

June, 1942.



Radiation on a Vertical Wall.

An enquiry received recently from the Building Research Station, Garston, presented an interesting problem. It was required to state the total amount of radiation falling on a vertical wall, facing south, between the months of November and April, including the diurnal variation.

In framing the reply the radiation was calculated for the neighbourhood of London. Radiation was divided into three types:

1. Direct solar radiation when the sun is shining.
2. Scattered and secondary long-wave radiation:
  - (a) When the sun is shining
  - (b) When the sun is obscured by cloud.
3. Scattered short-wave radiation:
  - (a) When the sun is shining
  - (b) When the sun is obscured by clouds.

The direct solar radiation was calculated from the expression:

$$I_h = S I_0 k \cos e \cos e \cos h$$

where  $I_h$  is the intensity of the radiation per square foot of receiving surface at hour  $h$

$S$  is fraction of time during which sun is shining at hour  $h$  (average for the month at Kew).

$I_0$  is solar constant, taken as 2 cal/cm<sup>2</sup>/min

$k$  is transmission coefficient of the atmosphere

$e$  is elevation of the sun at hour  $h$  on the 15th of each month.

$h$  is hour angle of sun from south

$k$  was calculated from values of solar radiation near

FG 5  
ST 27



noon at Kew obtained with an Angstrom pyrheliometer. Values of  $e$  and  $h$  were obtained from a diagram in D.S.I.R. Illumination Research Technical Paper No. 7.

The calculated values of  $K$ , the transmission coefficient, were as follows:

<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>
.62	.70	.73	.72	.74	.64	.61	.59

$K \cos \theta$  gives the proportion of the sun's radiation at the limit of the earth's atmosphere which reaches the ground when the sun's elevation is  $\theta$ .

The results of these calculations are given for each hour in table I and their sum, multiplied by 60 and divided by 100 in table II.

The remaining values were obtained from some measurements of the monthly mean values of radiation from various parts of the sky at Benson, Oxfordshire, described by W.H. Dines and L.H.C. Dines in the Memoirs of the Royal Meteorological Society Vol. II No. 11. The values for the hemisphere have been divided by 4 to give the proportion falling on a vertical surface, and have been multiplied by the proportion of time during which the sun was (a) shining, (b) obscured. These values probably do not vary greatly during the hours of daylight.

No allowance was made for the radiation received from the ground in front of the wall, as this would vary very greatly according to the nature of the surface.



Radiation on a Vertical wall facing south at  
Kew Observatory for the winter months.

Table I. Direct solar Radiation in cal/ft<sup>2</sup>/min.

<u>Hrs.</u>	<u>Sept.</u>	<u>Oct.</u>	<u>Nov.</u>	<u>Dec.</u>	<u>Jan.</u>	<u>Feb.</u>	<u>Mar.</u>	<u>Apr.</u>
0600							0.3	10
0700	7						55	85
0800	74	29				2	99	143
0900	107	106	6		8	35	188	215
1000	275	211	82	42	64	103	208	230
1100	348	312	153	95	138	160	286	268
1200	366	312	190	117	160	190	208	59
1300	348	297	171	113	150	183	203	210
1400	275	217	110	56	87	123	121	146
1500	176	121	26	0.04	18	56	55	94
1600	101	49				7	1	13
1700	20							
1800								

Table II. Total Radiation during Day in Hundreds of  
Calories per sq.ft.

Direct solar radiation	1258	992	443	254	315	518	837	933
<u>Long Wave radiation.</u>								
1. Sun shining	50	34	21	16	18	24	31	43
2. Sun obscured	107	122	122	122	124	117	110	100
<u>Short Wave radiation.</u>								
1. Sun shining	4	3	1	1	1	2	2	4
2. Sun obscured	40	40	18	10	7	8	29	27
TOTAL ..	1459	1191	605	409	465	669	1009	1157

[C. E. P. Brooks]



A Line Sandstorm in Eastern Cyrenaica.

The following is an account of the meteorological conditions prevailing during the evening of April 23rd 1942, at a point some 8 miles south-east of El Adem, height 180 metres above MSL. The weather was remarkable for the approach of a severe sandstorm and squall, presumably caused by the passage of a vigorous cold front.

The weather preceding the phenomenon was characterised by a moderate to fresh hot southerly wind, reduced visibility due to rising sand and a very low relative humidity. The barometer continued to fall steadily until approximately 1500 G.M.T. when it remained almost steady, and the wind slackened.

It was at this time that a well-defined "line sandstorm" was observed approaching from the west. As it came nearer its speed was estimated at 15-20 m.p.h. and the height of the driven sand some 1000-1500 feet. It reached the station at about 1625 G.M.T. It was accompanied by a squall with the wind veering rapidly to west then northwest strength force 5-6, gusty. Visibility was reduced to 5-10 yards with sky obscured and the temperature began to fall almost immediately; at 1630 G.M.T. it was 78°F. relative humidity 39%; at 1645 G.M.T. 74°F. relative humidity 34%. The barometer began to rise quickly, some 3 mbs. in 1½ hours.

These conditions prevailed for about one half to three quarters of an hour, after which the wind settled in the northwest averaging force 5, gusty, and visibility gradually improved. As far as could be seen there was no cloud formation. The wind continued to blow fresh from the sector NW-NNW for most of the night and finally slackened before dawn.

[Handwritten: April 23.5]

G. TEASDALE.



Auroral Notes, 1941 - March 1942.

There was considerable auroral activity in October 1941, the phenomenon being observed on 19 nights. Displays on the 2nd, 4th and 10th were of short duration and were reported only from Shetland. On the 11th, aurora was seen at many places from Shetland to Eskdalemuir and St. Abb's Head. Features of the display, which was observed at Lerwick from 18h. 55m. to 22h. 08m., were diffuse luminous surfaces of moderate intensity which stretched across the northern sky to an altitude of 40 degrees, and a bright arc with ray structure along the horizon from NNW to NNE at 19h. 05m. A bright and very active curtain was noted at 19h. 20m. from 5 degrees in NW to 50 degrees in N. As the curtain became less extensive it showed greater activity with red rays mingled with green. Aurora was also seen from northern stations on every night from October 14th to 31st, except the 15th, 21st and 29th. The display on the 22nd lasted for some hours at Lerwick and was observed from Aberdeen, Kettins, Swinton (Berwickshire) and many places in the Forth and Clyde areas. On the 23rd, observers in Nairn, Aberdeen, Kettins, Skye and Greenock noted aurora. Reports of a display on the 24th were received from Rothesay and Kettins and of another on the 26th from Eskdalemuir and Craibstone (Aberdeen).

In November, aurora was observed on 14 nights. It was seen from Lerwick, Stornoway, and Leuchars on the 1st, from Kettins and Duntulm (Skye) on the 6th and from Gordon Castle on the 12th. Duntulm also reported its appearance on the 16th. Nairn and Eskdalemuir reported aurora on the 17th and Duntulm, Paisley and Eskdalemuir on the 18th. Displays were noted at some northern stations each night from 19th to 22nd. Abbotsinch observed aurora on the 23rd, Wick on the 24th and Lerwick on the 27th. A fine display on the 28th was seen at many places from Shetland to the Solway Firth. Lerwick noted active aurora on that night from 18h. 05m. to 19h. 35m. and again from 21h. to 22h.

December's observations of aurora were confined to Shetland, except on the 14th when it was seen at many places on the east coast of Scotland, and on the 16th when it was reported from Wick. At Lerwick it was also seen on the 1st, 4th, 5th, 6th, 12th and 17th. During January 1942, aurora was seen from northern stations on the 4th, 5th, 7th, 9th, 10th, 11th,



14th and 18th. The display on the 5th was the most widely observed, being reported from Lerwick, Kirkwall, Wick and Arbroath.

In February, aurora was observed on 12 nights, viz. 3rd, 4th, 6th, 8th, 10th, 12th, 13th, 15th, 16th, 22nd, 23rd and 25th. The display on the 6th was seen as far south as Montrose and Kettins and that on the 23rd from Edinburgh, Eskdalemuir and St. Abb's Head. Good displays of aurora were observed from Lerwick in the evenings of March 1st and 5th, though, on the latter occasion, observation was interfered with by low cloud. The phenomenon appeared also on the 6th, 7th, 8th, 10th and 22nd. The displays on the 8th and 9th were noted as far south as Eskdalemuir and St. Abb's Head.

H.E.C.

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#### Lunar Halo Phenomena.

At Milford, near Godalming, between 0200 and 0330 G.M.T on the morning of April 29, 1942, two interesting halo phenomena were seen.

The moon, which was nearly full, was in the west; the sky was covered by about <sup>four</sup>~~ten~~ tenths cirrus and cirrostratus. The ground wind was strong, NE force 6.

The first halo effect was observed at 0200. Two halos were visible (Their angles measured approximately 22° and 46°). An arc of contact touched each halo above the moon. Neither halo was complete, and the arcs of contact were brighter than the two halos.

Later, when the moon was lower, a very faint ring appeared to pass through the moon, and there was a faint image of the moon on the ring diametrically opposite to the moon. As it was so faint no measurements were taken, and the description may be slightly at fault.

H.W. Sansom.



A complete lunar halo was observed at Preston, near Canterbury between 20h. and 20h.30m. G.M.T. on the evening of April 28th 1942.

The halo of  $22^{\circ}$  was almost complete; an upper arc of contact to the  $22^{\circ}$  halo was observed subtending an angle of approximately  $22^{\circ}$ . "Moon dogs" (mock suns) were seen to right and left of the moon, distance  $22^{\circ}$ . The upper arc of contact,  $22^{\circ}$  halo and "moon dogs" were faintly prismatic - the arc of contact being almost rainbow hued.

At 20h. G.M.T. the elevation of the moon was  $33^{\circ}$  due SE; the sky was covered by about eight tenths cirrostratus (very attenuated, only thinly veiling the moon). The wind was ENE, force 7-8 (very gusty) and the air temperature was  $48^{\circ}\text{F}$ .

J.H. DYSON.

Halo Display in the Stroud area on May 23rd, 1942.

A good halo display was visible in the Stroud area at 0600 G.M.T. on May 23rd. The  $22^{\circ}$  halo was faint, but with moderately bright mock suns on each side; on the right a part of the mock sun ring could be seen. The upper arc of contact to the  $22^{\circ}$  halo was very striking; a width of more than  $10^{\circ}$  of the bow could be seen and there was a very bright mock sun at the point of contact. The  $46^{\circ}$  halo was well developed, showing bright colours. The display continued with decreasing brightness until 0630 G.M.T., after which it faded rapidly.

C.E.P. BROOKS.



History of Science.

This collection of scholarly essays reprints in book form\* a series of public lectures on the history of science given by a group of Professors at Yale University in 1939. The sciences dealt with are Mathematics, Astronomy, Physics, Chemistry, Geology, Biology, Psychology and Medicine, the latter in its relations with other sciences. The average space devoted to each subject is under 40 pages but all manage to include a notable amount of matter. The first and longest lecture, that by Oystein Ore on the development of Mathematics, is in fact so full of information that if it was really delivered in full at a single sitting, the audience must have possessed remarkable staying powers. The others are more gentle; the essay on physics in which meteorologists will be most interested is comparatively short but makes pleasant as well as informative reading.

There is no essay on the development of Meteorology, for this subject, though essential to a flying age and now offering far more professional posts than many of the older sciences, is slow in making its way into the universities. Meteorologists could however read the book with profit, for the crises which have befallen other sciences have not been unknown in their own. It is recorded that in 1808 the French mathematician Delambre reported to Napoleon that almost all parts of mathematics had been brought to a standstill by insurmountable difficulties, and that the perfecting of details was all that remained. Yet Gauss was in the fullness of his powers and with his successors mathematics was soon to discover whole continents of new territory. The same dismal situation threatened physics towards the close of last century, and some of us can remember the time when the only future open to meteorology seemed to be to pile Pelion upon Ossa in mountains of statistics.

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- \* Development of the Sciences Edited by L.L. Woodruff  
9 1/2 in. x 6 in., pp. 336 illustrations  
New Haven, Yale Univ. Press and London, Oxford  
Univ. Press. 1941. 18/6 net.



The history of Science abounds in lessons which are still useful to the research worker. This in physics, the first great step forward came with the shifting of the quest from "how" to "why". Galileo revolutionised mechanics by laying emphasis on precise and quantitative analysis rather than on spectacular tours-de-force (later the lecturer on physics, Prof. Margenau, himself tends to present the discoveries of modern physics as a series of spectacular achievements, but this is no doubt due to the need for brevity). Finally we may quote Professor Longwell's summing up of the German geologist Werner, whose erroneous teaching set a whole generation of students astray. "One of his strongest virtues, a passion for methodical classification, led him into persistent error, because it urged him to assume relationships on the basis of meagre information. This is a weakness from which many scientific men of the present day are not entirely free."

C.E.P. BROOKS.

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OBITUARY.

Dr. D. La Cour. We regret to learn of the death of Dr. D. La Cour, Director of the Danish Meteorological Institute since 1923. Although he was most interested in Terrestrial Magnetism, in which he published a number of important papers, especially from the instrumental side, as a member of the International Meteorological Committee his pleasant but forceful personality was a great asset, and he took an active part in the work of many Commissions. In 1929 he was elected President of the Polar \*  
\* up  
to here Year Commission, and he was largely responsible for the successful organisation of the Second Polar Year, 1932-1933. The idea of reproducing the actual magnetograms and other autographic records on a small scale was due to him. In 1936 he was elected a member of the very active Commission for Aeronautical Meteorology, and in the same year he became President of the International Union for Geodesy and Geophysics. He was elected an Honorary Member of the Royal Meteorological Society in 1932. Little is known in this country of his activities since Denmark was invaded in 1940, but it is believed that he was in Sweden when he died.

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Dr. F. E. Magarinos Torres died on March 17th 1942. He joined the Meteorological Service of Rio de Janeiro in 1921 as Head of the section dealing with rainfall, floods, atmospheric electricity and solar radiation. In 1933 to 1934 he served as Director of the Institute of Meteorology; in 1934 he relinquished the post and devoted himself to the Hydrometric Section. He will be remembered for his contributions to the literature of floods and rainfall and for the esteem in which he was held by his colleagues.

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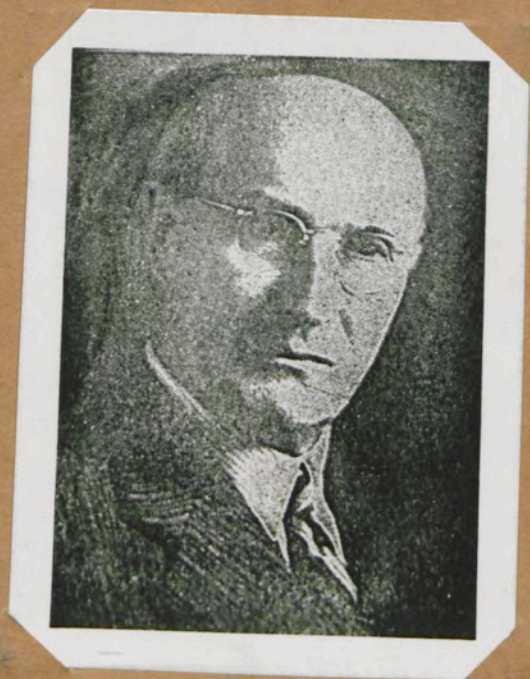
Dr. H. A. Des Voeux, president of the National Smoke Abatement Society and formerly vice-president and treasurer of the Medical Society of London died on May 20th, 1942. Apart from his profession Des Voeux's great interest in life was atmospheric pollution, especially the pollution of London air by smoke, and he will long be remembered for his work on the Atmospheric Pollution Committee. He was a member of the Committee which published the first Report (April 1914-March 1915) and in April 1931 he was elected Chairman of the Standing Conference in succession to Sir Napier Shaw. He held this office for the usual three years but continued to represent D.S.I.R. on that conference at least up till 1939. In addition Des Voeux was a <sup>contributed</sup> rainfall observer for the Meteorological Office and ~~continued~~ records from his home at Battamsley Close near Lymington from 1923 onwards.

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Mr. W. J. Monk. We regret to announce the sudden death on May 18th 1942 of Mr. W. J. Monk of Tavistock. Mr. Monk was an enthusiastic meteorologist and has contributed an excellent series of records to this Office. Summaries were published in the Meteorological Record in 1911 and have been included in the Monthly Weather Report since 1912. Mr. Monks continued the observations made by Mr. E. E. Glyde, F.R.Met.Soc. at Tavistock and at Whitchurch near Tavistock from 1895 until 1911 and it is hoped that the station will now be maintained by the Urban District Council.

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JOHN PATTERSON, B.A.Sc., M.A., F.R.S.C.

Birthday Honours



THE BIRTHDAY HONOURS. 1942

Three honours of interest to meteorologists appear in this list. A Knighthood is conferred upon R.A. Watson Watt and upon E.M. Wedderburn and Capt. L.G. Garbett receives the C.B.E. (Military Division).

The Professional Institute of the Civil Service of Canada has awarded the 1942 medal for the outstanding administrative contribution of the year to John Patterson who has for the past 37 years been active in the development of Meteorology. Patterson was in 1909 appointed Imperial Meteorologist to the Government of India. In 1910 he joined the Meteorological Service of Canada becoming Assistant Director in 1924 and Director in 1929. Under his administration the Canadian Service has greatly expanded and has been able fully to meet the exacting demands of the war. A portrait of Mr. Patterson is appended.

METEOROLOGICAL STATIONS.

The health resort stations at Perranporth and Eastborne have been closed for the duration of war.

The Climatological station at Attenborough maintained since 1920 by Mr. R.F.T. Granger and his brother and since 1939 continued by Miss J. Granger has also closed. It is hoped that observations may be resumed after the war.

New stations at Wealdstone, Raunds and West Lavington have been approved. The station at Wealdstone is under the direction of Messrs. Kodak Ltd. Rainfall observations have been received for many years and the firm made certain meteorological observations in addition. The equipment and site have now been standardised and summaries of the observations are included in the Monthly Weather Report.

The station at Raunds has been set up by Mr. T.C. Smith; summaries appear in the Monthly Weather Report and these form a useful continuation of records from an earlier station at Raunds (1904-1934).

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The station at West Levington is maintained by Dauntsey's School; good returns are received but observations are not taken at the standard hour.

The meteorological station at York and Bath both received considerable damage in recent air-raids. Equipment has been replaced and observations resumed with very little delay in each case.

Erratum.

Meteorological Magazine Dec.1941 - Feb.1942

page 7 for Dr. Robert Billvilter  
read Dr. Robert Billwiller.