

M.O. 452

*ADM. C. 11.*  
COPY FOR OFFICIAL USE

# THE METEOROLOGICAL MAGAZINE



February 1940

No. 889, Vol. 75

*Crown Copyright Reserved*

PUBLISHED BY THE AUTHORITY OF  
THE METEOROLOGICAL OFFICE

8264  
2

## FEBRUARY, 1940

NOTICES

The responsibility for facts and opinions expressed in the signed articles and letters published in this Magazine rests with their respective authors.



# THE METEOROLOGICAL MAGAZINE

M.O. 452

AIR MINISTRY ; METEOROLOGICAL OFFICE

---

Vol. 75

FEBRUARY, 1940

No. 889

---

## ICE CONDITIONS IN THE BALTIC AND DANUBE AREAS DECEMBER 1st 1939 TO JANUARY 23rd 1940

BY C. E. N. FRANKCOM, Master Mariner.

Ice conditions in the Baltic, Eastern North Sea and Danube have been more severe this winter than for several years as a natural result of the cold spell over Europe in January. The actual commencement of the ice season was not unduly early—in fact the closing of most of those ports which cannot be kept open occurred at about the average date. It is chiefly in the extension of the area affected to the waters of the Eastern North Sea that the severity of the season is most marked, for it is only in exceptional years that ice is encountered in the North Sea or to any extent in the rivers flowing into that sea. Danish ports have suffered rather exceptionally severely this winter. On the River Danube also conditions have been more severe than usual, but here again the ice did not appear at any unusually early date.

Every winter shipping is more or less seriously hampered in the Baltic and Danube districts owing to the prevalence of ice, but the length of the season and extent of the area affected vary considerably from year to year. The large area and the number of countries, as well as the multitude of ports involved make an

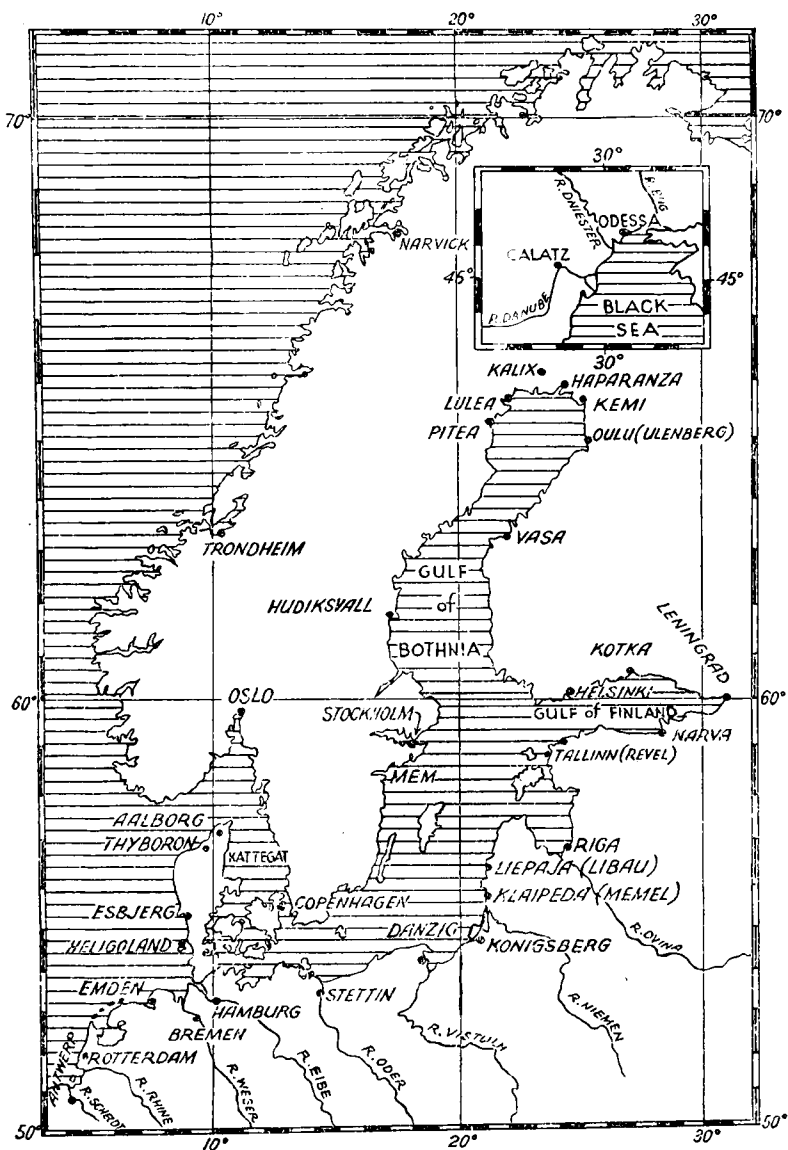
analysis of the general ice situation in Europe a rather complex problem, and it is somewhat difficult to convey a clear and comprehensive picture of the extent and severity of the "freeze up," and for any particular winter it is still more difficult to compare conditions with any average. Most of the countries affected publish more or less detailed accounts of conditions in their own waters, both daily and in the form of annual summaries, and the *Deutsche Seewarte* in particular published in peace time a daily map and report showing conditions throughout Baltic waters. Shipping interests in the British Isles are provided with concise daily reports as to conditions in the principal ports affected in *Lloyds List and Shipping Gazette*. The writer is indebted to the Shipping Editor of Lloyds for the information from which this report is built up.

There is apparently very little English literature on the subject of European ice, and the writer is not aware that anything in the nature of a concise report on the general ice situation over a period is normally given embracing all European waters. Owing to the many interests involved, it would appear that such a report might be interesting and helpful both for commercial and scientific purposes.

An attempt is made in this article to describe the state of the ice in the above mentioned areas during the winter 1939-1940 from December 1st to January 23rd. It is hoped that there will be an opportunity of publishing later a further article showing conditions during the latter part of the winter. It seems that the best way of tackling the problem is to lay it out somewhat in the form of a diary, using all the available information, but only dealing with the ports which appear to be the most important and treating the matter as briefly as possible. It will be noted that on account of the war little or no information is at present available concerning the ports of certain countries.

December 1. The first appearance of ice in the Baltic was indicated by the reported withdrawal of the Helsinki Light Vessel from its station.

December 2. Navigation reported closed at Kemi due to ice conditions.



MAP OF BALTIC AREA: DANUBE AREA INSET.

There is not room on the map to show clearly the Sound and the Great Belt. The Sound is the stretch of water between Copenhagen and the Swedish Coast and the Great Belt is the middle passage between the islands to the southward of the Kattegat.

December 4. Navigation closed at Kotka, the last vessel having sailed on December 1.

December 8. Navigation closed at Kalix.

December 11. Navigation closed at Oulu. Last vessel sailed December 7.

December 19. Navigation closed at Haparanda. Reports indicate that several ports in the Gulf of Bothnia (including Pitea, Lulea, Vasa and Hudiksvall) expect to keep open with icebreaker assistance until the end of December or middle January.

By this date it may be considered that the first stage of the "freeze-up" has been reached, badly located ports in the Gulfs of Finland and Bothnia have more or less frozen up, the ice having gradually spread south and west respectively from the heads of these Gulfs.

December 27. Reported from Tallinn that Leningrad harbour is closed owing to ice.

January 2. Esbjerg—soft or new ice, navigation not hindered. Aalborg—navigation difficult for sailing vessels. Most Danish ports report conditions difficult for small vessels. Narva and several other Estonian ports report fast ice; navigation closed.

January 4. Many Danish light buoys withdrawn. Riga—fast ice, navigation difficult for sailing vessels.

January 5. Thyboron—navigation difficult for sailing vessels, owing to soft or new ice.

The freezing of the water has by now gradually spread west through the Baltic, and Danish waters begin to be affected slightly. There has been nothing exceptional reported as yet.

January 6. Drift ice in the East Scheldt. Ameland temporarily cut off from the mainland by ice. River Maas frozen over from Woudrichem to Heusden. Icebreaker sent to Aalborg to free coasting vessels. Navigation difficult for sailing

vessels at Esbjerg and Tallinn owing to soft or new ice. More Danish light buoys withdrawn.

January 9. Heavy fast ice at Riga—navigation only possible for powerful steamers.

January 10. More Danish light buoys withdrawn.

January 11. Navigation closed for sailing vessels and difficult for small steamers at Aalborg. Heavy fast ice at Riga—navigation only possible for steamers reinforced against ice.

January 12 and 13. More Danish light buoys withdrawn.

January 14. Drift ice on River Scheldt reported to have torn buoys from their moorings.

In these nine days conditions have deteriorated very rapidly and one sees the first real indication of somewhat abnormal conditions, most particularly in the freezing of the Rivers Scheldt and Maas. Heavy fast ice is encountered in most eastern Baltic ports, and new ice in Danish waters and the rivers of Belgium and Holland is causing difficulties to shipping.

January 17. Heavy fast ice at Tallinn and Riga; navigation kept open by the icebreakers. At Liepaja (pack ice) and Aalborg (drift ice) navigation only possible for powerful steamers. Copenhagen Sound—navigation difficult for sailing vessels owing to soft or new ice. Copenhagen harbour full of firm thick ice. Extremely difficult conditions reported for shipping in all Danish waters. All seven Danish icebreakers hard at work. Fjords in Jutland frozen over. Ice 3 metres thick reported from western end of Limfjord. 23° of frost reported during the night in Denmark. Ice formation observed in the Great Belt. Ice reported in the North Sea off Jutland for the first time in many years, up to 2 miles from the coast in places. Baltic Sea frozen over as far as can be seen from Danish coast.

January 18. More Danish light buoys and light vessels withdrawn. Heavy ice reported in the sea off Riga and in Tallinn harbour; navigation only possible for powerful steamers.

January 19. Heavy drift ice reported in the sea off Liepaja and pack ice in the harbour; navigation only possible for vessels reinforced against ice. More Danish light buoys and Danish and Swedish light vessels withdrawn. Navigation difficult for sailing vessels in Copenhagen Sound and outer harbour. Fast ice reported at Tyboron; navigation only possible for powerful steamers. Ice-breakers necessary in the Great Belt between the islands of Sjaelland and Funen, and in the Sound between Sjaelland and the Swedish coast. Many steamers fast in the ice in the narrow Sound. Danish schooner reported caught in the ice and signalling for help between the islands of Laaland and Fehmarn.

January 20. Ice difficulties reported in the River Scheldt. Navigation reported only possible for powerful steamers at Esthonian ports. All Danish light vessels reported temporarily withdrawn, and more Danish light buoys withdrawn.

January 21. Heavy drift ice reported on the west Scheldt.

January 22. Large steamers unable, on account of packed soft ice and drift ice, to enter Copenhagen harbour without assistance. Most Danish ice-breakers reported more than fully occupied. Copenhagen outer harbour—navigation difficult for small steamers, closed for sailing vessels. Sailing through Danish Belt suspended due to danger of ice combined with that of mines. Very bad ice conditions reported in most Danish ports; navigation being mainly only possible for powerful steamers. River Scheldt—3 steamers which left Antwerp had to return to port because of ice. Tallinn Roads—heavy fast ice, navigation kept



open by icebreakers. Riga—heavy fast ice, navigation temporarily closed. Liepaja—pack ice, channel kept open by icebreaker.

January 23. More ice difficulties reported on River Scheldt. Various small vessels bound for Antwerp put into Flushing because of ice. Navigation to Brussels closed by ice. Fast ice reported at Lobith, on the River Rhine.

It is now very apparent from the diary that there has been an exceptionally cold period (some of our readers may have noticed this for themselves!). In the eastern Baltic the fast ice is superseded by pack ice and the ice here has spread out from the harbours some way into the sea. In this section shipping is by now generally restricted to specially constructed vessels.

The reported withdrawal of all Danish light vessels and apparently most of the buoys, the freezing of Copenhagen Harbour sufficiently to impede shipping, and the spread of ice out into the North Sea itself are definite indications of more than usually severe weather. It is unusual for shipping to be held up in the River Scheldt. One is reminded of the severe winter of 1928 to 1929 when considerable ice was reported in the North Sea.

#### RIVER DANUBE AND BLACK SEA.

December 31. Thin ice reported at Biala, River Danube.  $-11^{\circ}$  C. during night.

January 1. All navigation on the Danube stopped owing to ice.

January 4. River Danube reported blocked from Sulina to 18th mile post and from 35th to 43rd mile post, and frozen at Orsova. Turkish steamer *Altay* caught in the ice near 42nd mile post. Dredgers and tugs freed a British steamer from the ice near 3rd mile post.

January 5. River Danube reported very seriously blocked with ice.  $50^{\circ}$  frost reported from Moravia (presumably Fahrenheit).

January 10. Black Sea reported frozen at Odessa for the first time in many years. River Danube—Turkish steamer *Altay* still icebound. Icebreakers working with difficulty but forced to abandon operations. Ice jams below Galatz. Rivers Pruth and Sereth, also Ishmael, St. George and Machin branches completely frozen. Ice reported to be fast between Isaccea and Tulcea. 38th mile post to sea reported free of ice. Temperature of  $-18^{\circ}$  C. reported at noon to-day and  $-22^{\circ}$  C. during previous night.

January 18. Turkish steamer *Altay* still ice-bound, but weather mild, thawing. Icebreakers resuming work.

Reports as to conditions in this region are not so numerous as those from the Baltic, as the ice season tends to start later here. It will be noted that this winter there is about a month's difference between the first reports of ice in the two regions. The high rate of freezing in the Danube and the consequent speedy disorganisation of shipping is a feature of this river, and this is brought out in the diary. The severity of the winter is chiefly shown by the freezing of the Black Sea at Odessa.

---

## OFFICIAL NOTICE

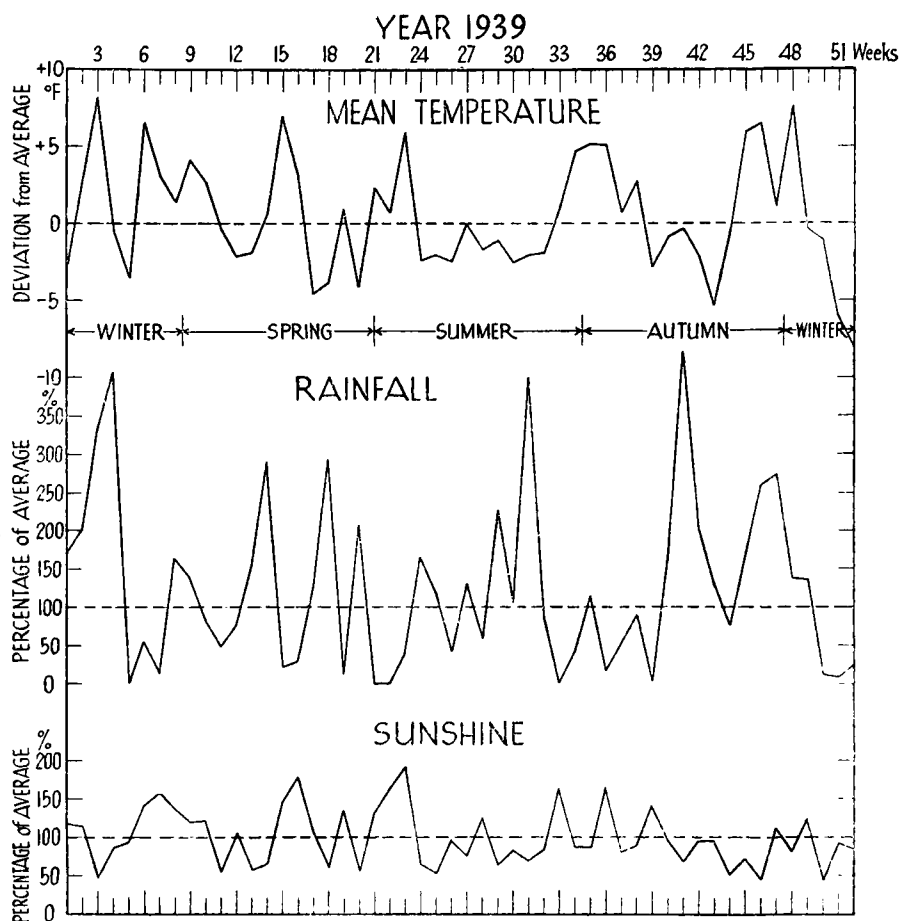
SUMMER TIME, 1940. Observers are reminded that "Summer Time" will start on February 25th, 1940.

---

## THE WEATHER OF 1939

Perhaps the most notable feature of the weather of 1939 was the excessive rainfall in east and south-east England, chiefly due to the exceptionally heavy rainfall in January, April, October and November. On the other hand the year was dry over a large area in the west of Scotland to the north and west of the Caledonian Canal and over a fairly large coastal area in the west of Ireland. A detailed account of the rainfall of 1939, including intense falls of rain and details of droughts and dry spells, has already appeared in *The Meteorological Magazine*, 1939, pp. 291-3.

Mean temperature for the year slightly exceeded the average, the deviation from the average for the districts ranging from  $+0.3^{\circ}$  F. in Ireland, N to  $+0.9^{\circ}$  F. in Scotland, E and England, NE. There were considerable deviations from the average in individual months; October and December were cold on the whole, January was cold for the most part in Ireland, Scotland and north-west England, and July was cool. Some notably low screen minima were registered during the first week of January; for example  $1^{\circ}$  F. at Dalwhinnie and Braemar on the 4th and  $5^{\circ}$  F. at Newport (Shropshire) and  $6^{\circ}$  F. at Logie Coldstone and Shrewsbury on the 6th. The deficiency in October was considerable in some parts; individual stations in England reported the lowest mean temperature for October since 1926. The cold weather in the latter half of December was, on the whole, most marked in the southern half of the country; among notably low screen minima registered in the last few days were  $6^{\circ}$  F. at Newport (Shropshire) and  $8^{\circ}$  F. at Barton (Manchester) on the 29th and  $8^{\circ}$  F. at Droitwich on the 30th. In the other eight months mean temperature, in general, exceeded the average; November was excessively mild, February mild, particularly from the 5th-12th, while the periods April 9th-16th, May 22nd-31st, June 3rd-7th, August 13th-31st, and September 1st-9th were mainly warm. During the



THE WEATHER IN 1939 IN SOUTH-EAST ENGLAND.

*Weekly variations from long-period averages computed from observations at five representative stations.*

warm spell in early June the diurnal range of temperature was great; a range of between  $40^{\circ}$  F. and  $50^{\circ}$  F. was recorded at many places.

Sunshine was variable, but about average over the British Isles as a whole; the percentage of the average for the districts ranged from 95 in England, E, and the Midlands to 104 in Scotland, W, and Ireland, N, and 105 in the Channel Islands. For the country generally, compared with the average the sunniest months were April, June and October and the dullest, July and November. January was notably sunny in

north and west Scotland and unusually dull in south-west England, February was exceptionally sunny in east and south-east England and parts of the Midlands and June was sunny generally, but particularly so in north Ireland. At some places in west and north Scotland and Ireland sunshine was notably excessive in August, and in October also a pronounced excess of sunshine was enjoyed in most of Ireland and west and north Scotland. July and November were markedly dull, with only 74 and 71 per cent. of the average sunshine over the British Isles generally.

Unusually severe gales were infrequent in 1939 but the north-westerly gale on the south-west coasts on the night of January 22nd-23rd was notably severe; a mean hourly velocity of 66 m.p.h. was recorded at the Lizard on the 22nd and at St. Mary's, Scilly, on the 23rd, and gusts of 96 m.p.h. and 92 m.p.h. were registered at Scilly on the 23rd and 22nd respectively, and 91 m.p.h. at the Lizard on the 22nd. The St. Ives lifeboat was capsized in the gale and serious loss of life resulted.

There was considerable snow at times in January; at Cantref (Brecknock) it was 14 inches deep on the 26th and snow was still lying on the 31st and at Stanford Dingley, Berkshire, level snow was 19 inches deep on the morning of the 26th.

The diagram on page 10 shows the weekly variations in temperature, rainfall and sunshine in south-east England in 1939. The variations are given in the form of deviation from the average of temperature and percentages of the average of rainfall and sunshine. The district value is the arithmetic mean of the values for the following stations:—Kew Observatory, Margate, Hastings, Southampton and Marlborough.

L. F. LEWIS.

---

## LETTERS TO THE EDITOR

## A Green Moon

Dr. F. J. W. Whipple in the November 1937 issue of the *Meteorological Magazine* wrote about a green moon. I observed at Totteridge what appeared to be a light green moon on the morning of Saturday, December 30th, 1939, at 8h. G.M.T. The moon was quite bright and high up in the sky and the morning was clear and frosty. Covering the moon was some cirrus cloud tinged with pink due to sunrise. I presume it was the pinky tinge of the cirrus cloud which made the moon appear light green.

J. MONGER.

46, Great Bushey Drive, Totteridge, N.20.  
January 2nd, 1940.

---

## NOTES AND NEWS

*Glazed Frost, January, 1940.*

Glazed frost is of comparative rarity in the British Isles. It occurs when rain falls with a temperature below freezing point; a layer of smooth ice, which may attain considerable thickness, is formed upon all objects exposed to the rain. The accumulation of ice is often sufficient to break trees and to bring down telegraph wires. A notable example occurred on the morning of December 21st, 1927, in London and many other parts of England; several thousand street accidents resulted. Some account of this frost is given in the issue of this Magazine for January, 1928, page 280.

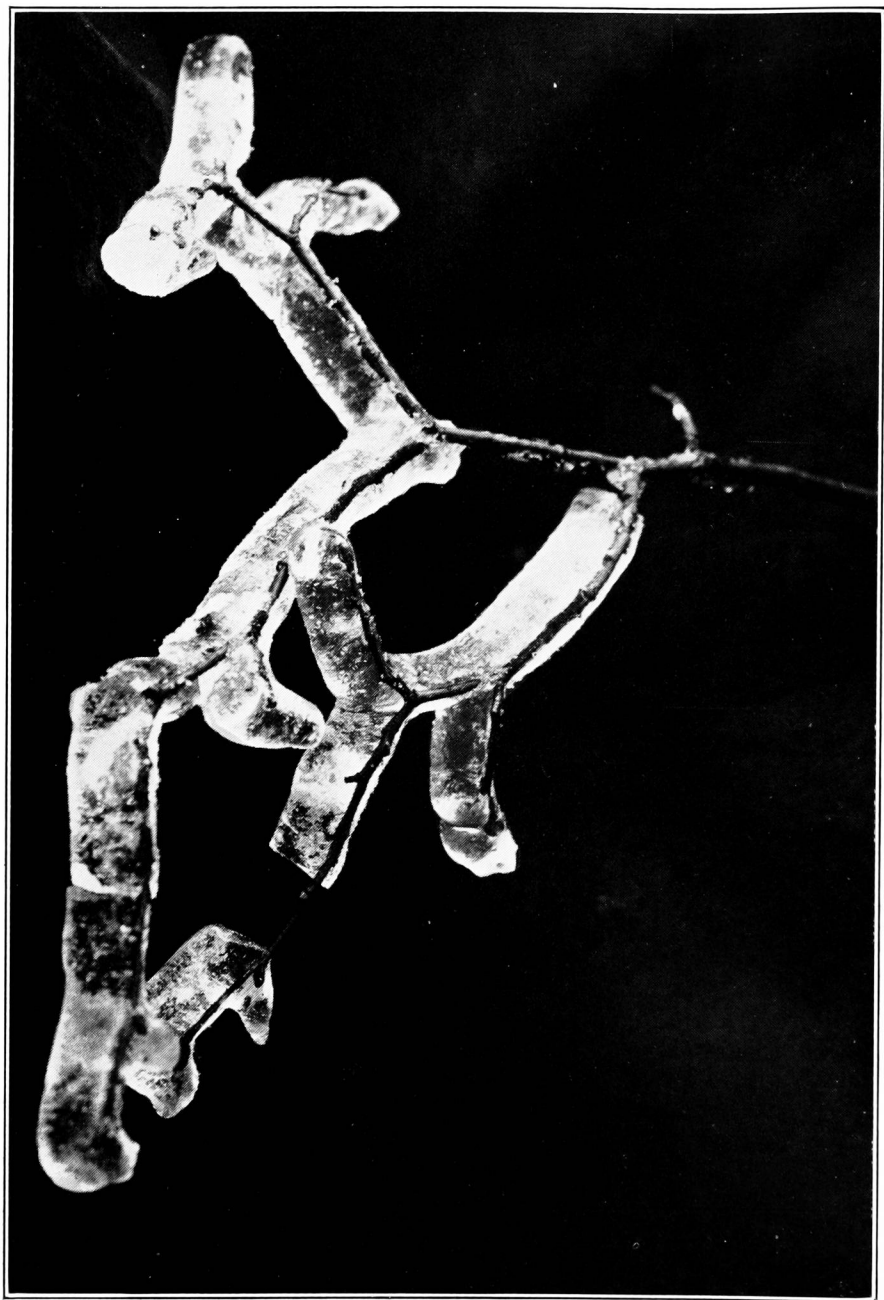
The accompanying photographs illustrate the severity of the glazed frost which began on January 27th-28th, 1940.





Photographer : S. Poulton.

GLAZED FROST IN GLOUCESTERSHIRE, JANUARY 29TH, 1940



*Photographer : S. Poulton*

GLAZED FROST, GLOUCESTERSHIRE, JANUARY 29TH, 1940

The following notes are contributed by Mr. J. Pattinson:—

“ During the severe glazed frost at the end of January one of the most remarkable features was the abnormal amount of ice which formed on trees and telegraph wires. Branches and wires were broken with its weight, while in many instances whole trees and telegraph poles fell.

Some measurements were made of the weight of ice formed around small branches and lengths of wire which snapped under the strain. Perhaps one of the most striking was that of a broken telegraph wire. A length of it measuring 4·5 in. and diameter ·05 in. was found to weigh 178 gm., this being 130 times the weight of the wire alone. The diameter of the cylinder of ice formed around the wire was 2·4 in.

Weights of broken twigs were as follows:—

<i>Weight of Twig alone.</i>	<i>Weight of Ice formed.</i>	<i>Ratio.</i>
0·7 gm.	24·3 gm.	34·7
1·25 gm.	21·75 gm.	17·4
27·0 gm.	146·0 gm.	5·4

In each case the ice was thickest on one side of the object, due to the keen easterly wind which generally prevailed throughout the glazing period.

The trees and wires, in many places, retained their ice formations for seven days, at least.”

The following notes on the glazed frost at Hermitage, Berks, are contributed by Mr. J. S. Dines.

“ On the morning of January 28th there was a coating of ice inside the funnel of the rain gauge which yielded ·32 in. of water. A further fall occurred on the following night. There was on this occasion some snow in the funnel together with the ice, but I estimate that the latter yielded ·57 in., making a total of ·89 in. of frozen rain in two days. The effect on all outdoor objects was striking. Small twigs were coated with ice to a diameter of 1 in. Blades of grass sticking up through the snow were similarly coated. A laurel bush was held rigid

with ice  $\frac{1}{4}$  in. thick over its leaves and icicles up to 4 in. long hung from the foliage. The surface of the ground and of walls facing to windward (East) were coated with a uniform layer of ice. The country looked beautiful but the damage done was very great. Few telegraph or telephone wires were left intact and many trees suffered serious damage. It was notable that some silver birch trees up to 20 or 30 feet in height were bent until the tops were resting on the ground and yet recovered when the ice fell from the branches. The temperature during the formation of the glazed frost was just below freezing. The occurrence did not mark the termination of the cold spell as is, I believe, usually the case. Temperature continued generally below freezing for some days and it was a week before the last ice had disappeared from the trees."

Numerous other accounts have been received from various parts of the country.

*Lunar Corona formed by Low Cloud at Benson.*

A lunar corona formed by low cloud was seen at Benson between 21h. 40m. and 21h. 50m. on the evening of October 26th, 1939. The diameter of the innermost ring varied from 4 to 10 times the diameter of the moon, and the red and yellow rings were clearly distinguishable. The corona was formed by low cloud which extended from 2,000 to 3,000 ft., while fragments at 1,300 ft. occasionally obscured it. These figures were obtained from a number of pilots who had just been flying. The phenomenon was observed again at 22h. 30m., the red, orange and yellow rings being discernible this time. The temperature at 3,000 ft. at 23h. 7m. was found by a pilot to be 30° F.

E. R. INKESTER.

*General Rainfall, January, 1940.*

					Per cent.
England and Wales	..	..	..	..	103
Scotland	..	..	..	..	49
Ireland ..	..	..	..	..	102
British Isles	..	..	..	..	90

*Sunshine, January, 1940.*

The distribution of bright sunshine for the month was as follows:—

		Total hrs.	Diff. from average hrs.			Total hrs.	Diff. from average hrs.
Stornoway	.. ..	32	+ 5	Chester	.. ..	66	+13
Aberdeen	.. ..	..	..	Ross-on-Wye	.. ..	87	+32
Dublin	.. ..	52	— 5	Falmouth	.. ..	67	+ 7
Birr Castle	.. ..	37	—12	Gorleston	.. ..	..	..
Valentia	.. ..	76	+32	Kew	.. ..	52	+ 8

Kew temp., mean, 31.4° F. diff. from average—9.1° F.

---

## OBITUARY

JOSEPH BAXENDELL, F.R.MET.SOC. Readers will learn with regret of the death of Mr. Joseph Baxendell, F.R.Met.Soc., which occurred at Southport on January 14th, 1940. An account of Mr. Baxendell's meteorological work was given in *The Meteorological Magazine* for February, 1937, in connection with his retirement, in June of the previous year, from the position of Borough Meteorologist to the Corporation of Southport, a position which he had held for nearly 50 years, having been appointed to it in 1887 when a mere youth of 18 years. The record is one of which many a man might be proud, but when we recollect that throughout the 70 years of his life Baxendell had to contend with persistent ill health, it becomes indeed remarkable. For weeks—often months—on end he was confined to his room, yet so detailed and conscientious was his scrutiny of the work of his assistants and so thorough the training which he gave them that the records of the Fernley Observatory rank among the most complete and trustworthy in the country.

Though condemned to lead the life of a recluse Baxendell had many friends among meteorologists, with whom he maintained contact by correspondence. On the rare occasions when personal contact was established he proved himself a stimulating companion, once he had got over his initial shyness. It was obviously a source of keen delight to him to meet a kindred spirit with whom

he could talk shop, and the visitor in his turn came away stimulated and with new ideas to think over.

Most of Baxendell's published work on theoretical meteorology concerned itself with periodicities, a branch of the subject to which his attention was probably directed early in life by his father, in his day a distinguished astronomer who did much work on variable stars, but Baxendell's interests were by no means confined to that side of the subject. His conversation would range over the whole meteorological field and bore witness to a familiarity with contemporary literature which betrayed wide reading and critical thought. One is glad to think that he was able to maintain his active interest in scientific work up to the end, as evidenced by a note in the current number of the *Quarterly Journal* in which he refers to some work of his father's on the interdiurnal variation of air pressure, published 79 years ago, and applies the method to the Southport records with interesting results.

Baxendell had a keen sense in instrumental design, which is the more remarkable when one remembers that opportunities for developing it by laboratory or workshop practice in his young days were denied him. His outstanding achievement in this field, which constitutes one of his strongest claims to be remembered by posterity, was the design of an anemoscope to record the changes of direction associated with the changes of velocity which the Dines' pressure tube anemometer had brought within the range of observation and study. Prior to the invention of these instruments meteorologists were, in general, content to use anemometers such as the Robinson which were deliberately designed to damp out the minor fluctuations. Attention was concentrated on hourly values and the short period variations were regarded as unwelcome though unavoidable complications which must be disregarded and if possible eliminated by mechanical means. The Dines-Baxendell instrument opened the way for the observational study of wind structure as we now know it.

R. G. K. L.



A. PEARSE JENKIN. We regret to record the death of Mr. Arthur Pearse Jenkin, J.P., which occurred at Trewirgie, Redruth, on January 14th, 1940, at the age of 76. Mr. Pearse Jenkin, who was a native of Redruth, was a man of outstanding personality, and his name was a familiar one throughout West Cornwall for the social work in which he had been actively engaged for many years. He had been a Fellow of the Royal Meteorological Society since 1907, had served on the Council, and contributed in 1912 a paper discussing "A three year period in rainfall." He also maintained a climatological station at Trewirgie, summaries of which were published from 1908 to 1911 in the *Meteorological Record* and from 1912 in the *Monthly Weather Report* of the Meteorological Office. The rainfall record at Trewirgie has been continued since 1880, the earlier records being maintained by Mr. Jenkin's brother. Since 1928 an additional record was forwarded from The Lizard for inclusion in *British Rainfall*. Mr. Jenkin also acted as Secretary of the Cornwall Rainfall Association, which stimulated local interest in the recording of rainfall and resulted in the collection of a number of valuable records.

H. G. LACEY. We regret to record the death, on February 4th, 1940, of Mr. H. G. Lacey, Assistant in the Meteorological Office, at the early age of forty-seven.

Mr. Lacey served in the last War, first with the R.N.A.S. and later with the R.A.F., Meteorological Section. He joined the Meteorological Office in June 1920, and after serving at Outstations and in the Forecast Division was posted to the Marine Division in March 1924, where he remained until the time of his death.

He was a loyal and assiduous worker and with his long experience of the work of the Marine Division was a valued member of its staff. His friendly disposition had endeared him to a large circle of colleagues through the Meteorological Office.

---

## Rainfall: January, 1940: England and Wales

Co.	Station.	In.	Per cent of Av.	Co.	Station.	In.	Per cent of Av.
<i>Lond'n</i>	Camden Square.....	2.24	120	<i>Warw</i>	Alcester, Ragley Hall.	2.99	155
<i>Surrey</i>	Reigate, Wray Pk. Rd.	2.60	108	"	Birmingham, Edgbaston	3.04	151
<i>Kent</i>	Tenterden, Ashenden.	3.11	145	<i>Leics</i>	Thornton Reservoir...	2.52	127
"	Folkestone, I. Hospital	2.91	141	"	Belvoir Castle.....	1.68	95
"	Margate, Cliftonville..	1.82	110	<i>Rull'd</i>	Ridlington .....	..	..
"	Edenb'dg., Falconhurst	2.47	101	<i>Lincs.</i>	Boston, Skirbeck.....	..	..
<i>Sussex</i>	Compton, Compton Ho	3.47	109	"	Cranwell Aerodrome...	1.95	113
"	Patching Farm.....	3.23	124	"	Skegness, Marine Gdns	1.58	91
"	Eastbourne, Wil. Sq..	3.52	134	"	Louth, Westgate.....	..	..
<i>Hants.</i>	Ventnor, Roy. Nat. Hos.	4.12	160	"	Brigg, Wrawby St....	1.73	..
"	Southampton, East Pk	2.66	100	<i>Notts.</i>	Mansfield, Carr Bank..	2.63	122
"	Ovington Rectory....	2.52	93	<i>Derby.</i>	Derby, The Arboretum	..	..
"	Sherborne St. John...	2.50	107	"	Buxton, Terrace Slopes	..	..
<i>Herts.</i>	Royston, Therfield Rec	1.99	115	<i>Ches.</i>	Bidston Obsy.....	2.46	116
<i>Bucks.</i>	Slough, Upton.....	2.61	140	<i>Lancs.</i>	Manchester, Whit. Pk.	2.06	82
<i>Oxford</i>	Oxford, Radcliffe.....	2.91	161	"	Stonyhurst College...	2.00	47
<i>N'hant</i>	Wellingboro, Swanspool	2.65	143	"	Southport, Bedford Pk	2.48	97
"	Oundle .....	1.75	..	"	Ulverston, Poaka Beck	..	..
<i>Beds.</i>	Woburn, Exptl. Farm.	2.14	125	"	Morecambe .....	2.28	87
<i>Cambs</i>	Cambridge, Bot. Gdns.	1.68	112	"	Blackpool .....	2.60	95
"	March .....	1.66	104	<i>Yorks.</i>	Wath-upon-Deane...	2.26	118
<i>Essex.</i>	Shoeburyness .....	1.53	113	"	Wakefield, Clarence Pk.	2.74	143
"	Lexden Hill House....	1.47	..	"	Oughtershaw Hall....	2.97	..
<i>Suff.</i>	Haughley House.....	1.32	..	"	Harrog'te, Harlow Moor	2.48	96
"	Campsea Ashe, High Ho	1.65	91	"	Hull, Pearson Park...	2.12	118
"	Lowestoft Sec. School.	2.04	122	"	Holme-on-Spalding...	1.93	102
"	Bury St. Ed., WestleyH	1.34	75	"	Felixkirk, Mt. St. John	2.77	139
<i>Norf.</i>	Wells, Holkham Hall.	1.25	86	"	York, Museum .....	2.26	128
"	Thetford W. W.....	1.28	..	"	Scarborough .....	1.38	69
<i>Wilts.</i>	Porton, W.D. Exp'l Stn	2.62	114	"	Middlesbrough .....	1.88	117
"	Bishops Cannings ....	2.46	106	"	Baldersdale, Hury Res.	1.40	43
<i>Dorset</i>	Weymouth, Westham.	3.42	..	<i>Durhm</i>	Ushaw College.....	1.35	66
"	Beaminster, East St..	2.68	77	<i>Norl'd</i>	Newcastle, Leazes Pk.	1.56	79
"	Shaftesbury .....	2.17	..	"	Bellingham, Highgreen	1.57	55
<i>Devon.</i>	Plymouth, The Hoe...	2.56	77	"	Lilburn Tower Gdns..	1.97	95
"	Holne, Church Pk. Cott	5.20	84	<i>Cumb.</i>	Carlisle, Scaleby Hall.	.95	38
"	Teignmouth, Den Gdns	1.74	60	"	Borrowdale, Seathwaite	..	..
"	Cullompton .....	2.44	75	"	Thirlmere, Dale HeadH.	..	..
"	Sidmouth, U.D.C.....	2.08	..	"	Keswick, High Hill...	2.04	40
"	Barnstaple, N. Dev. Ath	3.22	98	"	Ravenglass, The Grove	2.19	65
"	Dartm'r, Cranmere P'l	4.20	..	<i>West</i>	Appleby, Castle Bank.	1.12	35
"	Okehampton, Uplands.	2.72	53	<i>Alon</i>	Abergavenny, Larchfd	3.78	112
<i>Cornw</i>	Bude, School House ..	..	..	<i>Glam.</i>	Ystalyfera, Wern Ho..	4.81	76
"	Penzance, Morrab Gdns	2.98	79	"	Treherbert, Tynywaun	..	..
"	St. Austell, Trevarna..	4.05	95	"	Cardiff, Penylan.....	3.87	105
<i>Soms.</i>	Chewton Mendip.....	3.12	81	<i>Carm.</i>	St. Ann's Head.....	..	..
"	Long Ashton .....	2.44	85	<i>Card.</i>	Aberystwyth .....	4.07	..
"	Street, Millfield .....	2.11	89	<i>Radn'r</i>	Bir. W. W. Tyrmynydd	..	..
<i>Glostr.</i>	Blockley .....	3.16	..	<i>Mont.</i>	Lake Vyrnwy.....	..	..
"	Cirencester, Gwynfa ..	2.84	113	<i>Flint</i>	Sealand Aerodrome...	2.82	152
<i>Here</i>	Ross-on-Wye .....	2.80	116	<i>Mer</i>	Blaenau Festiniog...	5.96	64
"	Kington, Lynhales....	3.57	127	"	Dolgelley, Bontddu...	4.00	70
<i>Salop.</i>	Church Stretton.....	2.53	100	<i>Carn</i>	Llandudno .....	2.56	106
"	Shifnal, Hatton Grange	1.99	103	"	Snowdon, L. Llydaw 9	5.50	..
"	Cheswardine Hall ....	2.44	110	<i>Angl.</i>	Holyhead, Salt Island.	6.01	210
<i>Worc.</i>	Malvern, Free Library.	3.78	171	"	Lligwy.....	2.83	..
"	Ombersley, Holt Lock.	4.06	211	<i>I. Man</i>	Douglas, Boro' Cem...	6.57	200

## Rainfall: January, 1940: Scotland and Ireland

Co.	Station.	In.	Per cent of Av.	Co.	Station.	In.	Per cent of Av.
<i>Guern.</i>	St. Peter P't. Grange Rd.	..	..	<i>R &amp; C.</i>	Stornoway, C.G. Stn.	2.53	52
<i>Wig.</i>	Pt. William, Monreith.	..	..	<i>Suth.</i>	Lairg	1.41	43
"	New Luce School.	..	..	"	Skerry Borgie	2.12	..
<i>Kirk.</i>	Dalry, Glendarroch.	4.45	80	"	Melvich	2.58	78
<i>Dumf.</i>	Eskdalemuir Obs.	3.37	62	"	Loch More, Achfary	2.74	38
<i>Roxb.</i>	Hawick, Wolfelee	1.43	45	<i>Caith.</i>	Wick	1.43	58
"	Kelso, Broomlands	.94	54	<i>Orkney</i>	Kirkwall, Bignold Park	1.80	50
<i>Peebs.</i>	Stobo Castle	1.48	49	<i>Shet.</i>	Lerwick Observatory	1.57	37
<i>Berw.</i>	Marchmont House	1.67	74	<i>Cork.</i>	Cork, University Coll.	4.08	101
<i>E. Lot.</i>	North Berwick Res.	1.04	60	"	Roches Point, C.G. Stn.	3.72	90
<i>Midl.</i>	Edinburgh, Blackfd. H.	.77	44	"	Mallow, Hazlewood	1.74	..
<i>Lanark.</i>	Auchtyfardle	2.06	..	<i>Kerry.</i>	Valentia Observatory	6.44	117
<i>Ayr.</i>	Kilmarnock, Kay Park	2.67	..	"	Gearhameen	6.01	59
"	Girvan, Pinmore	2.46	52	"	Bally McElligott Rec.	2.38	..
"	Glen Afton, Ayr San.	1.97	39	"	Darrynane Abbey	4.51	90
<i>Renf.</i>	Glasgow, Queen's Park	3.10	95	<i>Wat.</i>	Waterford, Gortmore	4.18	115
"	Greenock, Prospect H.	3.50	54	<i>Tip.</i>	Nenagh, Castle Lough	2.22	56
<i>Bute.</i>	Rothsay, Arden Craig	2.11	47	"	Cashel, Ballinamona	2.74	73
"	Dougarie Lodge	2.76	64	<i>Lim.</i>	Foynes, Coolnanes	1.56	41
<i>Argyll.</i>	Loch Sunart, G'dale	1.62	23	"	Limerick, Mulgrave St.	2.01	53
"	Ardgour House	1.35	..	<i>Clare.</i>	Inagh, Mount Callan	3.69	..
"	Glen Etive	..	..	<i>Wexf.</i>	Gorey, Courtown Ho.	5.37	172
"	Oban	1.08	..	<i>Wick.</i>	Rathnew, Clonmannon	4.58	..
"	Poltalloch	1.93	38	"	Newcastle	..	..
"	Inveraray Castle	2.03	25	<i>Carlow.</i>	Bagnalstown Fenagh H.	2.99	95
"	Islay, Eallabus	5.89	126	"	Hacketstown Rectory	4.19	118
"	Mull, Benmore	..	..	<i>Leix.</i>	Blandsfort House	3.22	98
"	Tiree	..	..	<i>Offaly.</i>	Birr Castle	2.48	88
<i>Kinr.</i>	Loch Leven Sluice	1.33	42	<i>Dublin.</i>	Dublin, Phoenix Park	3.19	141
<i>Fife.</i>	Leuchars Aerodrome	2.04	112	<i>Meath.</i>	Kells, Headfort	4.69	149
<i>Perth.</i>	Loch Dhu	..	..	<i>W.M.</i>	Moate, Coolatore	2.71	..
"	Crieff, Strathearn Hyd.	..	..	"	Mullingar, Belvedere	3.82	119
"	Blair Castle Gardens	1.41	42	<i>Long.</i>	Castle Forbes Gdns	4.92	148
<i>Angus.</i>	Kettins School	2.17	83	<i>Galway.</i>	Galway, Grammar Sch.	3.07	83
"	Pearsie House	1.04	..	"	Ballynahinch Castle	4.80	77
"	Montrose, Sunnyside	.89	45	"	Ahascragh, Clonbrock	3.38	87
<i>Aberd.</i>	Balmoral Castle Gdns	1.31	47	<i>Rosc.</i>	Strokestown, C'node	3.91	125
"	Logie Coldstone Sch.	..	..	<i>Mayo.</i>	Blacksod Point	3.77	74
"	Aberdeen Observatory	..	..	"	Mallaranny	5.19	..
"	New Deer School House	1.40	60	"	Westport House	2.79	60
<i>Moray.</i>	Gordon Castle	1.00	50	"	Delphi Lodge	7.25	73
"	Grantown-on-Spey	..	..	<i>Sligo.</i>	Markree Castle	2.95	75
<i>Nairn.</i>	Nairn	.86	43	<i>Cavan.</i>	Crossdoney, Kevit Cas.	3.59	..
<i>Inver's.</i>	Ben Alder Lodge	..	..	<i>Ferm.</i>	Crom Castle	4.23	127
"	Kingussie, The Birches	.64	..	<i>Arm'h.</i>	Armagh Obsy	3.02	120
"	Loch Ness, Foyers	.36	9	<i>Down.</i>	Fofanny Reservoir	10.77	..
"	Inverness, Culduthel R.	.76	30	"	Seaforde	2.29	73
"	Loch Quoich, Loan	..	..	"	Donaghadee, C. G. Stn.	4.53	178
"	Glenquoich	.62	5	<i>Antrim.</i>	Belfast, Queen's Univ.	6.28	220
"	Arisaig House	.87	14	"	Aldergrove Aerodrome	3.31	121
"	Glenleven, Corroul	.60	7	"	Ballymena, Harryville	3.58	96
"	Ft. William, Glasdrum	1.12	..	<i>Lon.</i>	Garvagh, Moneydig	2.49	..
"	Skye, Dunvegan	1.77	..	"	Londonderry, Creggan	2.53	70
"	Barra, Skallary	2.39	..	<i>Tyrone.</i>	Omagh, Edenfel	3.47	98
<i>R &amp; C.</i>	Tain, Ardlarach	.96	34	<i>Don.</i>	Malin Head	2.63	80
"	Ullapool	1.54	33	"	Dunfanaghy	..	..
"	Achnashellach	.94	10	"	Dunkineely	4.14	..

## Climatological Table for the British Empire, July, 1939

STATIONS.	PRESSURE.		TEMPERATURE.							Relative Humidity.	PRECIPITATION.			BRIGHT SUNSHINE.			
	Mean of Day M.S.L.	Diff. from Normal.	Absolute.		Mean Values.			Mean.	Wet Bulb.		%	Am't.	Diff. from Normal.	Days.	Hours per day.	Percentage of possible.	
			Max.	Min.	Max.	Min.	Max. 1/2 Min.										Diff. from Normal.
London, Kew Obsv...	1012.0	—	79	48	67.5	55.2	61.3	56.0	82	7.9	1.79	—	19	6.0	37		
Gibraltar	1016.5	—	88	62	76.5	64.9	70.7	64.2	83	4.4	0.01	—	1	10.2	72		
Malta	1016.6	+	103	69	86.6	73.3	79.9	69.3	62	0.6	0.00	—	0	12.8	90		
St. Helena	1021.4	+	66	54	62.3	55.6	58.9	56.9	91	9.6	6.72	+	25	—	—		
Freetown, Sierra Leone	1014.1	+	88	72	84.8	73.8	79.3	73.1	89	8.9	25.78	+	26	—	—		
Lagos, Nigeria	1014.1	+	86	69	81.9	73.2	77.5	73.7	92	8.9	12.41	+	19	3.9	31		
Kaduna, Nigeria	1013.1	—	86	64	81.3	66.2	73.7	68.8	94	8.0	10.42	—	20	5.7	45		
Zomba, Nyasaland...	1017.2	—	81	49	71.8	53.3	62.5	56.8	80	6.5	0.27	—	3	—	—		
Salisbury, Rhodesia	1020.2	—	78	35	69.2	43.3	56.3	48.7	65	2.9	0.11	—	1	9.0	80		
Cape Town	1022.2	+	81	42	65.5	50.1	57.8	50.9	85	5.0	3.59	—	14	—	—		
Johannesburg	1022.4	—	86	32	56.7	39.7	48.2	41.4	69	3.4	2.36	+	7	7.6	71		
Mauritius	1019.1	—	80	58	75.6	63.7	69.7	66.7	79	5.5	3.81	+	22	7.3	66		
Calcutta, Alipore Obsv.	997.1	—	95	76	88.7	79.1	83.9	79.4	90	8.8	14.85	+	16*	—	—		
Bombay	1003.9	+	88	72	84.3	77.2	80.7	77.3	77	9.1	33.08	+	21*	—	—		
Madras	1004.5	+	101	75	95.9	80.2	88.1	74.3	61	8.7	1.39	—	3*	—	—		
Colombo, Ceylon	1010.3	+	86	73	84.2	76.1	80.1	77.0	83	8.1	8.62	+	20	6.2	50		
Singapore	1009.0	+	89	72	86.8	76.6	81.7	77.9	78	7.3	3.76	—	16	6.7	55		
Hongkong	1001.4	—	94	74	87.8	78.3	83.1	78.8	82	7.0	12.69	—	17	6.4	48		
Sandakan	1008.4	—	91	70	88.4	75.4	81.9	76.9	81	7.3	10.84	+	15	—	—		
Sydney, N.S.W.	1020.3	+	67	49	60.2	43.6	51.9	44.9	74	4.4	1.23	—	10	6.7	66		
Melbourne	1020.8	+	65	30	55.1	39.4	47.3	41.8	82	6.0	0.94	—	15	3.5	35		
Adelaide	1021.7	+	67	37	59.3	45.5	52.4	48.4	79	6.6	1.80	—	17	4.3	43		
Perth, W. Australia.	1018.1	—	68	41	62.6	47.8	55.2	50.7	84	6.8	11.18	+	20	4.9	48		
Coalgardie	1019.9	—	73	33	60.2	40.8	50.5	44.6	77	4.7	1.01	+	13	—	—		
Brisbane	1019.0	+	76	40	66.1	48.6	57.3	51.1	71	4.5	2.00	—	9	6.3	59		
Hobart, Tasmania.	1018.0	+	60	31	51.2	39.4	45.3	40.7	77	6.0	1.87	—	15	4.5	48		
Wellington, N.Z.	1001.8	—	59	33	48.1	38.6	43.3	40.6	77	7.4	6.03	+	22	3.7	39		
Suva, Fiji	1013.6	—	89	63	78.4	67.4	72.9	68.0	85	5.3	6.53	—	17	5.2	46		
Apia, Samoa	1011.8	—	87	68	84.7	72.7	78.7	74.2	75	2.9	3.28	+	7	9.7	85		
Kingston, Jamaica	1014.7	0.0	94	71	89.6	74.2	81.9	71.7	73	3.8	2.80	+	6	8.0	61		
Grenada, W.I.	1014.3	—	93	50	81.6	61.9	71.7	62.1	80	4.1	1.72	—	9	10.8	72		
Toronto	1012.9	+	100	35	83.9	57.0	70.5	58.1	79	4.9	1.42	—	5	10.5	66		
Winnipeg	1013.8	+	81	50	71.0	54.1	62.5	58.4	87	6.4	4.70	+	14	7.9	51		
St. John, N.B.	1017.6	+	81	47	67.6	51.6	59.6	56.5	87	3.6	1.18	+	9	10.3	66		
Victoria, B.C.	1017.6	+	81	47	67.6	51.6	59.6	56.5	87	3.6	1.18	+	9	10.3	66		

\* For Indian stations a rain day is a day on which 0.1 in. or more rain has fallen.

# ROYAL METEOROLOGICAL SOCIETY

## MEMOIRS

The series of MEMOIRS issued by the Royal Meteorological Society has now been brought to a close with the completion of Volume IV. No. 40, the last number, is entitled "Correlations between monthly rainfall at eleven stations in the British Isles", by D. A. BOYD, B.A. This has just been published and is obtainable from the Royal Meteorological Society, 49, Cromwell Road, London, S.W.7, price 2s. 6d. The title page and table of contents for Volume IV are also now available, and many of the back numbers of the MEMOIRS are still in stock. Persons wishing to complete their sets of this publication should apply to the Royal Meteorological Society for any numbers required.

---

# THE OBSERVATORY

A MONTHLY REVIEW OF ASTRONOMY, FOUNDED 1877

*Edited by*

R. v. d. R. Woolley

H. F. Finch

A. D. Thackeray

G. C. McVittie

---

"*The Observatory*" contains reports of the Meetings of the Royal Astronomical Society and of the Geophysical Discussions; also Articles, Reviews, Correspondence and Notes upon the latest developments in Astronomy.

---

*Annual Subscription for twelve Monthly Numbers:—20s. Price per copy, 2s.  
All applications concerning distribution of "The Observatory"  
should be sent to The EDITORS at the Observatory, Cambridge.*

---

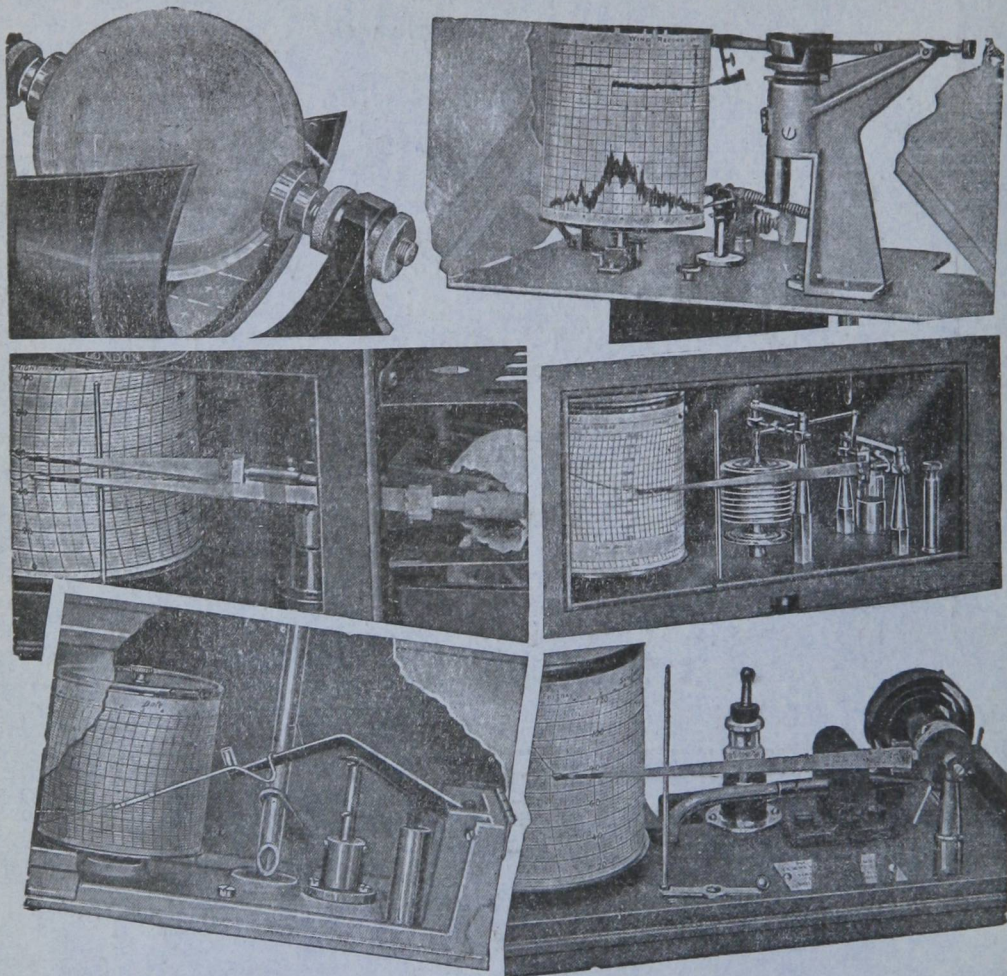
LONDON: PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE

To be purchased directly from H.M. STATIONERY OFFICE at the following addresses  
York House, Kingsway, London, W.C.2 - - 120 George Street, Edinburgh 2  
26 York Street, Manchester 1 - - - 1 St. Andrew's Crescent, Cardiff  
80 Chichester Street, Belfast, or through any bookseller

Price 6d. net, post free 6½d.

Annual Subscription, 6s. 6d. post free





Instruments for recording  
sunshine, wind, humidity,  
air pressure, rainfall and temperature

FULL DETAILS  
ON REQUEST

# NEGRETTI & ZAMBRA

38, Holborn Viaduct, London  
Makers of Meteorological Instruments since 1850

S.O. Code No. 40-43-2-40