicate that the front had just passed that station. During the 23rd El Fasher had 6 mm. of rain and by 6h. G.M.T. on the 24th the wind had become NW. force 3.

Khartoum's upper winds on the 24th had become southerly and reports from Merowe, M.V. *Strathmore* in the Red Sea and L.G. H.4 (Syrian Desert) indicate that the position of the front on the 24th was as shown by the line CC.

J. DURWARD.

OFFICIAL PUBLICATION

The following publication has recently been issued :—

PROFESSIONAL NOTES

No. 72. Upper winds at Wadi Halfa (Sudan). By J. Durward, M.A. (M.O. 336l).

In Professional Notes No. 72 is discussed the variation of wind with height at Wadi Halfa. The upper winds at this station are characterized by great constancy of direction and therefore the most graphic method of presenting the data is by the construction of direction frequency vectors and curves of average velocity.

The wind from ground level up to a height of about 4,000 feet is nearly always between N. and NE. In the months of December to February the wind above this height usually backs and is about 300° at 10,000 feet. In July to September the backing is much greater, the wind becoming 230°–260° at 10,000 feet. In the transitional period March to June the wind does not as a rule back beyond north and particularly in June the " constancy " at high levels is very small. The same applies to the winds during the second transitional period October and November.

The maximum wind speed in the early morning is generally encountered at 2,000 feet whilst the highest velocity at all heights occurs in April.

Certain cases are discussed in which the wind at Wadi Halfa is SE.–S. These are associated either with an extensive low pressure area in the western desert or with a northerly extension of the low pressure area in the Sudan. In the former case the change from SE. to N. or NE. is nearly always accompanied by sandstorms.

Discussions at the Meteorological Office

The subjects for discussion for the next two meetings are :—

November 30th, 1936. *Visibility : its measurement and significance in seeing.* By M. Luckiesh and F. K. Moss (Philadelphia, J. Franklin Inst. 220, 1935, pp. 431–66) and *Visibility and visibility determination.* By H. Sebastian (Beitr. Geophys., Leipzig, 45, 1935, pp. 35–62) (in German). *Opener*—G. W. Hurst, B.Sc., D.I.C.

December 14th, 1936. *Cooling in the lower atmosphere and the structure of polar continental air.* By H. Wexler (Washington, D.C., Mon. Weath. Rev., 64, 1936, pp. 122–36). *Opener*—C. S. Durst, B.A.

Correspondence

To the Editor, *Meteorological Magazine*

Rainbow with Vertical Shaft

On the evening of July 7th, 1936, I was driving with friends northward near Staffin towards Flodigarry on the east coast of the Isle of Skye and we witnessed the phenomenon which is illustrated in the photograph forming the frontispiece to this number of the magazine. The road runs not far from the edge of high cliffs down to the sea. The time was about 21h. B.S.T. The photograph faces roughly south-east and shews a primary rainbow (there was a secondary bow, but this does not appear in the photograph).

What seems to be noteworthy is that from the northern foot of both primary and secondary rainbows sprang a vertical shaft of light, each shaft exhibiting the colours in the order proper to its bow.

The shafts extended to approximately three-fifths the height of the top of the bows. Their bases coincided with the bases of the bows. No shafts were seen at the southern feet of the bows which were not "in" the sea as were the northern feet. The shafts were visible for about 40 minutes. When, however, we arrived at Flodigarry about 22h. the shafts and the secondary bow were no longer to be seen, but the primary bow persisted with brilliant colouring. The shafts did not appear to shew any trace of curvature.

I should be glad to have an explanation of the phenomenon, the like of which I have certainly never seen before.

FRANCIS DRUCE.

60, *Burton Court, London, S.W.3, October 28th,* 1936.

Again: St. Elmo's Fire on a Cloud

It is a great advantage of this magazine, that observers may contribute to its contents in writing down their observations of general interest. This stimulates the activity of others and is of much importance for the collection of material.

Only a few weeks ago I read about the phenomenon observed by Mr. M. D. Laurenson in New Zealand (July, 1936, page 134). In a period of 14 years' thunderstorm observations I have observed on two occasions clouds lit up during night time. In both cases, on May 3rd, 1934, at 20h. 26m. G.M.T., and June 21st, 1936, at 0h. 46m. G.M.T., the sky was overcast and a part was seen in the south-west direction illuminated by approaching thunderstorm, and respectively during 5 and 10 seconds. After reading Mr. Laurenson's article, I had the intention to write these observations to the *Meteorological Magazine.* It is obvious that in these two observations the light was originating from the same kind of phenomenon (St. Elmo's fire) as Mr. Laurenson described, though the source could not be seen, the sky being overcast.

Now before writing I saw the same phenomenon myself.

On September 5th at 16h. 15m. G.M.T. the sky was covered with cumulostratus about 9 tenths, associated with altocumulus and altostratus for about 5 tenths, bulging cumulus and lower cumulus with caps to the north-west, at which part of the sky from south-west to north clouds grew thicker to rather dark nimbostratus at the horizon. In the west-north-west at a height of about 30° an intense light was seen. At first I thought it was a mock sun (there was actually a slight part of a halo visible above the sun), but it was too high for it and the light was of one colour and of great intensity. As far as I can state it, the colour was greenish white. The light did not pulsate, but I did not see its development. I had just come out-of-doors when I first saw it.

There remained no question about its being an electric phenomenon. The light was so intense that it was just unpleasant for

the eye. At night time this unusual phenomenon would have attracted general attention, its brilliancy being many times more intense than the light of the moon and it would have set the town and country side in a bright illumination.

During its display (from 16h. 14m. until 16h. 16m.) the cumulonimbus-clouds over which it was situated could not be seen. Unfortunately they were just covered by altocumulus clouds. A few minutes afterwards the cumulonimbus calvus was coming from behind the lower clouds. So I could not state if there was a peak-formed head present at the time of occurrence, which makes an outflow of electricity possible. Mr. Laurenson saw " a ball of light balanced on a finger of cloud " (see his sketch). What I saw was shaped like a flame without a sharp limit and a little more than 1° in diameter.

At 16h. 37m. thunder became audible in the west. That afternoon a depression was centred over the north of Scotland. At the Dutch coast stations (middle and southern part) wind blew from W. force 4 and at stations 20–50 Km. inland wind was from S.–SSW. force 2–3. Thus strong vertical air currents were very likely. The friction for the air currents over land, and besides that, the downs along the coast, cause this effect. In this connexion it should be noted, that thunderstorms starting over the sea and dying out at about 10 Km. inland are very common at Leiden, especially in autumn in the evening and night. From this it follows that St. Elmo's fire on cloud will be most likely to occur in Holland near the coast and in other countries under similar conditions, viz. in favourable circumstances in the atmosphere.

K. VAN DER HEYDEN.

Garenmarkt 9, *Leiden, October 7th,* 1936.

" False Dawn "

In connexion with the account of a " false dawn " by Mr. Cumming in the *Meteorological Magazine* for September, 1936 (page 189), the following lines from The Kasidah by Sir Richard Burton (written in 1853) are of interest :—

The Wolf-tail* sweeps the paling East to leave a deeper gloom behind,
And Dawn uprears her shining head, sighing with semblance of a wind :

The Kasidah was written on Burton's return journey from Mecca.

I am indebted to Squadron Leader J. C. Foden, A.F.C., of this station, for bringing this reference to a " false dawn " to my notice.

The night January 6th–7th, 1933, was clear so that presumably 1933 in Mr. Cumming's letter is a mistake ; I have, in fact, been informed by the Editor that the date should be 1934. On the corresponding night of that year the weather in southern England

* The false dawn.

generally was very unsettled with fresh SSW. winds associated with cyclonic centres to north and west of Ireland; the moon was approaching last quarter and southed at 4h. 36m. Is it possible that low cloud prevented the moon being seen, and that a rift in a higher cloud layer was the cause of the increased illumination which enabled the Dorsetshire Hills to be discerned between 5h. 10m. and 5h. 30m. on this occasion?

C. V. OCKENDEN.

Meteorological Station, R.A.F., Boscombe Down, Wilts., September 25th, 1936.

A Double Corona Round the Moon

On the evening of Saturday October 31st, 1936, I observed a "Rainbow effect" surrounding half the moon. The colours were as follows: a band of yellow, then brown, purple and finally a distinct green. The whole of this was repeated again, once, like a reflection.

The moon was in the east and had just emerged from a high cloud and the rainbow effect was projected on to the surface of the cloud.

NORMAN E. NEVILLE.

83, *West Street, Fareham, Hampshire, November 3rd,* 1936.

Cyclones in the Tasman Sea

In the June, 1936, number of the *Meteorological Magazine,* p. 120, is a short reference to a paper by me which discusses the analysis of a series of weather charts covering the Australia–New Zealand area. The principal feature of the series was a deep cyclone which developed in the neighbourhood of the 30th parallel. Cyclones of this type are of considerable interest in view of the prospective development of trans-ocean air services in this region since they are one of the principal sources of danger to aviation. So far as I know, nothing closely parallel to them occurs in corresponding latitudes in the northern hemisphere. Tropical cyclones occasionally develop into the same type in their later stages when moving into higher latitudes, but generally they are of different origin, of much smaller area, much less frequent, and have a very different annual variation of frequency. The number of cyclones, of the type described, observed in each month during the past 38 years is indicated in the first line of the following table. The second line gives the number described on the coast of New South Wales in 36 years according to Mr. H. A. Hunt:—

Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Oct.	Nov.	Dec.	Year
16	20	21	15	35	38	40	21	17	18	8	6	255
20	21	15	17	24	33	28	20	17	15	7	7	225

The agreement is surprisingly close, and the differences probably correspond to a real difference in régime, the presence of the Australian continent affecting the New South Wales conditions. In winter,

for example, a warm sea borders the cold continent. The New Zealand figures probably underestimate the position slightly, since on a number of occasions recently, but for a single ship's report, we should have been unaware that a deep cyclone was crossing some portion of the waters to the north. In the early years, there were no reports from north of New Zealand. In this area the cyclones occur most frequently between the tropic and 36° S. or right in the high pressure zone. Further south, though cyclones do occur, they are very much rarer. The strong southward pressure gradient and consequent westerly winds make it very difficult for a complete wind circulation to develop. It has been commonly assumed that the so-called V-depressions experienced in New Zealand and Australia were connected with cyclones whose centres were passing much further south, in the neighbourhood of the 60° parallel.

It is probable that as the gradient for westerly winds decreases in high southern latitudes, south of 55° about, the number of cyclones does increase somewhat.

EDWARD KIDSON.

Meteorological Office, Wellington, New Zealand, September 7th, 1936.

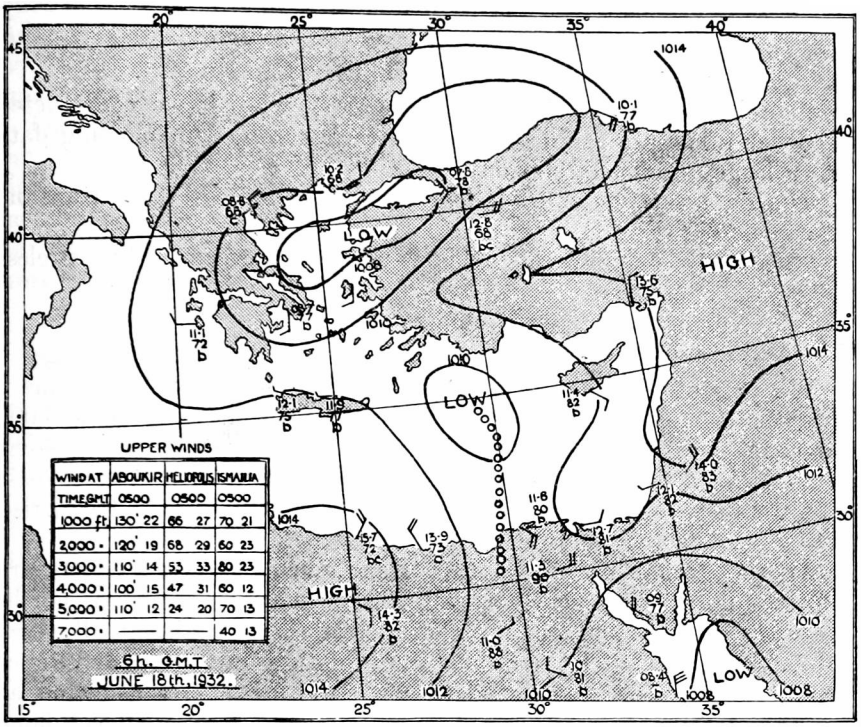
Minor Haboob at Ismailia, Egypt.*

The abrupt changes of wind direction and speed which take place in the Ismailia district were considered to be of great importance in connexion with airship mooring and at the request of the late M. A. Giblett, I undertook an investigation into this problem in 1928. Twenty-five cases of abrupt change of afternoon wind occurring between mid-April and mid-October were discussed and a memorandum submitted in 1928. The conclusion was reached in this memorandum that the majority, if not all, of the abrupt changes of wind which occurred at Ismailia and district during the afternoon were associated with the passage of a cold front or small desert disturbances which were often to be seen on the morning synoptic chart.

Since 1928 the amount of data received from the desert west of Egypt has increased considerably and it is now possible to trace the passage of desert depressions across Egypt more readily, and so far there has been no occasion to modify the conclusion reached in 1928.

The sequence of events described by Mr. Flower was almost certainly due to the passage of a well-defined cold front which at 8 a.m. zone time on the 17th had just passed Benghasi. The eastward movement of this front was about 20 m.p.h.; it passed Aboukir at 10.50 a.m., and would therefore reach Ismailia just before 4 p.m. A synoptic chart showing the situation at 8 a.m. (6h.G.M.T.) is on p. 235—the surface and upper winds at Aboukir should be noted.

* This note refers to the article by Mr. W. D. Flower in the *Meteorological Magazine* for June, 1936, p. 111.



The sandstorm or minor haboob which accompanied the abrupt change of wind is a fairly common occurrence when a sharp cold front passes over a sandy or dusty area.

J. DURWARD.

Meteorological Station R.A.F., Heliopolis, Egypt, July 1st, 1936.

Recent Weather Phenomenon

Once again I have discovered a saline deposit on the sphere of the sunshine recorder here. The appearance of the sphere was " smeary," with " blobs " or " splashes " of a greyish-white colour, not unlike soap marks or stains.

Some years ago you may remember a similar case of salt deposited on the ball at this Observatory.

This incident helped to clear up a mystery in connexion with electrical transmission wires on pylons—the salt having impaired the efficiency of the wires. Most of the deposit of yesterday still remains on the sunshine sphere. Evidently the strong to high SW. wind brought salt spray inland from Bristol Channel.*

F. G. PARSONS.

Ross-on-Wye Observatory, Herefordshire, October 27th, 1936.

* See *Meteorological Magazine,* **62,** 1927, p. 277 and **63,** 1928, p. 129.

NOTES AND QUERIES

The Plotting of Weather Charts

Meteorologists, professional or amateur, who have constructed weather maps are familiar with the task involved in plotting data for a large number of stations.

The data received by wireless usually undergoes three transformations :—

1. Morse to numerals (this is usually performed by wireless operators).
2. Numerals to plain language.
3. Plain language to symbols on the chart.

With practice it becomes possible to combine transformations 2 and 3, although this entails knowledge of the positions of some 3,000 stations, and the symbols corresponding to some 200 different code figures. This procedure is normally adopted by meteorologists, but it must be unusual for all three transformations to be carried out simultaneously.

At the Royal Naval College, Dartmouth, synoptic charts are plotted daily and recently Cadet Satow plotted a chart of north-western Europe and the northern Atlantic, combining all three transformations. The symbols were plotted on the chart direct from the wireless signals of G.F.A. and F.L.E. (transmitted at approximately 30 words per minute) and heard in the headphone without any intermediate writing down of the code groups. The plotting was done in two colours, and the temperature from all countries, except the British Isles, was corrected from Centigrade to Fahrenheit before entry on the chart. The chart was examined by a Master of the College and no error was detected. It must be agreed that this involves a very thorough knowledge of the codes, the positions of stations and mental concentration of a high order.

L. G. GARBETT.

New Observatory at Bulawayo named after Father Goetz

Permission has been obtained from the Government and the Jesuit Fathers to name the new Meteorological Observatory at Bulawayo, the Goetz Observatory.

The late Rev. Fr. E. Goetz, S.J., M.A., was very closely associated with meteorology in Rhodesia. Observations were commenced at St. George's School, Bulawayo, in March, 1897, by the Rev. Fr. V. Nicot, S.J., and continued up to May, 1903, when an observatory was opened.

Fr. Goetz took over the work here and remained in charge up to June, 1929, when the work was taken over by the Meteorological Office. During this period, in addition to making a unique series of local observations, he interested himself in the weather processes affecting the Colony and in the collection of old records. He

published papers in the Journals of the South African Society for the Advancement of Science and the Rhodesian Scientific Society; one paper in the latter, "The Rainfall of Rhodesia," is a very complete treatment of the rain conditions in this Colony.

The growth of Bulawayo and the development of civil aviation have necessitated the removal of the observatory to a more suitable site near the aerodrome, where a modern observatory with the latest meteorological equipment has been erected. The new observatory has been named the Goetz Observatory as a fitting memorial to the work of one of our pioneer meteorologists, the late Father Goetz.

Note on the Formation of Low Stratus at the Isle of Man

On January 24th, 1936, at 7h. G.M.T. a depression was approaching the Scilly Isles from the Bay of Biscay and a large part of the country lay in a light south to south-east gradient which, however, was increasing. Fog was present in the estuaries of the Mersey and the Dee, visibility being 220–550 yards at Speke and Sealand, while at 10h. the visibility at the latter place had decreased to 55 yards. At 7h. at the Isle of Man (Ronaldsway) visibility was 3–6 miles, there were 8 tenths of cloud at 800 feet, the wind being SSW. 15 m.p.h., while at Point of Ayre there was slight rain, visibility was twelve miles, there were 10 tenths cloud at 1,500 feet and the wind south by west 15 m.p.h.

The temperature at Sealand from 7h.–13h. was 33–34° F. and relative humidity was about 95 per cent, and these conditions may be taken as applying to a large part of west Lancashire. By noon, 10 tenths of stratus at 200–300 ft. were reported from Ronaldsway, while at 13h. Point of Ayre gave 10 tenths of stratus at 300–600 ft. with visibility 1,100 yards, the wind having backed to south by east, 21 m.p.h. Conditions improved considerably during the afternoon although at 18h. the cloud was still 10 tenths at 1,500 ft. Inland the cloud was high or medium except for a short period up till 8h. 30m.

It is almost certain that the serious deterioration at the Isle of Man was due to the setting in of eddy convexion caused by the passage of cold damp air over the relatively warm sea, together with the topographical lifting such as the high ground at the Isle of Man would cause.* It is quite likely that the low stratus formed first at the south end of the Island and then drifted northwards.

A similar case occurred on February 5th, 1936, although in this instance, in addition to mist or fog being present, snow had fallen during the latter part of the night and was falling intermittently inland in Lancashire until midday. The temperature between 7h. and 13h. was 32–35° F. with relative humidity 95–98 per cent,

* *See* SIR NAPIER SHAW, Manual of Meteorology, Vol. III, pp. 349–50, and Vol. IV, p. 152.

almost identical readings to those of the previous case. Low stratus 10 tenths at 300 ft. and visibility about 1,000 yards occurred at Ronaldsway just before noon and extended in a south-easterly direction for four to five miles, the cloud height beyond this point being 1,500–2,000 ft. As before, Point of Ayre reported similar conditions at 13h.

Thus, it appears that when the gradient wind is south-south-easterly about 30–35 m.p.h. over the Irish Sea, and a current of cold damp air flows from the mainland towards the Isle of Man, the sea being relatively warm, low stratus and very poor visibility may occur along the coast from Castletown to Point of Ayre. The distance from Speke to Ronaldsway is 88 miles, and this is the only sea track between the Isle of Man and adjacent coasts in which the conditions described have been known to occur; it is also the longest, which may be significant.

In the first case, when fog with clear sky or high cloud above it was present, the conditions at the Island did not persist for more than three hours or so, but in the latter case, when drizzle or rain was falling on the mainland with cloud 10 tenths at 1,000–1,500 ft. the low stratus at the Island persisted for about twelve hours.

C. W. G. DAKING.

REVIEWS

Typhoons and Indian Weather by V. Doraiswamy Iyer, B.A. India Meteor. Dept. Memoirs, Vol. XXVI, Part VI, Delhi, 1936.

In the tropics the most violent winds are generally those associated with circular storms (tropical cyclones) having a diameter of several hundred miles and a more or less calm centre, surrounded by a ring of hurricane winds. These are known by different names in different parts of the world. In the China Seas they are called typhoons. There is no sharp line of demarcation between the tropical cyclone and the temperate depression, for tropical cyclones that pass into temperate latitudes become ordinary temperate depressions. The ideal type of the tropical revolving storm is approached more often far out at sea than near land, for near the land there tends to be greater variability due to the effects of the land upon both wind and weather. In general these storms show what may be described as a marked aversion for passing across land, especially mountainous land. An abundance of moisture appears to be essential for their formation and for their continued existence. Therefore, as the supply of moisture is progressively reduced by distance from the sea, the cyclone that passes inland usually loses energy and eventually dies out. The interesting case sometimes arises, on the other hand, where a land barrier in the path of the storm is over-passed and then the weakened circulation may regain its former

energy. When Sir John Eliot wrote his well known " Handbook of Cyclonic Storms in the Bay of Bengal " he thought that it was only in extremely rare instances that a typhoon crossed Indo-China to enter the Andaman Sea and the Bay of Bengal, and that practically every cyclone in the Bay of Bengal had originated in the Bay itself. This was many years ago. With more information about the weather in the tropics, the life history of Indian cyclones is now seen to be longer than was formerly supposed and the author of this paper finds that out of 370 typhoons that moved westwards from the Pacific Ocean or the China Seas and struck the coast of Indo-China or south China, in the years 1884 to 1930, no fewer than 135 affected the weather in India. A similar case of cyclones being credited with too short a life-history is that of the West Indian hurricanes—the Atlantic representatives of the typhoon—many of which are now known to originate off the coast of Africa, east of the Cape Verde Islands, which in less well-informed days would have been regarded as having formed in the more frequented waters of the Carribean Sea.

To return to the 135 typhoons that affected Indian weather, of these only 20 re-developed into revolving storms that could be classed as tropical in type ; 48 re-developed into systems that were regarded as cyclonic depressions ; 11 merely fortified existing Indian depressions, and 56 resulted only in rain areas with little or no barometric disturbance. It appeared that September and, to a lesser extent, October were the months most favourable for the first two types of revival, yielding 39 out of 68 cases. It was observed that with the advance of the typhoon season the normal track across Indo-China shifts southwards ; that by September northerly to north-easterly winds of continental origin flow into Indo-China down to about 20° N., while the damp monsoons of both the China Sea and the Bay of Bengal have retreated southwards. The contrast between the air masses of continental and equatorial origin is believed to be greater than in previous months, and this is held by the author to be a reason why there is then a greater chance of survival for westward moving typhoons. But another and more obvious reason also given is that the land which they must cross is narrower and less mountainous in the lower latitudes generally traversed by the storms during their westward movement in autumn.

It is very satisfactory to find that in spite of the fact that the Indian Meteorological Service has had to face increased responsibilities with reduced grants, an official in that Service has found time in which to modify the generalisations of a pioneer worker like Eliot, by taking advantage of the greatly increased amount of meteorological data now available. It should not be forgotten, however, that such pioneer workers also had to contend with great difficulties, being hampered by dearth of information and the need to create a meteorological organization in a climate so exhausting for Europeans.

E. V. NEWNHAM.

Weather Science for Everybody.—By D. Brunt, M.A., Professor of Meteorology in the University of London. Size 7½ in. × 5 in. pp. xii+170. *Illus.* C. A. Watts & Co., Ltd., London, 1936. Price 2*s.* 6*d.* net.

The small book entitled "Weather Science for Everybody" by Professor D. Brunt comprises only 170 pages and yet gives in clear and concise language a masterly summary of the phenomena of the weather in most of its aspects and in its effects on many phases of human life.

A glance at the titles of the fourteen chapters shows the comprehensive nature of the book. The first two chapters are concerned respectively with weather and human affairs in time of peace and war and with weather observations and what they mean. The third chapter gives a lucid account of that difficult subject, radiation, and its relation to such matters as night frost, mist and fog and the differences between continental and oceanic climates. Chapter IV deals with conditions in the free atmosphere; it describes the vertical distribution of pressure and temperature in the troposphere and stratosphere and explains the conditions necessary for stability and instability. Reference is made to the increase in temperature above the stratosphere due to the intense absorption of the ultra-violet rays of the sun by ozone, and also to the Kennelly-Heaviside and Appleton layers. Water vapour in the atmosphere and the formation of cloud, rain, hail, snow, etc., are the subjects discussed in Chapter V, and Chapter VI describes the clouds and their classification. Chapter VII gives a short but adequate account of the weather map and the preparation of the weather forecast; it includes the Norwegian scheme of the polar front. This account should materially help the non-meteorologist to interpret the chart published in the press and should promote a better understanding between the public and the forecaster. The subjects of the remaining chapters are other weather disturbances, average climatic conditions over the globe, the world's climates, special types of winds, cycles in weather, special activities affected by the weather and the effect of weather on health and comfort. The last is a subject of widespread and increasing interest and is a happy inclusion in a book entitled "Weather Science for Everybody".

The book is eminently readable with references throughout to affairs of everyday life. It is well produced and the numerous illustrations are excellent. The reviewer noticed one error; on page 98, the ordinates in Fig. 17 refer to millibars of pressure and not to degrees of temperature. L. F. LEWIS.

BOOKS RECEIVED

Apia Observatory, Western Samoa, Annual Report for 1933, Wellington, 1936.

Monthly Rainfall of India for 1933 *and for* 1934. Published by the various Provincial Governments and issued by the India Meteorological Department, Delhi, 1935 and 1936.

OBITUARY

Dr. Alfred Nippoldt.—We regret to learn of the death, on October 4th, of Dr. A. Nippoldt. He was born on July 2nd, 1874, at Frankfurt-am-Main, and educated at Göttingen, where he became Assistant in the Magnetic Observatory in 1895. In April, 1898, he joined the combined Magnetic and Meteorological Observatory of Potsdam as a Scientific Assistant. His work lay almost entirely on the magnetic side, and as early as 1902 he published a paper on the meteorological nature of the variations of terrestrial magnetism. In 1903 he was awarded his doctorate at the University of Göttingen. He remained at the Observatory of Potsdam through the whole of his scientific life, becoming head of the magnetic side in October, 1928. When the various German official meteorological services were unified in 1934 in the Reichsamt für Wetterdienst, the Magnetic Observatory at Potsdam became a separate institution with Dr. Nippoldt as Director.

During the course of his life he accomplished a great deal of valuable work, including the preparation of magnetic charts of parts of Germany. He contributed the section on terrestrial magnetism and aurora to the " Einführung in die Geophysik," and the chapter on terrestrial magnetism and part of that on terrestrial electricity in the tenth edition of Müller-Pouillet's " Lehrbuch der Physik." He was also the author of a well-known text book on " Terrestrial Magnetism, Earth Current and Aurora " which passed through three editions; the last appeared in 1921.

Rev. Henry Hugh Breton. M.A.—We regret to record the death on September 13th, 1936, of the Rev. H. H. Breton at Westham, Sussex. Mr. Breton was a zealous parish priest who found time, nevertheless, to carry on climatological work, in which he was keenly interested. He maintained climatological stations at the various parishes where he ministered, including in succession, Sheepstor (Devon), Alfriston (Sussex), Morwenstow (Cornwall), Dean Prior (Devon) and Meshaw (Devon), covering in all a period of 26 years. He was an authority on the climate and weather of Dartmoor and his publications include two small books, " The great blizzard of Christmas, 1927 " and " The great winter of 1928–9."

ERRATUM

SEPTEMBER, 1936, p. 189, line 30 *for* " January 6th–7th, 1933 " *read* " January 6th–7th, 1934."

OCTOBER, 1936, p. 217, line 20 *for* " Mr. C. Fitzburgh Talman " *read* " Mr. C. Fitzhugh Talman."

NEWS IN BRIEF

The Cobb lectures of the Royal Society of Arts, for the session 1936–7 will be given by Prof. E. V. Appleton, M.A., LL.D., D.Sc., F.R.S. on the subject "Some problems of atmospheric physics". There will be three lectures, on Monday evenings, November 16th, 23rd and 30th at 8 p.m. in the Society's house in John Street, Adelphi, W.C.2.

We learn that Prof. S. Chapman, chief professor of mathematics in the Imperial College of Science, has been elected a member of the Kaiserlich Deutsche Akademie der Naturforscher, Halle, in recognition of his researches in terrestrial magnetism.

We learn that Señor Francisco Souza has been appointed Director of the Brazilian Meteorological Service in succession to Señor l'Ing. Herminio Silva who has retired.

The "Georg-Neumayer" Gold Medal of the Deutsche Seewarte, awarded at intervals of five to seven years for notable work in terrestrial magnetism, marine meteorology, oceanography or polar exploration, has been awarded to Prof. Gerhard Schott.

The Weather of October, 1936

Pressure was above normal over Alaska, western Canada, western United States, except California, and across the North Atlantic from eastern United States to south-west Europe, the greatest excesses being 5·8 mb. at Juneau, Alaska and 8·5 mb. at Scilly Islands. Pressure was below normal over central United States, California eastern Canada and across Greenland and northern, eastern and south-eastern Europe to western Asia, the greatest deficit being 8·2 mb. at Myggbukta and 6·0 mb. at Moscow*. In Spitsbergen temperature and rainfall were above normal but in Sweden they were both somewhat below normal.

The most notable feature of the weather of October over the British Isles was the frequency and severity of the gales and also the lack of appreciable rainfall in many districts until late in the month. Rainfall totals were generally below average except in south Scotland. From the 1st to 11th the British Isles came under the influence of a high pressure system centred during the 1st to 6th mainly to the north-east of Scotland; from then to the 11th the centre passed west-south-westwards across the country. Quiet conditions prevailed generally with little or no rainfall except locally in the east and south-east and in south-west Ireland, but strong winds were recorded on the west and south-west coasts on the 2nd, 3rd, 6th and 9th. Sunshine records were very good during the earlier part of this period, 10·6 hrs. being recorded at Clacton, Manston and Littlehampton on the 3rd,

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* See p. 225.

but became less so after the 8th, while temperature was above average except in the south-east until about the 7th when the weather became cold generally; 60° F. was exceeded in many parts on the 3rd to 5th, and on the 4th even in the south-east as well, 66° F. occurred at S. Farnborough and 65° F. at Colwyn Bay on the 4th, and 63° F. at Fort Augustus on the 3rd. Mist or fog was prevalent during this time. On the 12th a depression moved south-eastwards from Iceland causing rain and strong winds in Scotland and was followed on the 13th by a ridge of high pressure. From the 14th, however, to the end of the month pressure was generally low to the north and high to the south-west with depressions moving from Iceland to Scandinavia. Between the 14th and 16th the winds reached gale force in northern Scotland and from the 17th to 20th the gales became more severe and widespread affecting most exposed places except in the south-east; at Lerwick Beaufort force 10 was registered at 18h. on the 17th and a gust of 90 m.p.h. on the same day. During this period (12th–20th) rain occurred on most days in the north with some heavy falls locally, but in the south the rainfall was slight and only occurred on a few days; 1·59 in. was measured at Oban on the 16th. There were, however, considerable bright periods, especially in the north, and the 18th was a sunny day generally with 9·4 hrs. bright sunshine at Rothamsted and 9·3 hrs. at Catterick and Dovercourt, while temperature was mainly a little above average. From the 20th to 22nd there was an interval of quiet weather as a ridge of high pressure passed across the country. Rainfall amounts were generally small and the weather mainly cloudy, while temperature was unusually high on the 22nd in the eastern districts, 68° F. was reached at Aberdeen, the highest temperature recorded there in October since 1871, 65° F. at Durham and 64° F. at Clacton. From the 24th to 28th another period of severe stormy weather prevailed and numerous gales were reported from nearly all parts with gusts frequently exceeding 70 m.p.h.; on the 27th 89 m.p.h. was recorded at Renfrew and 85 m.p.h. at Eskdalemuir and on the 26th 85 m.p.h. at Fleetwood. Heavy rain fell in places, especially the Lake District, 5·30 in. at Watendlath (Cumberland) on the 24th and 1·60 in. at Festiniog (Merioneth). Between the 25th and 27th hail showers were widespread, and sleet or snow fell on the high ground in a few parts of Scotland and north England. Thunderstorms occurred in many parts on the 25th and 27th and at a few places on the 26th. Day temperatures were rather low but the 25th and 28th were generally sunny days; 9·1 hrs. bright sunshine occurred at Catterick and 8·6 hrs. at York, Penrith, Tynemouth, Lowestoft and Torquay on the 28th. From the 28th to 30th the anticyclone off our south-west coasts extended north-east and quiet misty or foggy weather was experienced, but on the 30th–31st a secondary depression passed across the south of England causing heavy rain there, 1·26 in. at St. Briavels, Gloucester on the 30th,

while fair sunny weather prevailed in Scotland. The distribution of bright sunshine for the month was as follows :—

	Total (hrs.)	Diff. from normal (hrs.)		Total (hrs.)	Diff. from normal (hrs.)
Stornoway ...	98	+19	Chester ...	90	−5
Aberdeen ...	111	+15	Ross-on-Wye ...	106	+6
Dublin	108	+11	Falmouth ...	116	+3
Birr Castle ...	98	+ 7	Gorleston ...	117	0
Valentia... ...	87	− 5	Kew	91	−2

Miscellaneous notes on weather abroad culled from various sources

Severe weather prevailed generally in Switzerland and northern Italy at the beginning of the month and again on the 8th and 9th. In Switzerland on the 1st snow fell down to the 2,000 ft. level and the passes were closed to vehicles, while on the 8th and 9th communications were interrupted owing to snow, and numerous trees were uprooted. Snow also occurred generally in northern Italy and even at Catania in Sicily. An unusually heavy north-westerly gale did much damage on the 18th to south Denmark and the North Sea coast of Germany and on the 19th to the Baltic coast of Germany; floods occurred in many parts and one person was drowned owing to a dyke breaking in Schleswig-Holstein. Stormy weather was experienced in the Ionian Sea on the 26th. Gales occurred generally in the North Sea on the 26th and 27th and in the Baltic on the 28th, causing much damage to shipping and floods on the north-west coasts of Germany. There was thick fog at the mouth of the English Channel on the 30th. (*The Times*, October 1st–31st.)

A typhoon passed across the island of Luzon (Philippines) on the 9th and 10th striking with the greatest force in the province of Nueva Ecija; over 300 people were killed and much damage done to the crops and property. The typhoon returned on its course on the 11th, and on the 12th two dykes on the Pampanga River gave way causing further floods. During the week ending the 14th the monsoon rains were in excess in Upper Burma, normal in north-west India and mainly scanty elsewhere in India. Gales were experienced off the coasts of Yezo (Japan) on the 24th and over southern Japan on the 26th. (*The Times*, October 12–28th.)

The total rainfall for the month in Australia was below normal in Western Australia, Queensland and New South Wales but mainly above normal in South Australia, Victoria and Tasmania.

Dense fog occurred over San Francisco on the 8th. A lake dredger foundered in Lake Erie, about 14 miles north-west of Cleveland, during a heavy gale on the 17th, drowning 20 people. In the United States temperature was mainly below normal at the beginning of the month, becoming above normal after about the 6th in the eastern and western States and Ohio Valley and above normal everywhere during the middle of the month. Temperatures considerably below

normal were experienced in north-west and middle States towards the end of the month and extended to the eastern States on the 27th. Rainfall was mainly below normal except in the Atlantic coast States and locally in the Ohio Valley and Lake region. Widespread floods occurred early in the month in the province of Porto Alegre, Brazil. (*The Times*, October 9th–28th and *Washington, D.C., U.S. Dept. Agric., Weekly Weather and Crop Bulletin.*)

Gales were experienced frequently on the North Atlantic during the month.

Daily Readings at Kew Observatory, October, 1936

Date	Pressure M.S.L. 13h.	Wind, Dir., Force 13h.	Temp. Min.	Temp. Max.	Rel. Hum. 13h.	Rain.	Sun.	Remarks. (see vol. 69, 1934, p. 1).
	mb.		°F.	°F.	%	in.	hrs.	
1	1024·6	NW.2	50	56	68	—	0·0	
2	1025·7	ESE.2	51	58	65	—	1·9	
3	1025·1	SE.3	38	57	49	—	9·8	Fx early. F 21h.
4	1017·3	ESE.1	37	60	51	—	9·0	Fx early. f 18h.
5	1018·2	E.5	33	53	54	trace	2·0	Fex early. d_0 9h.
6	1022·3	NE.4	40	52	54	trace	4·8	pr_0 14h.–15h.
7	1025·0	NNE.3	38	52	59	—	2·3	w early.
8	1022·1	SE.3	42	50	72	—	1·4	x early. r_0 9h.
9	1020·4	NNE.4	39	51	61	—	1·1	r_0. 13h.–15h.
10	1022·8	NE.4	43	52	64	—	2·2	
11	1026·3	N.3	39	53	65	—	5·5	x early. f 21h.
12	1024·1	SW.2	38	58	76	—	1·3	fe early.
13	1019·2	NNW.2	45	57	68	—	2·3	w early.
14	1012·9	SW.3	43	58	89	0·04	0·0	r_0 3h.–13h.
15	1017·0	W.3	49	65	71	—	4·6	w early.
16	1022·9	WNW.4	46	59	55	—	4·6	w early.
17	1017·0	SW.5	50	59	67	0·02	0·1	ir_0 21h.–24h.
18	1019·9	W.4	49	57	46	—	8·3	
19	1006·9	W.5	42	56	55	0·05	2·6	r-r_0 6h.–9h. and 17h.
20	1023·0	NNW.4	42	52	46	—	6·7	pr_0 23h.
21	1023·0	W.3	48	56	77	—	0·0	
22	1024·7	W.2	45	60	75	—	0·3	w early.
23	1020·9	SW.4	52	58	78	0·06	0·2	r-r_0 14h. & 22h.–24h.
24	1017·8	SW.2	47	56	83	0·05	3·9	r_0 0h.–4h. f to 8h.
25	1004·1	WSW.4	49	55	47	0·37	4·1	r 3h–7h. TLH 15h.
26	998·9	SW.4	41	60	92	0·20	0·0	r_0–r 7h.–11h.
27	1009·0	WSW.5	46	52	65	0·16	3·8	r_0 15h. R 18h.–19h.
28	1019·3	WNW.4	42	52	61	—	5·2	
29	1026·8	SW.3	33	53	75	0·01	0·8	xf early. d_0 16h.
30	1021·7	WSW.2	49	62	77	0·01	2·3	r_0 17h.–18h.
31	1016·5	N.4	50	51	93	0·82	0·0	r_0–r 2h.—18h.
*	1019·2	—	44	56	66	1·80	2·9	* Means or Totals.

General Rainfall for October, 1936

England and Wales ...	62	per cent of the average 1881–1915.
Scotland	105	
Ireland	72	
British Isles	75	

Rainfall: October, 1936: England and Wales

Co.	Station.	In.	Per cent of Av.	Co.	Station.	In.	Per cent of Av.
Lond.	Camden Square.....	2·04	78	*Leics.*	Belvoir Castle.....	1·89	70
Sur.	Reigate, Wray Pk. Rd..	2·05	62	*Rut.*	Ridlington	1·60	57
Kent.	Tenterden, Ashenden...	1·87	54	*Lincs.*	Boston, Skirbeck.....	2·08	76
,, .	Folkestone, Boro. San.	2·48	...	,, .	Cranwell Aerodrome...	1·86	65
,, .	Margate, Cliftonville....	1·94	66	,, .	Skegness, Marine Gdns.	2·28	83
,, .	Eden'bdg., Falconhurst	2·27	63	,, .	Louth, Westgate.....	2·45	63
Sus.	Compton, Compton Ho.	1·59	35	,, .	Brigg, Wrawby St.....	1·77	...
,, .	Patching Farm.....	1·96	49	*Notts.*	Worksop, Hodsock.....	1·87	71
,, .	Eastbourne, Wil. Sq....	1·19	29	*Derby.*	Derby, L. M. & S. Rly.	1·49	57
Hants.	Ventnor, Roy.Nat.Hos.	1·39	35	,, .	Buxton, Terr. Slopes...	6·61	135
,, .	Fordingbridge, Oaklnds	2·10	51	*Ches.*	Runcorn, Weston Pt....	1·84	53
,, .	Ovington Rectory.....	1·81	45	*Lancs.*	Manchester, Whit. Pk.	2·98	90
,, .	Sherborne St. John.....	1·93	55	,, .	Stonyhurst College.....	4·90	109
Herts.	Royston, Therfield Rec.	1·71	63	,, .	Southport, Bedford Pk.	2·09	59
Bucks.	Slough, Upton.....	1·65	59	,, .	Lancaster, Greg Obsy.	3·60	87
,, .	H. Wycombe, Flackwell	1·75	54	*Yorks.*	Wath-upon-Dearne.....	2·19	79
Oxf.	Oxford, Mag. College...	1·37	49	,, .	Wakefield, Clarence Pk.	2·07	72
N'hant	Wellingboro, Swanspool	1·66	66	,, .	Oughtershaw Hall.....	6·76	...
,, .	Oundle	1·22	...	,, .	Wetherby, Ribston H..	2·04	68
Beds.	Woburn, Exptl. Farm...	1·80	68	,, .	Hull, Pearson Park.....	1·55	52
Cam.	Cambridge, Bot. Gdns.	1·91	81	,, .	Holme-on-Spalding.....	1·72	57
Essex.	Chelmsford, County Gdns	1·09	44	,, .	West Witton, Ivy Ho.	2·23	60
,, .	Lexden Hill House.....	1·44	...	,, .	Felixkirk, Mt. St. John.	1·50	52
Suff.	Haughley House.....	1·46	...	,, .	York, Museum Gdns....	1·47	55
,, .	Campsea Ashe.....	2·41	92	,, .	Pickering, Hungate.....	2·01	66
,, .	Lowestoft Sec. School...	2·28	82	,, .	Scarborough.....	1·88	60
,, .	Bury St. Ed., WestleyH.	1·88	69	,, .	Middlesbrough.....	1·34	45
Norf. .	Wells, Holkham Hall...	2·49	89	,, .	Baldersdale, Hury Res.	3·78	95
Wilts.	Calne, Castle Walk.....	1·46	...	*Durh.*	Ushaw College.....	1·50	44
,, .	Porton, W.D. Exp'l. Stn	1·91	61	*Nor.*	Newcastle, D. & D. Inst.	1·41	49
Dor.	Evershot, Melbury Ho.	1·53	33	,, .	Bellingham, Highgreen	2·86	73
,, .	Weymouth, Westham.	1·16	32	,, .	Lilburn Tower Gdns....	1·56	42
,, .	Shaftesbury, Abbey Ho.	1·68	43	*Cumb.*	Carlisle, Scaleby Hall...	3·44	103
Devon.	Plymouth, The Hoe....	1·11	28	,, .	Borrowdale, Seathwaite	15·50	136
,, .	Holne, Church Pk. Cott.	2·35	36	,, .	Borrowdale, Moraine...	12·29	135
,, .	Teignmouth, Den Gdns.	·65	17	,, .	Keswick, High Hill.....	7·52	66
,, .	Cullompton	1·81	44	*West.*	Appleby, Castle Bank...	3·36	96
,, .	Sidmouth, U.D.C.....	1·03	...	*Mon.*	Abergavenny, Larchf'd	1·85	44
,, .	Barnstaple, N. Dev.Ath	2·40	53	*Glam.*	Ystalyfera, Wern Ho....	3·61	52
,, .	Dartm'r, Cranmere Pool	4·60	...	,, .	Cardiff, Ely P. Stn.....	1·96	41
,, .	Okehampton, Uplands.	2·79	46	,, .	Treherbert, Tynywaun.	5·06	...
Corn.	Redruth, Trewirgie.....	1·82	35	*Carm.*	Carmarthen, Coll. Rd.	2·27	40
,, .	Penzance, Morrab Gdns.	1·91	41	*Pemb.*	St. Ann's Hd, C. Gd. Stn.	1·11	26
,, .	St. Austell, Trevarna...	1·98	38	*Card.*	Aberystwyth	4·08	...
Soms.	Chewton Mendip.....	3·21	66	*Rad.*	BirmW.W.Tyrmynydd	5·15	78
,, .	Long Ashton.....	1·93	51	*Mont.*	Lake Vyrnwy	5·59	98
,, .	Street, Millfield.....	1·63	...	*Flint.*	Sealand Aerodrome.....	1·32	...
Glos.	Blockley	1·64	...	*Mer.*	Blaenau Festiniog ...	11·10	119
,, .	Cirencester, Gwynfa....	1·44	44	,, .	Dolgelley, Bontddu.....	4·79	79
Here.	Ross, Birchlea.....	1·70	51	*Carn.*	Llandudno	2·04	61
Salop.	Church Stretton.....	2·40	66	,, .	Snowdon, L. Llydaw 9..	15·04	...
,, .	Shifnal, Hatton Grange	1 85	65	*Ang.*	Holyhead, Salt Island...	2·00	50
Staffs.	Market Drayt'n, Old Sp.	1·59	52	,, .	Lligwy	2·41	...
Worc.	Ombersley, Holt Lock.	1·24	47	*Isle of Man*			
War.	Alcester, Ragley Hall...	·91	33		Douglas, Boro' Cem....	3·00	66
,, .	Birminghm, Edgbaston	1·61	58	*Guernsey*			
Leics.	Thornton Reservoir ...	1·79	64		St. PeterP't.Grange Rd.	2·59	58

Rainfall: October, 1936: Scotland and Ireland

Co.	Station.	In.	Per cent of Av.	Co.	Station.	In.	Per cent of Av.
Wig .	Pt. William, Monreith.	2·95	74	*Suth* .	Lairg.....	5·54	148
„ .	New Luce School.....	4·96	106	„ .	Tongue.....	4·70	112
Kirk .	Dalry, Glendarroch.....	5·94	113	„ .	Melvich.....	4·16	113
Dumf.	Dumfries, Crichton R.I.	3·36	90	„ .	Loch More, Achfary....	11·68	150
„ .	Eskdalemuir Obs.....	6·85	127	*Caith* .	Wick.....	3·46	117
Roxb .	Hawick, Wolfelee.....	2·92	76	*Ork* .	Deerness	4·21	111
Selk .	Ettrick Manse.....	6·85	124	*Shet* .	Lerwick	4·12	104
Peeb .	West Linton.....	4·49	...	*Cork* .	Dunmanway Rectory...	2·70	45
Berw .	Marchmont House.....	1·81	47	„ .	Cork, University Coll...	1·53	39
E.Lot .	North Berwick Res.....	1·25	42	„ .	Ballinacurra.....	1·15	28
Midl .	Edinburgh, Blackfd. H.	1·35	49	„ .	Mallow, Longueville....	2·15	60
Lan .	Auchtyfardle	4·60	...	*Kerry.*	Valentia Obsy.....	3·05	55
Ayr .	Kilmarnock, Kay Pk....	5·28	...	„ .	Gearhameen.....	8·20	89
„ .	Girvan, Pinmore.....	5·47	109	„ .	Bally McElligott Rec...	2·79	...
„ .	Glen Afton, Ayr San....	5·52	108	„ .	Darrynane Abbey.....	3·57	71
Renf .	Glasgow, Queen's Pk....	4·05	125	*Wat* .	Waterford, Gortmore...	1·42	36
„ .	Greenock, Prospect H..	7·72	143	*Tip* .	Nenagh, Cas. Lough....	2·63	78
Bute .	Rothesay, Ardencraig...	5·96	...	„ .	Roscrea, Timoney Park	2·53	...
„ .	Dougarie Lodge.....	4·49	...	„ .	Cashel, Ballinamona....	1·91	54
Arg .	Ardgour House.....	13·66	...	*Lim* .	Foynes, Coolnanes.....	3·12	84
„ .	Glen Etive.....	...	...	„ .	Castleconnel Rec.....	2·42	...
„ .	Oban.....	7·16	...	*Clare* .	Inagh, Mount Callan....	5·86	...
„ .	Poltalloch.....	7·88	160	„ .	Broadford, Hurdlest'n.	1·92	...
„ .	Inveraray Castle.....	14·12	201	*Wexf* .	Gorey, Courtown Ho...	1·49	42
„ .	Islay, Eallabus.....	5·46	114	*Wick* .	Rathnew, Clonmannon.	1·21	...
„ .	Mull, Benmore.....	13·20	102	*Carl* .	Hacketstown Rectory...	1·65	43
„ .	Tiree.....	...	...	*Leix* .	Blandsfort House.....	2·22	63
Kinr .	Loch Leven Sluice.....	2·61	76	*Offaly.*	Birr Castle.....	1·95	67
Fife .	Leuchars Aerodrome...	1·12	43	*Dublin*	Dublin, FitzWm. Sq....	1·32	49
Perth .	Loch Dhu.....	10·05	141	*Meath.*	Beauparc, St. Cloud....	2·08	...
„ .	Balquhidder, Stronvar.	8·67	...	„ .	Kells, Headfort.....	1·87	56
„ .	Crieff, Strathearn Hyd.	2·93	75	*W.M* .	Moate, Coolatore.....	2·11	...
„ .	Blair Castle Gardens....	3·86	124	„ .	Mullingar, Belvedere...	2·79	89
Angus.	Kettins School.....	1.81	57	*Long* .	Castle Forbes Gdns.....	2·37	73
„ .	Pearsie House.....	1·96	...	*Gal* .	Galway, Grammar Sch.	3·04	...
„ .	Montrose, Sunnyside...	0·68	25	„ .	Ballynahinch Castle....	4·88	82
Aber .	Braemar, Bank.....	3·04	81	„ .	Ahascragh, Clonbrock.	2·94	81
„ .	Logie Coldstone Sch....	1·69	52	*Mayo.*	Blacksod Point.....	3·77	76
„ .	Aberdeen, Observatory.	1·18	39	„ .	Mallaranny	5·43	...
„ .	Fyvie Castle.....	2·81	73	„ .	Westport House.....	3·35	74
Moray	Gordon Castle.....	2·57	81	„ .	Delphi Lodge.....	7·53	79
„ .	Grantown-on-Spey	3·24	109	*Sligo* .	Markree Castle.....	3·82	94
Nairn.	Nairn	2·33	99	*Cavan.*	Crossdoney, Kevit Cas..	2·56	...
Inv'e .	Ben Alder Lodge.....	7·55	...	*Ferm* .	Newtwnbtlr, Crom Cas.	2·74	84
„ .	Kingussie, The Birches.	4·86	...	„ .	Enniskillen, Portora....	3·42	...
„ .	Loch Ness, Foyers	5·18	154	*Arm* .	Armagh Obsy.....	2·80	103
„ .	Inverness, Culduthel R.	3·13	...	*Down.*	Fofanny Reservoir.....	3·36	...
„ .	Loch Quoich, Loan.....	17·75	...	„ .	Seaforde	2·68	75
„ .	Glenquoich.....	15·60	156	„ .	Donaghadee, C. G. Stn.	2·02	70
„ .	Glenleven, Corrour.....	11·42	187	*Antr* .	Belfast, Cavehill Rd.....	3·18	...
„ .	Fort William, Glasdrum	9·63	...	„ .	Aldergrove Aerodrome.	2·46	82
„ .	Skye, Dunvegan.....	6·62	...	„ .	Ballymena, Harryville.	3·94	107
„ .	Barra, Skallary.....	4·98	...	*Lon* .	Garvagh, Moneydig....	3·41	...
R&C .	Alness, Ardross Castle.	5·03	131	„ .	Londonderry, Creggan.	4·68	127
„ .	Ullapool	6·46	133	*Tyr* .	Omagh, Edenfel.....	4·57	125
„ .	Achnashellach.....	12·41	155	*Don* .	Malin Head.....	3·81	...
„ .	Stornoway, Matheson...	5·70	110	„ .	Killybegs, Rockmount.	4·15	...

Climatological Table for the British Empire, May, 1936

STATIONS.	PRESSURE.		TEMPERATURE.							Relative Humidity.	Mean Cloud Am'nt	PRECIPITATION.			BRIGHT SUNSHINE.	
			Absolute.		Mean Values.				Mean.							
	Mean of Day M.S.L.	Diff. from Normal.	Max.	Min.	Max.	Min.	½ Max. and Min.	Diff. from Normal	Wet Bulb.			Am'nt.	Diff. from Normal.	Days.	Hours per day.	Percentage of possible.
	mb.	mb.	°F.	°F.	°F.	°F.	°F.	°F.	°F.	%	0–10	in.	in.			
London, Kew Obsy.	1016·1	+ 0·2	77	37	62·8	46·0	54·4	— 0·1	47·6	81	7·9	0·51	— 1·21	5	6·4	41
Gibraltar	1013·3	— 2·8	68	47	63·3	54·7	59·0	...	54·1	83	6·5	5·43	...	14	...	...
Malta	1011·0	— 3·5	77	54	68·7	59·6	64·1	— 1·8	59·3	78	4·2	1·19	+ 0·78	6	10·1	72
St. Helena	1014·3	— 0·2	68	55	63·9	57·8	60·9	— 2·2	58·6	91	9·7	3·04	+ 0·36	28	...	...
Freetown, Sierra Leone	1011·3	+ 1·8	92	68	87·3	72·8	80·1	— 1·4	76·5	82	8·2	17·87	+ 6·40	23	...	...
Lagos, Nigeria	1010·5	— 0·1	89	72	86·5	76·0	81·3	— 0·5	76·7	87	8·3	12·08	+ 1·33	20	4·8	39
Kaduna, Nigeria	1006·5	— 4·3	96	63	89·1	70·8	79·9	+ 0·5	73·3	85	8·0	7·26	+ 1·56	17	7·6	60
Zomba, Nyasaland	1014·2	— 1·2	81	48	75·8	58·2	67·0	+ 1·2	63·0	74	4·4	0·51	— 0·53	3	...	...
Salisbury, Rhodesia	1016·8	— 1·3	80	37	72·9	49·2	61·1	+ 0·5	54·9	62	2·2	0·42	— 0·06	5	8·3	73
Cape Town	1020·4	— 2·3	84	38	64·8	48·4	56·6	— 2·3	49·3	86	4·4	2·70	— 1·05	10	...	...
Johannesburg	1018·9	— 1·1	73	24	60·8	44·0	52·4	— 2·0	45·0	68	3·3	5·74	+ 4·98	10	7·3	67
Mauritius	1016·1	— 0·3	84	59	79·5	65·7	72·6	0·0	68·5	72	4·9	2·10	— 0·93	21	7·8	70
Calcutta, Alipore Obsy.	1002·3	— 1·2	100	71	92·8	78·0	85·4	— 0·7	79·5	85	6·9	9·49	+ 3·93	13*	...	...
Bombay	1005·6	— 1·8	93	77	91·3	80·2	85·7	— 0·1	78·3	76	5·2	0·33	— 0·22	1*	...	...
Madras	1003·7	— 1·7	104	76	95·5	81·5	88·5	— 1·3	78·6	67	6·8	0·02	— 1·82	0*	...	...
Colombo, Ceylon	1007·6	— 0·8	89	71	85·4	76·3	80·9	— 1·9	76·8	79	8·4	33·81	+ 22·87	25	4·2	34
Singapore	1007·9	— 0·8	90	74	86·8	77·2	82·0	0·0	78·2	82	6·8	10·34	+ 3·70	17	5·9	49
Hongkong	1009·7	+ 0·6	88	68	81·5	73·5	77·5	+ 0·1	74·0	84	8·1	10·16	— 1·91	15	4·6	35
Sandakan	1007·9	...	91	73	89·4	76·5	82·9	+ 0·4	78·5	81	6·9	9·92	+ 3·59	12	...	...
Sydney, N.S.W.	1021·8	+ 3·2	80	44	68·4	51·1	59·7	+ 0·9	54·1	73	5·4	2·27	— 2·91	9	6·2	60
Melbourne	1020·8	+ 1·6	77	36	65·1	44·5	54·8	+ 0·7	47·6	76	4·2	0·90	— 1·26	12	6·0	59
Adelaide	1019·6	— 0·4	80	42	70·1	51·3	60·7	+ 2·8	52·3	55	4·2	2·08	— 0·70	7	6·4	63
Perth, W. Australia	1018·8	+ 0·4	83	38	68·1	51·7	59·9	— 0·8	52·4	67	6·2	5·43	+ 0·46	15	5·3	51
Coolgardie	1018·0	— 1·1	84	34	70·8	44·3	57·5	— 0·2	48·7	60	3·5	0·26	— 1·07	5	...	...
Brisbane	1020·3	+ 1·7	80	51	73·0	57·0	65·0	+ 0·4	59·6	73	3·8	1·14	— 1·67	11	6·3	58
Hobart, Tasmania	1019·1	+ 3·8	74	35	58·7	43·8	51·3	+ 0·8	44·6	70	5·0	0·76	— 1·14	9	6·2	64
Wellington, N.Z.	1022·0	+ 6·4	63	37	54·6	44·6	49·6	— 3·2	47·1	79	7·3	2·87	— 1·81	13	3·9	39
Suva, Fiji	1011·3	— 1·4	89	67	81·4	72·4	76·9	+ 0·4	73·1	87	8·2	25·63	+ 15·56	24	2·8	25
Apia, Samoa	1009·9	— 1·2	87	71	85·7	75·2	80·5	+ 2·1	76·9	79	5·7	7·21	+ 1·14	20	7·2	63
Kingston, Jamaica	1010·9	— 2·2	90	69	88·2	73·4	80·8	+ 1·1	73·3	79	4·5	8·95	+ 4·56	8	5·7	44
Grenada, W.I.	1010·6	— 2·0	89	70	86	72	79·0	— 0·7	74	79	5	7·90	+ 3·71	19	...	...
Toronto	1016·5	+ 1·6	90	32	70·1	47·3	58·7	+ 4·9	50·8	70	8·3	0·72	— 2·07	10	8·9	61
Winnipeg	1014·0	+ 0·2	93	29	71·2	43·8	57·5	+ 5·5	45·0	77	5·2	0·94	— 1·06	8	8·7	57
St. John, N.B.	1013·9	0·0	70	30	54·5	40·1	47·3	— 0·4	44·1	78	6·9	5·37	+ 1·66	15	5·9	40
Victoria, B.C.	1016·0	— 0·7	74	42	61·4	47·9	54·7	+ 1·7	50·8	81	6·5	1·68	+ 0·55	16	6·8	45

Addendum:

* For Indian stations a rain day is a day on which 0·1 in. or more rain has fallen.

4407) Wt. 19/92 1,125 11/36 Hw. G.377