The Meteorological Magazine

Vol. 55

March 1920

No. 650

Air Ministry :: Meteorological Office

LONDON: PUBLISHED BY HIS MAJESTY'S STATIONERY OFFICE.

To be purchased through any Bookseller or directly from H.M. STATIONERY OFFICE at the following addresses: IMPERIAL HOUSE, KINGSWAY, LONDON, W.C. 2, and 28, ABINGDON STREET, LONDON, S.W. 1; 37, PETER STREET, MANCHESTER; 1, ST. ANDREW'S CRESCENT, CARDIFF; 23, FORTH STREET, EDINBURGH; E. PONSONBY, LTD., 116, GRAFTON STREET, DUBLIN; or from THE METEOROLOGICAL OFFICE, SOUTH KENSINGTON, LONDON, S.W. 7.

The International Meteorological Conference. Paris, October, 1919.

THE French edition of the Minutes of the International Meteorological Conference, which met in Paris in October last, has now been issued.*

The last preceding meeting of this body took place at Innsbruck in 1905. But for the war a meeting would have been held in Holland in 1915.

There were present at Paris the Directors of the Meteorological Services and of Observatories belonging to the Allied and Neutral Powers, the number of representatives from British Dominions being 9, from other Allied Powers, 38, and from Neutral Powers, 19.

At the first meeting the members were welcomed by M. Angot, who was subsequently elected Secretary, Sir Napier Shaw being President. As the President pointed out in his opening address the Conference was an important epoch-making occasion in

*Paris, Bureau Central Météorologique, Proces-Verbaux des Seances de la Conférence Météorologique Internationale des Directeurs et du Comité Météorologique International. Réunion de Paris, 1919.

the history of International Meteorology, for the events of the war had brought many new problems into the field of discussion, chief among them being the growing meteorological requirements of aviation, and the re-establishment of the international organization, which the war had either suspended or disorganized.

This question of international organization took the first place on the programme. The scheme adopted was on the same lines as that which was in operation before the war. The organization comprises (1) The Conferences of Directors ; (2) The International Meteorological Committee, and (3) Commissions.

The Conferences of Directors are chiefly concerned with administrative questions and work requiring international co-operation, purely theoretical matters being excluded. In addition to the directors of official services, the directors of certain private institutions, and also representatives of Meteorological Societies may be invited to the Conferences. They are to be convened in future every six years instead of at intervals of nine years as laid down hitherto. The International Meteorological Committee is to maintain international intercourse during the intervals between the conferences. The Committee is nominated by a Conference of Directors and its powers cease with the following conference. The members are to belong to different countries and to be directors of independent meteorological establishments. This Committee is to meet every three years as hitherto. The number of members has been increased from seventeen to twenty, but four places are for the time being to remain unfilled.

The Commissions investigate particular branches of meteorological work. They are organized and their Presidents nominated in the first instance by a Conference or the Committee, but they may co-opt members and organize their own work.

The Commissions appointed by this Conference are shown in the following list, the names of the Presidents being in brackets :—

Agricultural Meteorology (M. Angot).

Meteorological Telegraphy (Lieut.-Col. E. Gold).

Maritime Meteorology (M. van Everdingen).

Solar Radiation (M. Maurer).

Application of Meteorology to Aerial Navigation (Lt.-Col Saconney).

Réseau Mondial (Sir Napier Shaw).

Exploration of the Upper Atmosphere (Prof. V. Bjerknes).

Terrestrial Magnetism and Atmospheric Electricity (M. Angot).

Polar (Sir Napier Shaw).

A few of the decisions recorded on practical matters may be referred to.

It was agreed that in view of the requirements of aviation, telegraphic reports four times a day were desirable. The standard hours hitherto have been 7 h. and 18 h. It was decided to have additional readings at 1 h. and 13 h., the hours adopted already in the British Isles, and incorporated in the scheme put forward by the Radiotelegraphic Commission. A proposal to replace the hours 1, 7, 13 and 18 by 3, 9, 15, 21, a series with which we are familar in this country as partially in use at climatological stations, was not accepted by the Conference.

The code for the transmission of the reports was revised, provision being made for the inclusion of information as to the movement of clouds.

On the question of international organization for supplying weather information for flying purposes, it was agreed that for any flight over the territory of several countries it should be possible to obtain :—

(*a.*) The actual weather conditions along the route;

(*b.*) A detailed forecast for the following six hours, and

(*c.*) A general forecast for the following twenty-four hours.

The provision of handbooks for aeronautical use on the lines of *The Weather of the British Coasts* was recommended.

The suggestion that the estimated probability of their fulfilment should be given with the special forecasts issued to aeronauts was supported. It was stated that in Holland in forecasting rain the conventions adopted are that "probable" indicates a probability of about 60 per cent. and "very probable" a probability of about 80 per cent., "certain" corresponding with 100 per cent.

Some time was devoted to the consideration of a proposal to create a commission to prepare an international meteorological vocabulary, one speaker urging that the scope of such a work should be wide enough to include the Japanese and Chinese languages. As a preliminary it was agreed that each meteorological service should provide the Committee with a translation in the language of its country of the terms appearing in *The Meteorological Glossary* published by our own Office.

A photograph of the members of the Conference is issued with this number of the *Meteorological Magazine*, as frontispiece to the annual volume.

Official Notices.

Summer Time Act.

It is officially announced that "Summer Time" will come into force this year at 2h. G.M.T., on the morning of Sunday, March 28th, and will continue until 2h. G.M.T. on the morning of Monday, September 27th.

After the public clocks have been altered, each hour of observation for the climatological record should remain the same by G.M.T. and should, therefore, be one hour later by Public Time.

Observers are reminded that it is important to state explicitly the standard of time on all communications with regard to natural phenomena observed during the summer months, and also that the times of observations tabulated in the Monthly Weather Report should be checked at the beginning and end of the summer-time period.

Changes in the Monthly Weather Report.

The Monthly Weather Report has been extended by the addition of two extra pages. One of these takes Table V., which gives the rainfall at 196 stations not included in Table III., so that a very large part of the information on which the map of rainfall for the month is based is now published. In this Table V. the rainfall is given in inches and in millimetres and also as a percentage of the normal. In the Report for January the last page is left blank, the form of the Table which is to fill it not having been finally settled.

Attention may be called to a small change which has been made in Table III. of the Report. The terminal hours for maximum and minimum temperature, and for rainfall, are now stated explicitly instead of being indicated by letters. Observers are requested to check the accuracy of the entries against their respective stations both in the January report and also after the advent of summer time.

The following new stations are now being included in Table III., Bexley Heath, Bridlington, East Ham, Luton and Wantage.

Climatological Stations.

Carnforth.—Observations at the station at Carnforth, overlooking Morecambe Bay, had to be discontinued from January 1st, 1920. Mr. W. Farrer, who contributed a series of observations which extends over fourteen years, is transferring the instruments to his house at Witherslack, which is nine miles north-west of Carnforth. The equipment includes an anemobiagraph, the records from which have been utilised in the Monthly Weather Report since June, 1914, but the exposure of the instrument was not entirely satisfactory, tall trees standing to the east of the house on which it was mounted.

Royal Meteorological Society.

THE usual monthly meeting of the Society was held on 18th February, Mr. R. H. Hooker, President, in the Chair. The first paper, by Capt. C. J. P. Cave, was on "The Status of a Meteorological Office."

Mr. W. H. Dines, F.R.S., read a paper entitled "Atmospheric and Terrestrial Radiation," in which the flow of radiant energy through the atmosphere was discussed. It is well known that the air obstructs incoming solar radiation only slightly, but that the non-luminous heat escaping from the earth is to a great extent absorbed by the atmosphere, whilst the atmosphere itself is sending out radiation of a similar character. In this paper, Mr. Dines has computed the flow of such radiant energy, other than solar, both upward and downward across any horizontal plane in the atmosphere. He finds that over Europe the air from the earth's surface up to about eight kilometres is losing heat by radiation, from eight kilometres to twelve it is gaining heat in this way, from twelve kilometres upwards it is losing. The balance in each case must be made up by the direct effects of solar radiation and by the movements of air (and water) in and out of the layers.

Lt.-Col. E. Gold, Sir Napier Shaw and Mr. L. F. Richardson took part in the discussion.

Mr. D. Brunt, M.A., read a paper on "Internal Friction in the Atmosphere." When a steady state of motion is assumed, any portion of the atmosphere is in equilibrium under the action of three forces, the gradient of pressure, the deflecting force at right angles to its motion, and the "frictional force." The first two of these are measurable and so the third can be evaluated. The paper gives a comparison of the "frictional force" defined in this manner with the values derived from a theoretical discussion of turbulent motion. Use was made of observations made at the Eiffel Tower to derive the value of the co-efficient of eddy viscosity.

The paper was discussed by Mr. F. J. W. Whipple and Mr. M. A. Giblett.

Scottish Meteorological Society.

A MEETING of the Society was held on the evening of 30th January, 1920, in the Lecture Room of the Royal Society of Edinburgh. Mr. D. A. Stevenson, M.Inst.C.E., Vice-President, was in the chair, and Dr. C. G. Knott, President, delivered a lecture on "The Colours of the Sky and some Optical Phenomena."

The colours of the sky, in all their varied beauty could be explained in terms of a few fundamental principles of physical optics. There was, first of all, the composite character of sunlight, which Newton showed to be composed of a large number of graded tints of red, orange, yellow, green, blue, indigo and violet. In general, the diversity of colour in natural bodies was due to the selective absorption of certain of these colours, so that the so-called colour of the body was a resultant of the remaining tints which were not so strongly absorbed. Again, light was undulatory, and colours varied with wave length. Rayleigh had shown the blue colour of the sky to be due to the fact that some particles on which white composite light falls scatter by diffraction more of the light of shorter wave-length, that is, more violet than blue, more blue than green, more green than yellow, more yellow than red. Were there no atmosphere the sun would appear a great white or bluish ball in a black sky, but actually the small particles of dust and of the air itself send to the eye scattered light, and this light is mainly blue, whilst the light which comes straight through the atmosphere from the sun is mainly yellow. The colours of the sunrise and sunset were considered, with their endless variety due in part to variations in the number and character of the dust particles and rain drops floating about in the atmosphere. Another principle was physiological rather than physical, and depended on the tendency of the eye to see contrasted or complementary colours. When a red and a white light were arranged so as to throw two shadows of an object on a white screen, the one shadow appeared red (as was to be expected) and the other appeared green, although the part of the screen it occupied was being illuminated by white light. Thus a citron sky behind a range of hills intensified the purple glow of the hills, already themselves bathed in bluish light scattered back from the particles of the air or floating dust. The exquisite beauty of sunrise and sunset colours was no doubt enhanced by this subjective action in the eye; but to what extent, it would be difficult to say. The physiology of vision, especially of colour vision was still but little understood.

The lecture was on popular lines and illustrated by experiments. There was a large attendance.

NOTES AND QUERIES.

Effects of the Diurnal Variations of Temperature in Surveying.

IN a recent paper on Systematic Error in Spirit Levelling, Mr. J. H. Cole* has discussed certain small errors which have been detected in the levelling work of the Survey of Egypt. It is found that when a line of levels is taken across the country and back again by the same route, there is a disagreement. In fact if two bases were at exactly the same height then a leveller, working from the first to the second, would report the latter as the lower and *vice versa.*

The explanation is found to lie in the fact that precise levelling can only be carried on during the two or three hours after sunrise, when the temperature-gradient (or as we should now say the lapse-rate of temperature) is changing rapidly. It was shown by direct experiment with a specially designed thermopile that in Egypt the lapse-rate at sunrise is negative and of the order 1° F. per foot. It vanishes about two hours after sunrise and later becomes positive. Between two observations of level made during the morning at an interval of a few minutes, the effect of refraction is diminishing. It should be explained that in levelling the observer takes up a position about halfway between two staves and compares the heights of marks on them. The one which is nearer the starting-point of the survey is called the backstaff, the other, the forestaff.. In the ordinary routine of surveying the observer looks in succession at the backstaff and the forestaff. Refraction of the light will, therefore, raise the image of the backstaff more than that of the forestaff. The accumulation of such effects leads to the artificial difference in the heights of the bench marks, at the beginning and end of the set of observations.

The success of the investigation suggests that it might be profitable to set up telescopes with the object of measuring the variation of the lapse-rate near the ground as part of the routine of a meteorological observatory. The difficulty in direct measurement of air temperatures is so considerable that an indirect method would be of great service.

Mr. Cole's mathematical investigation of the relation between the lapse-rate and refraction is open to the criticism that it is invalid for rays which are horizontal or nearly so, *i.e.*, for the case which for the surveyor is most important.

---

* Cairo : Survey of Egypt : Departmental Paper, No. 35, 1919.

As has been pointed out by Sir Arthur Schuster, a good way to deal with such problems is to consider the movement of an advancing wave front in the beam of light. Suppose a beam proceeding from a point starts with its axis horizontal and that it is observed at a distance x. Further let the speed of the light, which depends on the temperature of the air, be $v\ (1 + ay)$ where y is height above ground. When there is an inversion of temperature so that the air is cold and dense near the ground, the coefficient a is positive. It is easily shown that owing to the greater speed of the light passing along the upper rays of the beam as compared with the lower ones, the wave front is canted through an angle $\frac{1}{2} ax$. This is the correction to be applied to the inclination of the line of sight, and the corresponding correction to the observed height of an object is $\frac{1}{2} ax^2$.

It is shown in the paper that the coefficient a is equal to the centigrade lapse-rate multiplied by $8{\cdot}9 \times 10^{-7}$, so that if for example the lapse-rate is 1° C. per metre and the distance x is 100 metres, the apparent displacement of the object is 4·45 mm.

This effect of a temperature inversion on levelling was discussed in France twenty-five years ago, but the effect of the rapid change in the lapse-rate does not appear to have been noticed previously. To the meteorologist the most interesting point brought out by the investigation is, perhaps, the persistence of the inversion near the ground up to two hours after sunrise.

Corona with a Bright Ring.

On 5th January, at 21 h., a lunar corona was seen here which, though I do not think was very abnormal, yet presented interesting features and was well placed for careful observation.

The sky was covered with a very thin ci-st (*Cirrus Haze*), which would hardly have been evident at all had the moon not been shining. In it showed a faint lunar halo, of 22°, and a plain yellowish corona of 1½° diameter. The interesting point was the existence of a narrow bright ring in this corona, about 0°·8 in diameter, and 0°·1 wide, and appreciably brighter than either the annular space between it and the moon, or the rest of the corona outside it. No colouring could be detected, the whole being composed of different shades of a general yellow tint. The intensity of the corona was maintained with little change to a diameter of 1½°, beyond which it fell off rapidly to that of the surrounding sky.

The phenomenon appeared to be of a permanent nature and was, I think, a real effect and not merely an optical illusion.

Valencia Observatory, Cahirciveen. L. H. G. DINES.

The Highest Aeroplane Ascent.

FROM the newspapers we learn that on February 27th, 1920, Major R. W. Schroeder, Chief Test Pilot at Dayton, Ohio, U.S.A., while attempting to break all previous altitude records in a Le Fère biplane, driven with a 400-h.p. Liberty engine, fainted, while his machine was nearly seven miles above the earth, and fell over five miles in a "sheer nose-dive."

The machine was fitted with a device which compresses the rarefied atmosphere at high levels to sea-level pressure, and the pilots' clothes were electrically heated. The supply of oxygen having suddenly stopped, Major Schroeder had to raise his ice-coated goggles to examine the oxygen tank. "All at once it seemed as though a terrific explosion had taken place inside his head. His eyes hurt terribly and he could not open them. He seemed to be peeping through a crack. There was a tremendous rush of air and he seemed to be falling." His subconscious sense, however, saved him, for he made a perfect landing from a height of 2,000 feet. The height recorded by the altimeter was 36,000 feet, and the corresponding temperature was 230a.

The height reached by Schroeder is very close to the record claimed by Glaisher and Coxwell, on September 5th, 1862. On this occasion the observer, Glaisher, lost consciousness after taking the barometer reading corresponding with 29,000 ft. At the time of observation the balloon was ascending at about 1,000 feet a minute, and the greatest height reached was estimated as 36,000 or 37,000 feet, by making allowance for the time which elapsed before Coxwell opened the valve for the descent. It is remarkable, however, that the lowest temperature recorded by a minimum thermometer on this occasion was no lower than —12° F. (249a). This is a higher temperature than any found in the stratosphere in soundings in recent years. The official account of this ascent is given in the *Report of the British Association, 1862*, p. 383. The record of Berson and Süring, who reached 35,400 ft. in a balloon on July 31st, 1901,* is more reliable and is generally accepted as giving the greatest height attained by aeronauts hitherto. It is to be hoped that Schroeder's performance, which follows closely after that of Rohlfs (34,600 ft. on September 18th, 1919), will be authenticated in due course.

---

* *Ver. Kön. Preuss. Met. Inst. Ergebnisse der Arbeiten am Aëronautischen Observatorium*, 1900-1901, p. 227.

Atmospheric Pollution.

THE fourth and fifth reports of the Advisory Committee on Atmospheric Pollution contain the results of the observations for the years ending March, 1918, and March, 1919. The gauge at Newcastle-on-Tyne showed the largest mean monthly deposit in both years among the stations for which complete and reliable analyses are available. In the latter year Rochdale had a higher mean monthly deposit, but only nine months' observations are available at this station. As in earlier years, Malvern Wells had the smallest deposit for the year ending in March, 1918, and is representative of uncontaminated country air. No returns were made at Malvern during the last year owing to the observer's absence and the smallest records were given by the gauge at Wandsworth Common. Numerous tables show the classification of the elements of pollution, the seasonal variation compared with previous years, and the comparison of mean monthly deposits during summer and winter. An analysis showing the months of highest and lowest deposits for each element of pollution for London stations is compared with similar results for Glasgow. The fourth report adds : "In all the elements we find the months of maximum and minimum deposits are different for the two groups of stations. If we look at the deposits of total insoluble and soluble matter, we find that in the Glasgow group of stations insoluble matter shows its maximum deposit during the summer months, whereas the total soluble matter shows its maximum during the winter months. There is no sign of such a seasonal variation in the London group. It must, however, be noted that while all the Glasgow gauges are on the ground level, two of the three London gauges are on the roofs of houses, and thus raised above one of the sources of summer deposit, *i.e.*, dusty streets or roads." The most recent analysis reveals a considerable diminution of the deposit in 1918 as compared with 1917 in the majority of stations. There is indication of distinct improvement in the Glasgow air in 1918.

Some notes on the composition of rainfall samples in Georgetown, British Guiana, as representing entirely different conditions from those of the British Isles are included. An account is given of research work relative to the problem of measuring suspended impurity in the air, carried out by Mr. G. M. Watson, under the general direction of the Chemical Sub-Committee. The reports include also a detailed explanation of an automatic air filter, designed by Dr. J. S. Owens, which gives records over a period of twelve hours, and of other experimental apparatus.

Wind in Relation to Tide.

In reply to Dr. Walter's enquiry regarding the Relation of the Wind and the Tides in the Vale of Conway, I beg to make the following remarks :—

This vale runs practically north to south, with the Snowdonian range forming its western slope and along it the tide flows for a distance of about twelve miles. During the passage of western cyclones the direction of the wind on the adjoining heights varies between south-east and south-west, but owing to the trend of the vale the direction there will be south to north.

This occurs without any relation to the direction of the tidal flow. With the veering of the wind towards west, or north-west, which occurs at any state of the tide, the direction in the vale will be quite the reverse, viz., north to south, again following the trend of the valley. The same applies during sea and land breezes with the result that according to tradition, the wind has generally speaking two directions in the Vale of Conway, known locally as " At y Mor " and " At y tir,"—" seawards " and " landwards."

As the direction of the tide changes twice a day and these winds blow during a large proportion of the year, it is quite natural to expect the direction of the wind and the tide sometimes to change simultaneously. In fact, according to the law of average, they ought to do so, but not, in my opinion, on account of any physical relation.

J. R. GETHIN JONES.

Bryn Awel, St. Mary's Road, Llandudno, 28th January, 1920.

Geostrophic Wind at London; April, 1881—1915.

FREQUENCY OF STRENGTH AND DIRECTION.

Estimates based on the D.W.R. charts (8*h.*, 1881-1908; 7*h.*, 1909-1915).

Direction.	5 m/s. 11 mi/hr.	10 m/s. 22 mi/hr.	15 m/s. 33 mi/hr.	20 m/s. 44 mi/hr.	Over 20 m/s. Over 44 m/hr.	Total Frequency of Direction.
N.	27	18	13	10	5	73
NE.	29	49	21	7	4	110
E.	14	60	40	15	4	133
SE.	21	30	6	2	1	60
S.	10	29	17	4	3	63
SW.	18	58	33	13	5	127
W.	25	69	64	26	13	197
NW.	25	37	28	8	3	101
Total Frequency of Strength	169	350	222	85	38	864

Indeterminate — 186.

Tropical Thunderstorms.

THE meteorological potentialities of aeroplane observation become more apparent almost daily, and owe much of their value to the gaining of that second view-point which is so essential in studying all natural phenomena. *The Times* of 20th February prints an extremely interesting account of tropical thunderstorms as seen from mid-air, during the recent great attempt to cross the African continent.

> " Usually in the district lying between Victoria Nyanza and Lake Nyassa the mornings are fine from sunrise until noon ; but after that heavy thunderstorms may be expected to continue until sundown. . . .
>
> " In the air even the worst thunderstorms can be dodged. The average Central African thunderstorm consists of a mighty mass of nimbus rising sometimes to a height of 10,000 feet, pitch dark in the centre, turning to a silver grey at the base, from which the rain falls practically in a solid column to the ground. They move in broad circles at a rate ranging from 12 to 40 miles an hour.
>
> " I have seen as many as a dozen of these storms within an area of 100 square miles, yet, by dodging, we got safely home without feeling a splash of rain. On the ground their approach was heralded by a fierce, cool wind, but in the air one always experienced severe gusts and bumps within a mile of the rain column."

Readers of *British Rainfall* are familiar with the characteristic highly localized rainfall of heavy thunderstorms in this country, generally taking the form of narrow bands of heavy precipitation, sometimes continuous, sometimes interrupted, but nearly always separated by tracts in which no rain falls, or at most only slight showers. The work of Mr. J. Fairgrieve has gone some way towards throwing light on the process of development of these rain-fields, but much still remains to be discovered as to the direction of propagation and to the circumstances which give rise, either simultaneously or progressively, to a number of local columns of violent vertical air currents such as would appear to be necessary for the deposition of tropical rainfall.

February Phenology.

IN February, more fresh flowers have come out than in any of the fifteen years we have lived here, namely, 46 out of the 95 which were in bloom on the 29th. This compares with 25 out of 108 in 1913, our warmest winter. In 1917, our coldest winter, the totals at the end of February were 12 fresh out of 23 in all.

J. EDMUND CLARK.

Aysgarth, Purley, Surrey.

Review.

Meteorology for all : Being some Weather Problems explained. By D. W. Horner, F.R.Met. Soc., M. Aer. Inst. Introduction by M. de C. S. Salter. London : Witherby and Co., 1919. Size, $7\frac{1}{2} \times 5$. Pp. xii., 184. *Illustrations.*

THIS volume is a popular guide to the study of the weather. From the somewhat disproportionate number of chapters dealing with instruments, apparatus and units of measurement, and the excellent way these are presented it is quite evident that the author's tastes are chiefly mechanical. The regional aspect of meteorology, commonly disguised under the name of climatology, is left out altogether; but probably the author realizes that this side of the subject would require a volume to itself. In chapter XII., on "The Cause of Some Meteorological Phenomena," there is evidence of p. 115 that the author is not familiar with the principle of cooling by adiabatic expansion in the production of rainfall. In explaining the origin of thunderstorms on hot afternoons, he says : "As the hot air ascends it mixes with the colder atmosphere of the upper regions, and heavy squall cumulus clouds or 'thunder-heads' are formed." The primary cause of rainfall is the rising of air into regions of diminished pressure by whatever mode this is effected, with consequent expansion and cooling. Rather more than the average amount of credence is given in Chapter XVI., on "Weather Saws and Rules" to popular sayings about the weather, which, in default of a rigid definition of the terms of the argument, may generally be interpreted as one pleases. We must take exception to the author's endorsement of the superficial dictum, generally atrributed to Macaulay, that an English summer merely consists of a spell of three hot days, followed by a thunderstorm. This is more true of Scotland than England, and it is certainly a libel on the climate of the south of England, which during the summer half of the year experiences on the average a very considerable number of hot days.

Throughout the work there occur statements about the weather, for which the authority should be given; whether, for example, they are founded on statistical investigation or upon long personal experience. On pages 100 and 101 appear Abercromby's conventionalized diagrams of cyclone and anticyclone, which now ought to be banished from the text-books as effete. In the pioneer days, when isobaric configurations were first being studied, they served a useful purpose as broadly delineating the weather conditions appropriate to opposed types of atmospheric circulation. But apart from the wide variability in the character of individual depressions Abercromby's idealized cyclone appears faulty in the fuller light of modern knowledge, and should be replaced by Bjerknes's representation. Abercromby's diagram does not even suggest that the most persistent rainfall occurs generally with the easterly winds on the northern side of an ordinary eastward-moving system. L.C.W.B.

Obituary.

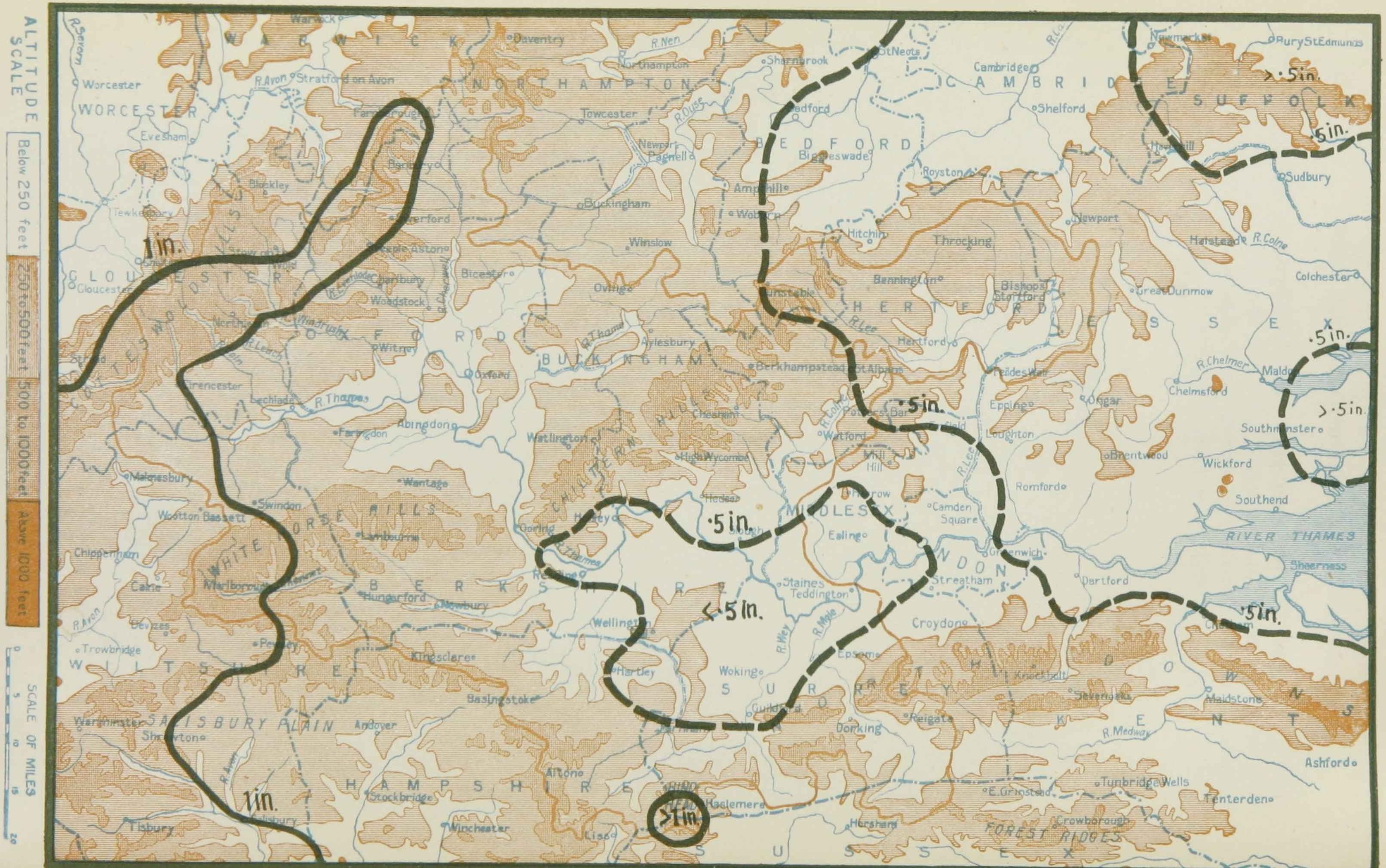
WE learn, with deep regret, of the death, after a short illness, of *Mr. John Robert Gethin Jones*, of Llandudno. Mr. Gethin Jones's occasional contributions to scientific literature betray a wide knowledge of general meteorology and a keen insight into weather phenomena among the Welsh hills. His experience as a rainfall Observer was unparalleled, at any rate, in the British Isles. For twelve years he supervised observations at numerous remote spots in the mountains, in the Snowdon district, observations which throw valuable light on the control exercised by the configuration of the land. A still more arduous task was the measurement of the rainfall and stream-flow in the Black Mountains in Breconshire, on which he was engaged for about seven years, during which period daily observations were made over a wide area. His devotion to nature made him an inspiring companion as well as a reliable guide in scientific matters. The letter printed on p. 27 shews how his interest in Meteorology was maintained to the end of his life.

News in Brief.

The Meteorology of the Weddell Sea.—Meteorologists will be interested to know that Mr. R. C. Mossman, F.R.S.E., has undertaken the reduction of the meteorological data collected during the last Shackleton Antarctic Expedition, in co-operation with Mr. L. D. A. Hussey, B.Sc., Meteorologist to the Expedition. It is unfortunate that the autographic records went down with the *Endurance*, as they would have been useful in the investigation of certain characteristics of the diurnal variation of pressure and temperature, which appear to be peculiar to the Antarctic.

Zone Time.—It is announced that "Zone Time," four hours slow on Greenwich, is to be introduced in the Argentine on April 30th. The 24-hour clock is to be used for all official purposes.

THAMES VALLEY RAINFALL. FEBRUARY, 1920



Watershed of River Thames above Teddington, and River Lee above Feildes Weir

Isohyetals

Weather in the British Isles: February, 1920.

FEBRUARY was characterized by a mean temperature decidedly in excess of the normal, a moderate amount of sunshine, and an absence of the boisterous conditions which prevailed in January.

In its deviation from the normal, the mean temperature for the month was remarkably uniform. The excess ranged from 2°·7 F, in Scotland, West, to 3°·6 F. in England, South-east. No district in any week showed a deficit, and except in Scotland West, every district, in one or other of the first three weeks, exceeded the normal by 3°·6 F. Scotland North reached 5° F. in the first week, England North-west, 5°·2 F., and the Midlands 5°·4 F. in the second week. The mild character of the month was shown by the fact, that, with the exception of Cambridge, which was nearly, and Raunds, which was exactly, at the normal in the week ended February 28th, no station contributing to the Weekly Weather Report had temperature below the normal in any of the four weeks. Only once during the past thirty-four years has so mild a February been recorded at Totland Bay. During the first three weeks, there were very few days when the maximum failed to reach 50°. On the 17th, a temperature of 61° in London was followed by a ground frost at night; next day, temperatures of 60° were general, and 62° was reached at Leamington Spa, Bath, and Aberystwyth, and 63° at Rhyl. On the 19th and 20th, a somewhat sudden change occurred in association with the south-easterly passage of a trough of low pressure off our north-western coasts. This caused the warm southerly current to be replaced by cold northerly winds, with a rapid decrease of temperature, and in the Midlands there were falls of snow and sleet. At Kew Observatory the maximum fell 15°, from 58° on the 19th to 43° on the 20th. At Meltham (Yorks.), the highest maximum temperature (61°) for at least forty-three years was followed twenty-six hours later by snow, which, between 16 h. and midnight of the 19th, had fallen to a depth of 7 inches. The Observer at Raunds (Northants.) speaks of passing from "Spring to mid-winter in twenty-four hours."

Sunshine, though mostly below the average during the second week, was in most places slightly above the normal for the month. The difference varied from a deficit of 0·75 hr. per day in Scotland North, and 0·18 hr. per day in Ireland North, to an excess of 0·55 hr. per day in Scotland East and England East, and 0·63 hr. per day in England North-east. During the month there were several occasions on which the day's sunshine amount reached 7·0 hr. Over 8 hrs. was recorded along the south coast, on the 7th (Hastings, 8·5 hrs.), as much as 9·0 hrs. on the 17th (Hastings, 9·3 hrs.), while on the 22nd, Penzance had 10·0 hrs., an amount very little short of the maximum for the time of year. A correspondent mentions the spring-like character of this same day, the 22nd, at Cambridge, when the sun shone from a cloudless sky all day, and the river was full of boats.

For the first few days of the month, there was a strong current of air from W.S.W. across the country, and the wind reached gale force in Scotland. The strength was estimated as Force 10 on the Beaufort Scale at Lerwick, on the 3rd and 4th. Gales also occurred in many parts of the kingdom between the 9th and 11th. Precipitation was abnormally heavy in Scotland, North and West, during these days, 30 mm. being measured at Eskdalemuir and at Glasgow on the 9th, and no less than 103 mm. at Fort William on the 9th and 10th together.

Over the south and east of England there was considerable deficiency of rain, large areas in the Thames Valley having less than ·50 in. More than

Continued on p. 36.

Rainfall Table for February, 1920.

STATION.	COUNTY.	Aver. 1875—1909.	1920		Per cent. of Av.	Max. in 24 hours		No. of Days
		in.	in.	mm.		in.	Date	
Camden Square	*London*	1·66	·58	15	35	·24	20	11
Tenterden	*Kent*	1·90	·59	15	31	·18	20	14
Arundel (Patching)	*Sussex*	2·17	·70	18	32	·31	10	9
Fordingbridge (Oaklands)	*Hampshire*	2·34	·89	23	38	·17	10	20
Oxford (Magdalen College)	*Oxfordshire*	1·62	·68	17	42	·34	20	11
Wellingborough	*Northampt'n*	1·70	·82	21	48	·36	20	11
Hawkedon Rectory	*Suffolk*	1·55	·74	19	48	·42	20	14
Norwich (Eaton)	*Norfolk*	1·75	·73	18	42	·29	20	13
Launceston (Polapit Tamar)	*Devon*	2·95	1·06	27	36	·19	10	17
Lyme Regis (Rousdon)	,,	2·50	·50	13	20	·11	20	11
Ross (Birchlea)	*Herefordshire*	2·12	·67	17	32	·23	19	16
Church Stretton (Wolstaston)	*Shropshire*	2·17	2·40	61	111	1·11	19	12
Boston	*Lincoln*	1·53	·83	21	54	·39	20	11
Worksop (Hodsock Priory)	*Nottingham*	1·64	2·12	54	129	1·69	19	17
Mickleover Manor	*Derbyshire*	1·71	2·39	61	140	·88	19	13
Southport (Hesketh Park)	*Lancashire*	2·07	2·12	54	102	·67	19	17
Wetherby (Ribston Hall)	*York, W.R.*	1·71	1·80	46	105	·50	19	8
Hull (Pearson Park)	,, *E.R.*	1·78	1·51	38	85	1·07	19	13
Newcastle (Town Moor)	*North'land*	1·63	·98	25	60	·54	19	9
Borrowdale (Seathwaite)	*Cumberland*	10·96	14·50	368	132	..	..	..
Cardiff (Ely)	*Glamorgan*	3·07	1·62	41	53	·32	9	21
Haverfordwest	*Pembroke*	3·42	2·12	54	62	·64	19	18
Birmingham ww. Tyrmynydd	*Radnor*	5·16	4·18	106	81	1·09	9	18
Llandudno	*Carnarvon*	2·11	2·56	65	121	·91	19	16
Dumfries (Cargen)	*Kirkcudbrt.*	3·42	4·38	111	128	1·04	9	19
Marchmont House	*Berwick*	2·15	2·26	57	105	·56	18	12
Girvan (Pinmore)	*Ayr*	3·87	4·20	107	109	·60	9*	19
Glasgow (Queen's Park)	*Renfrew*	2·70	5·19	132	192	1·52	9	18
Islay (Eallabus)	*Argyll*	3·91	5·16	131	132	·93	9	22
Mull (Quinish)	,,	4·45	6·58	167	148	·71	8	23
Loch Dhu	*Perth*	6·69	15·45	392	231	2·95	9	19
Dundee (Eastern Necropolis)	*Forfar*	1·91	1·81	46	95	·52	18	14
Braemar	*Aberdeen*	2·55	3·14	80	123	·58	12	15
Aberdeen (Cranford)	,,	2·36	1·23	31	52	·35	18	13
Gordon Castle	*Moray*	1·95	1·74	44	89	·79	18	14
Drumnadrochit	*Inverness*	2·89	5·86	149	203	·79	9	23
Fort William	,,	6·85	19·11	485	279	3·20	9	24
Loch Torridon (Bendamph)	*Ross*	7·53	14·07	357	187	1·74	1	23
Stornoway	,,	4·19	7·44	189	178	1·26	17	24
Dunrobin Castle	*Sutherland*	2·58	2·25	57	87	·50	10†	10
Wick	*Caithness*	2·23	2·36	60	106	·28	2	19
Glanmire (Lota Lodge)	*Cork*	3·76	1·76	45	47	·28	16	21
Killarney (District Asylum)	*Kerry*	4·99	3·01	76	60	·61	16	25
Waterford (Brook Lodge)	*Waterford*	3·18	1·86	47	58	·43	25	18
Nenagh (Castle Lough)	*Tipperary*	2·89	3·61	92	125	·96	17	20
Ennistymon House	*Clare*	3·44	4·52	115	131	·75	9	21
Gorey (Courtown House)	*Wexford*	2·75	1·61	41	59	·28	25	17
Abbey Leix (Blandsfort)	*Queen's Co.*	2·55	2·68	68	105	·62	9	18
Dublin (FitzWilliam Square)	*Dublin*	1·93	1·85	47	96	·34	3	15
Mullingar (Belvedere)	*Westmeath*	2·67	2·76	70	103	·50	19	21
Woodlawn	*Galway*	2·80	3·04	77	109	·51	9	19
Crossmolina (Enniscoe)	*Mayo*	4·20	5·92	150	141	1·09	2	23
Collooney (Markree Obsy.)	*Sligo*	3·20	3·17	80	99	·50	9	20
Seaforde	*Down*	2·81	2·15	55	77	·62	18	16
Ballymena (Harryville)	*Antrim*	2·99	2·74	70	92	·42	18	19
Omagh (Edenfel)	*Tyrone*	2·68	3·64	92	136	1·18	9	22

Supplementary Rainfall, February, 1920.

Div.	STATION.	RAIN. in.	RAIN. mm.	Div.	STATION.	RAIN. in.	RAIN. mm.
II.	Ramsgate	·60	15	XII.	Langholm, Drove Rd.	6·04	153
,,	Sevenoaks, Speldhurst	·58	15	XIII.	Selkirk, Hangingshaw	2·47	63
,,	Hailsham	·50	13	,,	North Berwick Res.	1·67	42
,,	Totland B. Aston Ho.	·41	10	,,	Edinburgh, Royal Ob.	2·40	61
,,	Ashley, Old Manor Ho.	·92	23	XIV.	Biggar	3·88	99
,,	Grayshott	·83	21	,,	Leadhills	7·41	188
,,	Ufton Nervet	·71	18	,,	Maybole, Knockdon	6·20	157
III.	Harrow Weald, Hill Ho.	·49	12	XV.	Rothesay	6·20	157
,,	Pitsford, Sedgebrook	·51	13	,,	Oban	8·23	209
,,	Chatteris, The Priory	·49	12	,,	Inveraray Castle	14·72	374
IV.	Elsenham, Gaunts End	·47	12	,,	Holy Loch, Ardnadam	11·83	300
,,	Lexden, Hill House	·35	9	XVI.	Loch Venachar	10·10	256
,,	Aylsham, Rippon Hall	·73	18	,,	Glenquey	7·10	180
,,	Swaffham	·69	18	,,	Loch Rannoch, Dall.	8·08	205
V.	Devizes, Highclere	·97	25	,,	Coupar Angus	1·97	50
,,	Weymouth	·44	11	,,	Montrose Asylum	1·27	32
,,	Ashburton, Druid Ho.	1·38	35	XVII.	Balmoral Castle	2·07	53
,,	Cullompton	·80	20	,,	Fyvie Castle	·99	25
,,	Lynmouth, Rock Ho.	1·86	47	,,	Peterhead, Forehill	..	..
,,	Hartland Abbey	1·17	30	,,	Grantown-on-Spey	2·28	58
,,	St. Austell, Trevarna	1·10	28	XVIII.	Cluny Castle	6·87	174
,,	North Cadbury Rec.	1·05	27	,,	Loch Quoich, Loan	29·80	757
VI.	Clifton, Stoke Bishop	1·86	47	,,	Skye, Dunvegan	11·06	281
,,	Ledbury, Underdown	·56	14	,,	Fortrose	3·11	79
,,	Shifnal, Hatton Grange	1·53	39	,,	Ardross Castle	4·91	125
,,	Ashbourne, Mayfield	2·89	73	,,	Glencarron Lodge	15·00	381
,,	Barnt Green	·63	16	XIX.	Tongue Manse	4·68	119
,,	Blockley, Upton Wold	1·20	30	,,	Melvich	3·10	79
VII.	Grantham, Saltersford	1·22	31	,,	Loch More, Achfary	12·13	308
,,	Louth, Westgate	2·09	53	XX.	Dunmanway Rectory	3·73	95
,,	Mansfield, West Bank	2·30	58	,,	Mitchelstown Castle	2·63	67
VIII.	Nantwich, Dorfold Hall	3·19	81	,,	Gearahameen	·58	15
,,	Bolton, Queen's Park	3·90	99	,,	Darrynane Abbey	2·82	72
,,	Lancaster, Strathspey	2·78	71	,,	Clonmel, Bruce Villa	2·15	55
IX.	Wath-upon-Dearne	1·89	48	,,	Cashel, Ballinamona	2·28	58
,,	Bradford, Lister Park	2·88	73	,,	Roscrea, Timoney Pk.	2·30	58
,,	West Witton	2·00	51	,,	Foynes	3·30	84
,,	Scarborough, Scalby	1·35	34	,,	Broadford, Hurdlesto'n	3·82	97
,,	Ingleby Greenhow	·91	23	XXI.	Kilkenny Castle	1·87	48
,,	Mickleton	3·40	86	,,	Rathnew, Clonmannon	1·35	34
X.	Bellingham	2·53	64	,,	Hacketstown Rectory	2·73	69
,,	Ilderton, Lilburn	2·02	51	,,	Ballycumber, Moorock	3·14	80
,,	Orton	8·01	204	,,	Balbriggan, Ardgillan	1·80	46
XI.	Llanfrechfa Grange	1·26	32	,,	Drogheda	1·68	43
,,	Treherbert, Tyn-y-waun	6·23	158	,,	Athlone, Twyford	2·78	71
,,	Carmarthen, The Friary	2·36	60	,,	Castle Forbes Gdns.	2·56	65
,,	Fishguard	1·56	40	XXII.	Ballynahinch Castle	4·78	121
,,	Lampeter, Falcondale	3·22	82	,,	Westport House	3·96	101
,,	Abergwngy	7·25	184	XXIII.	Enniskillen, Portora	2·95	75
,,	Crickhowell, Talymaes	2·10	53	,,	Cootehill, Dartrey	3·06	78
,,	Sennybridge	2·30	58	,,	Armagh Observatory	2·47	63
,,	Lake Vyrnwy	8·21	208	,,	Warrenpoint, Manor Ho.	2·35	60
,,	Llangynhafal, P.Drâw	2·67	68	,,	Belfast, Cave Hill Rd.	2·17	55
,,	Dolgelly, Bryntirion	5·28	134	,,	Glenarm Castle	4·99	127
,,	Lligwy	2·74	70	,,	Londonderry, Creggan	2·61	66
XII.	Stoneykirk, Ardwell Ho.	2·58	66	,,	Sion Mills	2·92	74
,,	Gatehouse, Cally	4·21	107	,,	Milford Manse	3·10	79
,,	Carsphairn, Shiel	7·84	199	,,	Killybegs	5·06	128

Climatological Table for the

STATIONS Those in italics are South of the Equator	Pressure		TEMPERATURE							
	Mean M.S.L.	Diff. from Normal	Absolute				Mean Values			
			Max.	Date	Min.	Date	Max.	Min.	½ max. and min.	Diff. from Normal
	mb.	mb.	° F.		° F.		° F.	° F.	° F.	° F.
London, Kew Obsy. ..	1017·0	+0·2	83·	11	31·	30	65·7	48·6	57·2	+0·1
Gibraltar	1015·9	—0·1	87·0	1	56·1	29	77·9	65·2	71·5	—0·8
Malta	1015·7	—2·2	87·8	16	65·5	25	82·0	70·7	76·3	+0·6
Sierra Leone	1013·6	+1·2	90·0	2,13	58·	17	84·0	62·8	73·4	—5·8
Lagos...............	..	..	86·5	21	70·3	19	81·0	73·3	77·1	—1·0
Kaduna, N. Nigeria ..	*944·2	..	94·	29	64·	16	83·8	66·7	75·3	..
Cape Town	..	..	83·0	17	39·2	12	63·7	47·8	55·7	—2·2
Johannesburg	..	..	86·1	28	31·0	14	70·6	46·0	58·3	—0·9
Mauritius	1018·7	—1·4	80·8	29	58·8	2, 9	77·7	63·0	70·3	+0·3
Bloemfontein	..	..	87·7	28	26·0	7	71·9	40·0	55·9	—3·9
Calcutta, Alipore Obs.	..	..	93·5	21	75·4	7	88·6	78·2	83·4	+0·6
Bombay	..	..	89·3	22	76·2	3	86·2	74·4	80·3	—0·3
Madras	..	..	99·0	1, 2	73·3	16	91·8	76·9	84·3	—0·6
Colombo, Ceylon	..	..	86·9	19	71·6	13	84·9	74·7	79·8	—2·1
Hong Kong	1010·6	+2·1	88·0	7,11	72·7	16	84·7	76·8	80·8	—0·9
Sydney.............	..	..	92·3	27	41·4	8	71·7	51·2	61·5	+2·5
Melbourne...........	..	..	85·0	19	36·0	21	65·6	46·5	56·1	+2·1
Adelaide	..	..	83·7	23	39·4	7	66·0	48·0	57·0	0·0
Perth	..	..	72·3	7	40·9	20	64·3	47·7	56·0	—2·2
Coolgardie	..	..	84·2	21	35·2	11	70·5	43·3	56·9	—1·2
Brisbane	..	..	87·3	14	46·5	9	76·3	55·4	65·9	+0·6
Hobart, Tasmania	..	..	74·9	19	35·1	5	60·2	44·3	52·3	+1·5
Wellington, New Zealand	1011·0	—1·8	65·3	26	31·2	9	57·1	43·8	50·5	—0·9
Suva, Fiji	1017·4	+1·8	89·4	6	62·8	7	78·5	68·5	73·5	—1·0
Kingston, Jamaica ...	1011·2	—0·9	92·8	4	70·1	20	89·9	74·0	81·9	+0·4
Grenada	1008·8	—3·1	88·0	2,10	72·0	16†	85·1	75·1	80·1	—0·1
Toronto	..	..	94·7	8	38·7	18	73·9	53·0	63·5	+2·7
Fredericton..........	..	..	78·7	29	32·0	16	66·4	45·7	56·1	+1·
St. John, N.B.	..	..	75·2	2	39·3	16	62·0	49·2	55·6	—1·1
Victoria, B.C.	..	..	81·4	14	48·0	29	64·9	50·4	57·7	+1·0

* At Station Level, height of 2088 feet. † Also 21 and 23.

London, Kew Observatory.—1 thunderstorm, 6 fogs.

Gibraltar.—3 thunderstorms.

Sierra Leone.—1 thunderstorm, 1 gale.

Mauritius.—Prevailing wind ESE ; mean speed, 5·1 mi./hr.

Bloemfontein.—Severest drought experienced.

Colombo, Ceylon.—Prevailing wind SW ; mean speed, 5·0 mi./hr. ; 3 thunderstorms.

British Empire, September, 1919.

TEMPERATURE				PRECIPITATION						
Mean Values				Amount						
Dew Point ° F.	R'tive. Humidity %	Max. in Sun ° F.	Min. on Grass ° F.	in.	mm.	Diff. from Normal mm.	Days	Mean Cloud Am'nt.	Bright Sunshine Hours per day	STATIONS Those in italics are South of the Equator
50·7	76	133·3	19·6	1·5	37	—11	10	5·2	5·10	London, Kew Observatory.
62·0	74	145·	50·	2·61	66	+29	9	4·2	..	Gibraltar.
..	78	142·	..	0·42	11	—23	1	5·3	8·2	Malta.
71·9	82	..	..	20·81	529	—217	25	5·3	..	Sierra Leone.
71·4	81	160·3	59	2·74	70	—60	11	8·0	..	Lagos.
68·3	86	..	..	11·57	294	+34	24	2·6	..	Kaduna, N. Nigeria.
48·5	75	..	..	3·54	90	+33	14	5·4	..	*Cape Town.*
38·7	61	..	30·2	0·25	6	—18	3	2·8	9·37	*Johannesburg.*
61·0	74	..	52·3	3·24	82	+43	13	5·9	..	*Mauritius.*
35·6	46	..	..	0·44	11	—12	4	2·2	..	*Bloemfontein.*
77·2	84	..	69·1	2·58	66	—197	8	6·7	..	Calcutta, Alipore Obsy.
75·9	84	129·6	68·0	8·16	207	—68	19	6·8	..	Bombay.
75·4	80	164·5	72·2	6·72	171	+40	10	4·9	..	Madras.
73·4	84	161·7	68·9	16·74	425	+288	25	8·3	..	Colombo, Ceylon.
70·7	73	..	..	2·65	67	—187	10	4·7	7·78	Hong Kong.
48·7	58	139·2	31·9	3·98	101	+27	11	3·6	..	*Sydney.*
43·2	60	133·9	25·2	1·05	27	—34	14	5·8	..	*Melbourne.*
47·2	67	137·0	30·3	3·05	77	+27	18	5·2	..	*Adelaide.*
47·6	71	137·6	31·0	2·41	61	—24	14	4·6	..	*Perth.*
40·0	47	141·0	26·8	0·48	12	—5	3	2·8	..	*Coolgardie.*
51·5	59	142·1	35·5	0·19	5	—48	3	2·6	..	*Brisbane.*
39·1	57	132·2	28·1	1·19	30	—24	15	6·0	..	*Hobart, Tasmania.*
43·4	77	135·0	23·0	1·96	50	—49	12	6·5	5·65	*Wellington, New Zealand.*
67·7	82	..	..	11·36	289	+119	18	7·2	..	*Suva, Fiji.*
72·2	70	..	..	1·95	50	—54	10	5·6	..	Kingston, Jamaica.
73·6	80	138·0	..	11·05	281	+81	22	4·7	..	Grenada.
52·6	80	128·3	33·7	1·91	49	—23	10	5·1	..	Toronto.
47·9	75	..	..	5·16	131	+41	11	5·9	..	Fredericton.
49·7	82	133·8	31·0	4·81	122	+30	16	6·9	..	St. John, N.B.
52·0	74	131·5	35·0	1·35	34	—9	8	3·5	..	Victoria, B.C.

HONG KONG.—Prevailing wind E by S; mean speed, 9·7 mi./hr.

Sydney.—Highest maximum on record in September.

Melbourne.—Drought severe. Highest maximum on record in September for 63 years.

Brisbane.—Rainfall continuously seriously deficient.

Wellington.—3 sunless days, 1 thunderstorm; snow on hilltops on 2nd.

GRENADA.—4 thunderstorms.

3 inches occurred on the Pennines, and in the west, and also over the whole of Scotland except coast strips in the south and east. Part of the Lake District of the Scottish Highlands had more than 15 inches, a considerable area having more than double the average. In Ireland the fall ranged from rather less than 2 inches along the south and east coasts to 6 inches in the extreme west. The general rainfall expressed as a percentage of the average was :—England and Wales, 77 ; Scotland, 164 ; Ireland, 89 ; British Isles, 112.

In London (Camden Square) the mean temperature was 43°·0, or 3°·3 above the average, it being the third successive month with an excess of more than 3°. Duration of rainfall, 22·5 hours. Evaporation, ·24 in.

Weather Abroad: February, 1920.

In western Europe the rainy and stormy weather of January continued during the month, though with less severity. The heaviest rains occurred in association with a depression which passed from Portugal to the Mediterranean. At Perpignan, on the north side of its path, 25 mm. and 48 mm. of rain were measured for consecutive days, the 19th and 20th. Floods were subsequently reported at many places in the south of France. High temperatures occurred on the Continent, as in the British Isles, on the 17th , when the maximum at Strasbourg was as high as 69° F. Phenomenal rain fell at Madeira on the 25th and 26th, the total fall of 48 hours being 213 mm., or 8·5 in.

In the near East, in S. Russia, Greece and Egypt, and especially in Palestine, cold and stormy conditions prevailed. In Jerusalem no less than 39 inches of snow fell on the 13th, the heaviest snowfall since 1860, and under the influence of a high wind the snow accumulated in drifts, causing much damage. As a record of this event, a photograph shewing soldiers knee-deep in snow, in a street in Jerusalem, has been reproduced by the *Graphic.*

In Australia, the welcome rains continued, and early in the month the serious drought which had been prevalent in South Africa, was broken by copious falls.

The most remarkable conditions of the month were in North America. On the first day of the month a shallow depression appeared off the south of Florida ; this depression passed north-eastwards along the coast, deepening rapidly, and on the 6th, it was off New York. On this day the severe weather experienced in the north-eastern States during January culminated in one of the greatest snow blizzards ever recorded there. The snow fell with a north-easterly gale, which extended far out into the Atlantic. Transport, both passenger and goods, was rendered impossible. The New York summer resorts suffered severely, especially Coney Island, which was almost destroyed. In New York it proved impossible to clear the streets for nearly a fortnight. Boston, Buffalo, and other cities were similarly snow-bound. It must be remarked, however, that the mean temperature of this period was not below the normal for February, which is about 30° F. In the St. Lawrence Gulf, heavy ice-fields still held the steamship *Montcalm,* while in Canada, heavy snows and continuous cold (for twelve weeks no temperature above freezing point had been reported) caused great inconvenience.