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THE GEOGRAPHICAL DISTRIBUTION OF RAINFALL IN THE BRITISH ISLES.

During January and February Dr. H. R. Mill delivered at the request of the Council of the Royal Geographical Society, a course of six lectures on the Geographical Distribution of Rainfall in the British Isles. The course was well attended and at the end, a party was conducted over the headquarters of the British Rainfall Organization at Camden Square, where the whole process of dealing with rainfall returns was explained and illustrated. The following is a brief summary of the lectures.

Lecture I.—In considering the geographical distribution of any condition over a given area, the first essential is a clear view of the position and configuration of the area in question. The importance of the position of the British Isles from the point of view of climatology and especially of rainfall, lies in its relation to the continent on the east, and the ocean on the west in the track of the prevailing south-westerly winds which blow from ocean to continent, carrying warmth and wetness to the land they first encounter. Ireland standing well to the west of the larger island and thus enjoying more of the oceanic climate is remarkably open to the sweep of the wind. The central plain is practically continuous, broken only near the edges by the mountain groups of the north-west and the north-east and by the more compact masses of high land which run through the south of the island from south-west towards north-east, forming a fairly continuous highland belt from Kerry to Wicklow. Great Britain shows a more elaborate vertical relief, the great groups of high land being clearly marked off from one another by plains narrower than that of Ireland, but like it stretching in most cases from sea to sea. In order from north to south the lofty land-masses include the Highlands and the Southern Uplands of Scotland, each filling nearly the whole breadth of the country and separated by the Lowland Plain with its lines of low ridges and abrupt bosses of volcanic rocks. Lying as Scotland does on the whole to the west as well as to the north of England and Wales it possesses distinct differences in climatic character from South Britain. The southern and larger part of Great Britain may be best divided into a Western and an Eastern

Division. The Western comprises the separate highland masses of (1) The Lake District, (2) The Pennine Chain, (3) Wales and (4) the western horn of Cornwall and Devon. These four groups of elevations are separated by low plains over which the rivers taking their rise in the high ground pass to the sea. The Eastern Division is in the main, a plain traversed by long ridges of low hills of well-marked individuality radiating from near the Bristol Channel to the north-east and east. The line commencing with the Cotteswold Hills stretches, now higher, now lower to the moors of the North Riding of Yorkshire. The next line, including the White Horse Downs and the Chiltern Hills, though broken by the flat of the Fenland, rises again in the Wolds of Lincolnshire and the East Riding of Yorkshire, while the third line runs broadly through Salisbury Plain and splits into the curved sweeps of the North Downs and the South Downs with the Forest Ridges between them, each of the members of the system being defined and separated from the others by narrrow plains. The river-systems of the country emphasize the divisions of the plain which bounds the masses of high ground and serve as the most natural units of surface for the discussion of rainfall data. Taken as a whole the vertical relief of the land is the effective agent in directing the action of wind and all climatic conditions arising from the effect of aspect and shelter.

Lecture II.—Before bringing into relation the land and the rain it is necessary to consider the character and causes of the latter. The term *rain* for purposes of measurement includes all forms of condensation of water from the atmosphere, not merely the fall of liquid drops. The principal agent for the transformation of solar radiation into work is water, which evaporated from the surface of the hydrosphere ascends as vapour, and is condensed and precipitated whenever it reaches a height where the temperature is below the point of saturation, and where appropriate nuclei are present upon which condensation of water can take place. These nuclei are usually considered to be supplied by dust, but it is now suggested that the part may be played by electrons also. While it is the lowering of the temperature of air which produces condensation of the aqueous vapour into water, the most usual cause of fall of temperature in masses of air is the ascent of the air, either by expansion due to heat, or release of pressure, or by wind blowing along the slope of a land surface; ascending air may thus be looked upon as practically the only cause of rain. When condensation takes place in minute globules, the friction exercised by the air causes them to fall so slowly that they often appear to float as clouds; but the apparent stability of a cloud is frequently an optical effect, due to the formation of fresh cloud above and the simultaneous evaporation of the water globules below, when they fall into air which is not saturated. In a cloud formed in saturated air the globules have an opportunity to run together, and fall in drops, which sometimes attain a considerable size. In a cyclonic system, and still more in a whirlwind, there is a rapid ascensional movement of air, and those conditions are consequently associated with excessive precipitation; electrification also plays an important part in the production of torrential rainfall. The magnitude of rain as a working power in nature can only be realized when one remembers that all the water of every river is merely rain on its way back to the sea, whence it came.

Lecture III.—The method of measuring rainfall is very simple; but many small precautions have gradually been discovered to be necessary in order to secure satisfactory results, and thus it happens that there are few good records of rainfall of any great length. Christopher Wren designed, in 1662, the earliest rain gauge which has been described; but the first known record was begun at Paris, in 1668, and the second at Townley Hall, near Burnley, in 1677. Very few records exist before the commencement of the nineteenth century, and our comprehensive knowledge of the distribution of rain over the British Isles may be said to have started in 1860, when the late Mr. G. J. Symons initiated the British Rainfall Organization, and in 1861 published 507 records for the year. The work of this Organization is still carried on in Mr. Symons's old house, 62, Camden Square, London, but now it deals with the records of 4500 stations every year. Experiments were made in the early days to determine the best form of instrument and the best method of observation, and the outcome was to establish the use of the Snowdon pattern of rain gauge, 5 inches in diameter, or the Meteorological Office pattern, 8 inches in diameter (the two differ only in size), set with the receiving surface one foot above the ground, read once daily at 9 a.m., and recorded to the date of the commencement of the 24 hours to which the reading refers. Elevation above the surface of the ground or exposure to strong wind causes a loss in the catch of the rain, on account of ascending eddies formed round the instrument, and various sheltering devices have been employed in very exposed places to counteract this effect. Rainfall observers in the British Isles belong to all classes of society, and for the most part they do the work voluntarily on account of its interest to themselves, the efforts of the Rainfall Organization—which, unlike the state-supported rainfall services of all other countries, is a private and self-supporting body—being mainly (1) to collect the records and publish them in the annual volumes of *British Rainfall*; (2) to encourage accuracy and regularity in observers, and (3) as far as is practicable to endeavour to enlist the aid of new observers in the large areas where as yet there are no rain gauges. New records are urgently wanted in all parts of Ireland, and of the Scottish Highlands, but also in many parts of England, such as Northumberland, the East and North Ridings of Yorkshire, in the west of Wales, and in general in all places more than 500 feet above the sea.

Lecture IV.—The first essential in mapping rainfall is to make sure of the accuracy of the individual records on which the map is based. It is a rule to which the longest experience offers no exception that rainfall varies gradually from point to point. The gradation may sometimes be very gentle, sometimes almost abrupt, but whatever the period may be for which the rainfall is plotted, an erroneous figure stands out with manifest discordance. A map is thus a valuable means of detecting errors which may usually be corrected by enquiry or by comparison with neighbouring records. The distribution of rainfall may be delineated by means of isohyetal lines similar to isotherms or isobars, and the areas of maximum rainfall may be brought into prominence by the use of deepening tints of colour. The general rainfall or mean depth of rain over a particular area is best obtained by measuring the area between successive isohyets, multiplying each area by the mean rainfall of the zone, adding all such volumes together and dividing by the total area. In this way the difficulty of irregularly distributed stations, which would falsify an arithmetical mean, is practically overcome. In the case of mapping the rainfall of a single day, which is very often the rainfall of the natural unit, a shower, the most important precaution is to make sure all the observations used were made at the same hour and entered to the same date. This can be done much more readily in the case of heavy than in the case of light rains. The area enclosed by an agreed-upon isohyet to represent the superficial extent of a shower, may conveniently be referred to as a *splash*, and such splashes are very sharply defined in the case of thunderstorm rains, or the rain accompanying a line squall. But when the rain accompanies, or is produced by a moving depression of the familiar cyclonic type, the result is a series of confluent splashes which forms a belt across the country, and may be comprehensively termed a *smear*. The smear as a rule lies mainly to the left of the track of a depression. A heavy shower may dominate the rainfall of a month, but in the course of a year the inequality due to any one shower ceases to appear. The peculiarity of heavy showers due to meteorological causes, such as a thunderstorm, a squall, or a cyclone, is that they depend upon the condition of the air alone, and may fall with equal intensity in any part of the country, on a mountain, on a plain or over the sea ; the configuration of the land seems to exercise no contrôl upon them.

Lecture V.—While the rain of a heavy shower shows no trace in its distribution of any effect of configuration or of the elevation of the land, the total rainfall of a year, whether it be relatively a dry year or a wet one, shows so complete a congruence with the configuration that there can be no doubt as to the relation of cause and effect. The highest annual rainfall is always in the neighbourhood of the highest land, the lowest is always on the low and level plains. An average rainfall map isolates the high land as areas of high rainfall with nearly the same precision as a map coloured for elevation. The Highlands of Scotland, the Southern Uplands, the Lake District, the Pennine Chain, Wales, the western horn of Cornwall and Devon, and the mountains of Ireland, all stand out as wet areas, and even the gentle hills of the Eastern Division of England are seen to be wetter than the surrounding plains. It appears probable that after deducting from the annual total the heavy rains due to meteorological causes there remains the bulk of the rain which must be assigned to geographical causes, and which is in all probability produced by the cooling of the air consequent on the uplift of the wind blowing over ascending slopes. This very reasonable deduction has not yet been rigidly proved, because it is exceedingly difficult and laborious to separate into meteorological and geographical showers, the rainfall for a number of stations, sufficient to allow a map of any particular year to be drawn.

The dependence of rainfall on configuration, which is apparent in the rainfall map of any year, is much more marked when the average rainfall of many years is considered. The making of an average rainfall map is beset by special difficulties. The length of the period is important because the total rainfall of one year varies greatly from that of another; and speaking generally the wettest year may amount to 150 per cent., and the driest to 65 per cent. of the average, and even a period of ten years may be much in excess or much in defect of the average of a longer period. The rainfall record maintained at Camden Square shows an average of 25·0 inches for 50 years; but the five consecutive decades from its commencement gave averages of 25·5, 25·5, 27·0, 24·0 and 23·5 respectively, the wettest individual year (1903) was 38·10 in., and the driest (1864) 16·93 in. A period of 35 years is the shortest time which can yield a really satisfactory average rainfall in the British Isles and probably the rainfall of one period of 35 years does not differ from that of any other by more than 2 per cent. As it is imposible to make a map from the small number of 35 years' records which exist, it is necessary to apply a correction to the means of shorter records so as to allow for the relative dryness or wetness of the years they comprise. Reinforced by such computed data the long records suffice for the compilation of a very satisfactory rainfall map of the British Isles; but the labour, or in other words the expense, of doing so would be very considerable. The best way of making a true average rainfall map is to prepare a map of the rainfall of each year since records were sufficiently numerous and then to combine these by some mechanical method so as to produce a map on which every individual yearly total would receive due weight. The preparation of annual maps from the current year back to 1870, or perhaps to 1865, is now in progress.

Lecture VI.—Average rainfall maps of many small districts have been prepared by the method of correcting the shorter records to their equivalent averages for 35 years, and such maps of counties have been published on a small scale in the Geological Survey's "Water Supply Memoirs" for Lincolnshire, Suffolk, and the East Riding of Yorkshire, while they are in preparation for Northamptonshire, Bedfordshire, Kent, Sussex, Oxfordshire, and Hampshire. In the case of some counties the number of observing stations is so great that it has been possible to plot the data on maps of the large scale of 2 miles to an inch. The result has been to show that the relation of average rainfall to configuration is astonishingly close, and to prove that in bare patches for which no records are available the contour lines of elevation may be taken as guides for the most probable run of the isohyets. The relation is nevertheless not altogether a simple one, as it involves altitude, slope and exposure to the prevailing wind. It is found for instance, that while the rainfall gradually increases with altitude on the slope facing the prevailing wind, this increase continues for a short but variable distance down the leeward slope, the suggesting being that the wind, forced to rise by the slope of the ground towards the summit, continues to ascend for a short distance after the summit is passed, and drops the maximum rainfall from the point where it attains its greatest height. The economic aspects of rainfall were referred to, and attention was called to the damage done by floods and torrential falls, the influence of rainfall in agriculture, the rapidly increasing importance of the question of water supply for consumption in towns and for the generation of electrical power. The problem of water supply was shown to be one of national and not of merely local importance, and it was in its main lines a geographical question which ought to be dealt with in a far more comprehensive way than the public yet realized.

Some curious effects of rainfall on architecture and on processes of agriculture were pointed out and illustrated, as were all the points in the lectures, by lantern slides.

NOTES ON SOME GREAT FROSTS IN RECENT WINTERS.

By L. C. W. Bonacina.

The public mind of our country, to judge from many sections of the daily press which is its mirror, is quite keenly interested, personally if not scientifically, in the weather of the passing moment, but has an incredibly short-lived and inaccurate memory for that of the past. Now the weather, in virtue of the very evanescence of its interesting and beautiful phenomena, is evidently meant to be remembered, and the least we as rational creatures permitted to behold it can do for the weather as we see it in all its infinite variety from day to day, month to month, and year to year, is surely to take such an intelligent interest in it that we may remember its more important features with as much accuracy as many other events of the past; for just as every man or woman, or if you like, phase of humanity, is in his or her individuality the product of a vast number of causes operating through ancestry, so every phase of weather that passes before our eyes depends in its existence and intensity upon antecedent phases in such a way that we may legitimately say that the kind of weather which prevailed, for instance, during the battle of Hastings is connected with, and in a sense responsible for, the precise intensity and type of weather of this present moment. Yet it cannot rain, nor snow, nor freeze, nor become warm with more than usual intensity but there appear on the morrow in certain sections of the London press all sorts of exaggerated, or altogether untrue, statements as to its being the wettest, coldest or hottest day for many years, when in as many cases as not it is only necessary to go back a single year to find the same phenomenon repeated with similar or greater intensity. Such erroneous comparisons do not, of course, affect the meteorologist; but they are harmful to intelligent or sometimes even intellectual persons who do not make a special study of meteorology, and who consequently cannot be expected to be weather-wise to the extent of remembering accurately the conditions of the past, by causing them to acquire an altogether false impression of the climate of their own country.

Thus, after a somewhat severe frost in the early part of January, 1908, one was everywhere confronted by newspaper placards announcing in large letters, red and sensational, "coldest day for 20 years"; when, in point of fact, to go by the Greenwich Observatory records, it was the sharpest night frost in the neighbourhood of the metropolis for five years since February, 1902, but not, as I believe, the coldest *day* since that time. In order to protest against this piece of utterly false newspaper information, I resolved, with the permission of the editor, to use the authority of the *Meteorological Magazine* as being the only monthly meteorological organ in the United Kingdom, for making a short review of severe frosts from 1890 up to the present winter. The period embraces nearly twenty years, and my personal recollection of general weather conditions extends with distinctness no further back than 1890. All temperatures given below have been carefully ascertained and verified by reference to meteorological records. The Greenwich Observatory observations are used because they are more representative of the temperature conditions—at all events in time of frost—than those of any other metropolitan station, of the south-east of England, and are less affected by the artificial warmth of the large tract of town forming London. All frosts are arbitrarily included in the review and ranked as "severe," during which the air temperature has fallen below 20° F. at Greenwich Observatory. It should be noted, however, that brief spells of very low temperature have sometimes occurred locally in other parts of England, even on the usually mild south coast, in years when no "severe" frost has occurred at Greenwich.

The following are the winters (the table shows the number of months during which temperature fell below 20°):—

Winter of.	Month or Months and Number of Days in each with Temperature below 20° F.	Absolute Minimum in each of the Months.
1889-90	March ; 1	13° F.
1890-91	November ; 1	18° ,,
,, ...	December ; 6	13° ,,
,, ...	January ; 3	12° ,,
1891-92	December ; 3	17° ,,
,, ...	February ; 1....................	19° ,,
1892-93	December ; 1	18° ,,
,, ...	January ; 5	14° ,,
1893-94	January ; 5	13° ,,
1894-95	February ; 11	7° ,,
1899-1900	December ; 1	19° ,,
,, ...	February ; 2..	18° ,,
1901-02	February ; 3.....................	14° ,,
1904-05	January ; 1	19° ,,
1907-08 (up till Jan. 31st) ...	January ; 3	18° ,,

It will be thus seen how feebly the frost of January, 1908, compares, both as regards intensity and persistency, with many others of recent years. The two very hard winters of 1890-91 and 1895 stand out very conspicuously. The two intensely cold months of the period are December, 1890, and February, 1895. December, 1890, had 6 nights below 20° and only 4 slightly above 32°; whilst February, 1895, had 11 nights below 20°, with 2 below 10°, and only 4 slightly above 32°. The absolute maximum shade temperature in December, 1890, was 43°, and in February, 1895, 45°.

December, 1890, formed part of the long period of severe weather remaining unbroken for two months from about November 21st till January 21st; the great frost of February, 1895, began moderately about January 21st and ended very gradually about March 5th. The 1890-91 frost affected only the southern half of Great Britain, whilst that of 1895, during which temperatures below zero were common in the inland parts of England, Ireland and Scotland, prevailed all over the British Isles, even in the Scilly Isles, and was, if anything, more severe in Scotland than in the south of England.

Of other severe frosts during the period under notice, that of the early part of January, 1894, deserves attention for a very low maximum temperature at Greenwich of 19°, with keen east wind and snow on the 5th.

Of the heavy snowstorms affecting more or less large areas that have occurred since 1890, three are very prominent, namely those of (1) March, 1891, (2) February, 1900, (3) December, 1906.

The great blizzard of March 9th and 10th, 1891, proved a suitable termination to one of the most terrible winters for cold and darkness ever known in the south of England, and the herald of a most inclement spring.

This storm, which affected the whole of southern England including London, raged with its greatest fury over the counties of Devon and Cornwall. The snow was dry and powdery and driven by a fierce easterly gale, so that the conditions were almost truly "blizzard." Trains from Paddington were choked for days in Cornwall. In the streets of South Devon seaside resorts like Torquay and Sidmouth, the snow lay a foot deep, whilst on and around Dartmoor the tremendous drifts produced effects which none but eye-witnesses could easily deem credible. (See this Magazine for an account of this storm).

In the first half of February, 1900, snow fell in enormous quantities over the whole of the United Kingdom, especially perhaps in northern England; the amount of snow was described in *British Rainfall, 1900,* as being probably unprecedented for the British Isles. The recent storm of the last week of December, 1906, was especially severe only in the north-east of England, east of Scotland, and north of Ireland. Severe snows, disorganizing traffic and cutting off villages are, however, so common in many parts of Scotland that they do not draw so much attention as when they occur in the south of England.

ROYAL METEOROLOGICAL SOCIETY.

THE March meeting of this Society is always the "popular" night of the session, and the meeting on the 11th ult. was no exception to the rule, for a large audience gathered in the hall of the Institution of Civil Engineers, to hear a lecture on "The Dawn of Meteorology," by Dr. G. Hellmann, the Director of the Royal Prussian Meteorological Institute, and an Honorary Member of the Society, who had been good enough to come from Berlin at the invitation of the Council.

The President, Dr. H. R. Mill, announced the awards which had been made by the Council in connection with the Prize Competition for Teachers (see p. 55). He then introduced the lecturer, and said that Dr. Hellmann's last visit to the Society was when he had been present at the Jubilee celebration of the Society, in 1900, conveying the congratulations of German meteorologists.

Dr. Hellmann began his lecture by saying that meteorology as a science is young, but as a branch of knowledge it is very old, perhaps as old as mankind; indeed, the beginnings of meteorology are to be found at the origin of human civilization. In referring to weather proverbs, he pointed out that it would be wrong to imagine that the rich weather lore found in the Bible, especially in the book of Job, and in the writings of Homer and Hesiod—that is in the writings of the eighth century B.C.—originated then in Palestine or Greece. On the contrary, the familiarity of the people with the sayings and rules concerning the weather, revealed to us by these writings, show clearly that they must be considered as a primeval stock of the culture of the time. There is every reason to believe that the origin of much of modern weather lore can be traced to an Indo-germanic source. Some of the tablets excavated from old Babylon, which have been deciphered by English and German authorities, have been found to contain references to the weather: the lecturer gave several examples.

The Greeks were the first to make regular meteorological observations as far back as the fifth century B.C., and had parapegmata, a kind of weather almanack, fixed on public columns, some of which are still preserved. The Greeks at this early period also used wind-vanes, and in connection with this Dr. Hellmann referred to the "Tower of the Winds," at Athens, which was erected in the first century B.C.

The lecturer next pointed out that the earliest quantitative observations, viz.: the measurement of rain, were found in the first century A.D. These were made in Palestine, and the results of the observations are preserved in the Mishnah. He also made the most interesting statement that the amount of rainfall then considered as normal for a good crop corresponds pretty much with that deduced from modern observations made by Mr. Thomas Chaplin, at Jerusalem; whence it may be inferred that the climate of Palestine has not changed.

After mentioning that meteorology made but little progress among the Romans, Dr. Hellmann proceeded to show that the barbarous state of Europe after the fall of the Occidental Empire was not adapted to the furthering of science, which was barely kept alive within the Christian Church. Yet the pursuit of meteorology never wholly ceased: for the Fathers of the Church writing commentaries on the work of the seven days, often took occasion, when dealing with the first day of the Mosaic creation, to insert long elaborations on the atmosphere and its phenomena. The resuscitations of experimental science in the thirteenth century led to the development of regular meteorological observations in the fourteenth century. The earliest known record of systematic observations of the weather in this country was kept by the Rev. William Merle, at Oxford, from January, 1337, to January, 1344. The MS. is still preserved in the Bodleian Library.

Dr. W. N. Shaw proposed, and Mr. Richard Bentley seconded, a hearty vote of thanks to Dr. Hellmann for his interesting lecture.

Mr. J. E. T. Barbary, Mr. E. H. Brandt, Mr. E. Howarth, F.R.A.S., Mr. A. E. Jones, Mr. W. R. Nash, Dr. A. A. Rambaut, F.R.S., and Mr. G. Penn Simkins, were elected Fellows of the Society.

THE ROYAL METEOROLOGICAL SOCIETY'S ESSAY COMPETITION.

IN response to the offer of three prizes for the best essays on Climate or Weather, treated in a manner adapted for elementary school teaching, no fewer than 180 essays were sent in. These have been carefully examined, and proved to be of such excellence that the Council of the Society resolved to increase the number of prizes, so as to reward various classes of competitors whose work it would have been hardly fair to judge by the same standard. If the purpose of the competition was to stimulate the study of meteorology, and extend the interest taken in the explanation of common phenomena, this decision appears likely to serve it well. We understand that one or more of the essays will be published in the *Quarterly Journal* of the Society. The following is the official list of awards:—

1st prize. *Five pounds.*—W. C. UPSHALL, Broughton, Stockbridge.

2nd prize. *Three pounds.*—Miss A. B. PHILLIPS, 34, Blythe Hill, Catford.

3rd Prize. *Two pounds.*—ALBERT V. STEVENSON, St. Paul's School, Sunderland.

Extra prizes. *One pound each.*—JOHN YOUNG, Barrock School, by Wick. HENRY COLLAR, Lavender Hill School, Clapham Junction.

In addition to the above the following prizes have been awarded for essays sent in by pupil teachers:—

First prize. *One pound.*—ARNOLD B. TINN, 28, Macauley Road, Birkby, Huddersfield.

2nd prize. *Ten shillings.*—Miss DAISY E. JAMES, Church House, Wokingham.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THUNDERSTORMS, APRIL 3rd, 4th and 5th.

A SOMEWHAT unusual phenomenon, in this neighbourhood at least, is the occurrence of a thunderstorm on three consecutive days, but such has been the case during the present month. On the 3rd, heavy thunder clouds (cu.-nim.) came up from W. and N.W., at 1.10 p.m., moving with exceptional rapidity. A sharp thunder squall broke at 1.20 p m., accompanied by several loud claps of thunder and vivid fork lightning of a red and blue colour. The storm passed away in an E. direction, rain of varying intensity falling to 1.30 p.m. Distant rolling thunder was again heard to the E. at 2.10 p.m. The barograph remained steady at 29·90 in.

On the 4th, very massive electrical cu. of a bright pearly white to a coppery hue formed soon after midday. Towards 3.45 p.m., cu.-nim. in extended formation moved up quickly from N.W., travelling towards S.E., but on reaching the zenith, a few minutes before 4 p.m., were deflected in a N.E. direction. A short but sharp thunderstorm broke at 4 p.m., being accompanied by very loud thunder exactly overhead, the interval to fork lightning (colour red) being inappreciable, heavy rain, with some large snowflakes, fell at 4.5 p.m. The barograph reading at 4 p.m. was 29·75 in., when a jump of 0·02 occurred, followed by a fall of 0·05.

On the 5th, the weather was showery to 1.30 p.m., when thunder clouds were again seen forming to N. and N.E., moving up rapidly, a bright flash of sheet lightning was noticed at 1.40 p.m., when a heavy fall of hail commenced. During heavy rain, accompanied by some flakes of snow, distant rolling thunder was heard in S.E. at 1.50 p.m. Barograph steady at 29·78 in.

The latter part of this day was marked by typical thunder rains, occasional hail and snow, with dense blue-black to brown gloom. The outstanding features of all three storms were the low elevation and rapidity of movement of the storm clouds.

SPENCER C. RUSSELL, F.R.Met.Soc.

Epsom, April 5th, 1908.

TEMPERATURE EXTREMES.

I READ with interest, on page 236 of your Magazine for January, the number of days at Slough with shade temperature over 80° F.—with which it is interesting to compare the figures at Totland :—

	Slough.	Totland.		Slough.	Totland.
1898	19	1	1904	14	1
1899	31	2	1905	14	0
1900	23	1	1906	21	1
1901	19	2	1907	0	0
1902	9	0		—	—
1903	6	0		156	8

For the same ten years shade temperature here fell below 20° F., as follows :

1898 ... 1907.
0. 0. 0. 0. 0. 0. 0. 0. 0. 0. = 0.

for the preceding ten years :

1888 ... 1897.
0. 0. 1. 2. 0. 0. 2. 5. 0. 0. = 10.

Could you give us some midland station, say, Slough or Oxford, for contrast of cold?

JOHN DOVER.

Aston House, Totland Bay, Isle of Wight.

THE CLIMATE OF PENZANCE.

THE climate of Penzance (where I now write) has some interesting points of contrast to that of Greenwich One might ask to what extent Londoners benefit as regards escape from winter cold by coming to the "Cornish Riviera." I find the average number of frost days here to be about *eight*, against *fifty-four* at Greenwich. Sometimes there are none (*e.g.*, the winter 1897-8).

A comparison day by day of the Penzance minima in December to March, 1906-7 with those for Greenwich shows the former to be higher by about 7° on the average. In one case (in January) the difference rose to 18°·7, and one day only (25th February) Penzance had a *lower* minimum than Greenwich (37°·0 against 40°·1).

The rainfall (average 40·1 in. for 1887-1907) culminates in December, and is least in June (Greenwich, October and February or March).

The rise of temperature in spring in the Cornish Riviera is more gradual than in Greenwich. Thus, taking Mr. Bayard's figures (of mean temperature) for Falmouth, we have:—

	Falmouth.	Rise.		Greenwich.	Rise.
	°	°		°	°
January	42·6			38·5	
February	43·7	+1·1	......	39·5	+1·0
March	44·6	+0·9	......	41·7	+2·2
April	49·0	+4·4	......	47·2	+5·5
May	52·7	+3·7	......	53·1	+5·9

Greenwich is warmer than Falmouth in May, June, July and August.

My thanks are due to Mr. A. C. Benn, F.R.Met.Soc, for access to his excellent record.

A. B. M.

Tregenna House, Penzance, 1st Feb., 1908.

METEOROLOGICAL NEWS AND NOTES.

THE CONFERENCE OF METEOROLOGISTS of the British Empire, originally intended to meet at Ottawa in the month of May, has been postponed to July.

THE RAINFALL OF THE THAMES VALLEY in March, which is the subject of the map inserted in the present number, proved to be very interesting and characteristic. The high rainfall, it will be observed, corresponds closely to the high land, while the lowest rainfall occurs in the Thames estuary. The distribution of rain is very similar to that which prevails in an average year.

MESSRS. NEGRETTI AND ZAMBRA have issued a new catalogue of rain gauges, in which we are pleased to note that due prominence is given to the deep rimmed patterns, which can alone be looked upon as trustworthy instruments for common use.

Messrs. Casella & Co. have introduced a new coloured liquid for minimum thermometers which is sufficiently transparent to allow the index to be read with the same ease as when colourless alcohol is used, while the intense light red tint of the liquid makes it much easier to see that the instrument is properly set and that no portion of the alcohol column is detached. The colouring matter is, so far as we can judge, permanent.

THE WEATHER OF MARCH.

By Fred. J. Brodie.

The seasonal division of the year into four quarterly periods affords a convenient working arrangement for the statistician, but is not always held in respect by the forces of nature. With the close of February meteorological custom has decreed that winter should come to an end. March is, however, sometimes as vigorous as any of the three preceding months—this year it was actually colder than February. The origin of last month's cold is not far to seek. In the winter time a wind from south-west is the only one which may be relied upon to produce a spell of warmth much in excess of the normal. The same thing holds good in the early springtime, and the general coldness of last month may be attributed to the fact that on five days only out of the thirty-one was a south-westerly breeze experienced over any considerable portion of the United Kingdom. On each of those occasions the thermometer rose above the average, the greatest warmth occurring on the 8th or on the 23rd or 24th. On the earlier date the shade maxima were above 55° in many parts of England and also in the south of Ireland; at Hereford the thermometer reached 59°, while at Raunds (in Northamptonshire) it touched 61°. On the later occasion the warmth was more general, shade temperatures of 55° and upwards being recorded at many places situated in all but the extreme northern parts of the country, and a reading of 61° at Cromer, Norwich and Geldeston.

At other times in the month the winds were most commonly from some polar quarter, and at rather frequent intervals sharp touches of frost were experienced in nearly all districts. The lowest temperatures of all were experienced between the 1st and the 5th, when the sheltered thermometer fell below 20° at many places in the northern and central parts of Great Britain, and reached a minimum of 10° at Balmoral and 16° at Newton Rigg (Cumberland). On the surface of the grass the readings about this time were as low as 4° at Balmoral, 11° at Newton Rigg, and 17° at Buxton and Crathes. After this the sharpest frosts occurred in the third week—mostly between the 15th and 17th or between the 19th and 21st. At one or other of those times the thermometer again fell below 20° at several places in the eastern parts of Great Britain. In the screen a reading as low as 18° was registered at Balmoral, and a reading of 19° at Cambridge; while on the grass the thermometer fell to 14° at Crathes and 15° at Balmoral, Rauceby, Cambridge and Greenwich. Each touch of cold was accompanied by falls of snow or sleet, and at the commencement of the month a considerable depth was reported in several parts of our northern and central districts.

The most important feature in the weather of the month was, however, not so much the occasional presence of sharp frost, as the general absence of spring-like warmth. At the London Observing Station of the Meteorological Office in St. James's Park the thermometer never rose above 57°. In 1901, and in 1883, the highest March temperature was only 55°, and in 1900 and 1888 only 56°, but in every other year back to 1871 the absolute maximum of the present year was exceeded. In the north the conditions were equally inclement. At Leith the mean of all the maximum temperatures for the month was the lowest observed in March since the year 1888, or with that exception since 1883. Over the United Kingdom as a whole the March of 1883 was the coldest on record.

REVIEW.

Konstant auftretende secundäre Maxima und Minima in dem jährlichen Verlauf der meteorologischer Erscheimungen. Von Dr. Van Rijckevorsel, Dritte und Vierte Abteilung. Rotterdam, 1907.

This pamphlet dealing with observations for many years, from places scattered all over the globe, is divided into two parts; the one discussing atmospheric pressure, and the other rainfall, and is a sequel to a previous one discussing temperature. It shows the form of the curves of the minor variations of pressure and rainfall for each hemisphere and for the whole earth. The rainfall curves of January and July for the tropical portion of the northern hemisphere, and for the extra-tropical portion, show not only a much greater mean rainfall within the tropics, but also that the maxima and minima or the minor variations during these months are more sharply pronounced than in the temperate latitudes. The ratio is approximately 1·25; and is probably the same for the southern hemisphere. The rainfall curve for the northern hemisphere agrees with the temperature curve better in the winter than in the summer months, but there is no such correspondence between the rainfall and pressure curves. L.C.W.B.

RAINFALL TABLE FOR MARCH, 1908.

STATION.	COUNTY.	Lat. N. ° ′	Long. W. [*E.] ° ′	Height above Sea. ft.	RAINFALL OF MONTH. Aver. 1870-99. in.	RAINFALL OF MONTH. 1908. in.
Camden Square	*London*	51 32	0 8	111	1·62	2·37
Tenterden	*Kent*	51 4	*0 41	190	1·89	2·16
West Dean	*Hampshire*	51 3	1 38	137	1·79	3·31
Hartley Wintney	,,	51 18	0 53	222	1·77	3·27
Hitchin	*Hertfordshire*	51 57	0 17	238	1·53	2·80
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	1·62	2·63
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	1·64	2·01
Brundall	*Norfolk*	52 37	*1 26	66	1·65	2·56
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	2·41	3·51
Torquay (Cary Green)	*Devon*	50 28	3 32	12	2·45	3·13
Polapit Tamar [Launceston]	,,	50 40	4 22	315	2·41	5·05
Bath	*Somerset*	51 23	2 21	67	1·94	2·72
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	1·86	3·38
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	2·01	3·37
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	1·75	2·66
Boston	*Lincolnshire*	52 58	0 1	25	1·36	2·17
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	1·55	2·80
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	1·49	2·72
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	2·88	3·66
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	1·85	3·82
Arncliffe Vicarage	,, ,,	54 8	2 6	732	5·03	6·34
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	1·79	2·17
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	2·10	3·37
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	10·51	11·57
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	2·79	3·11
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	3·03	4·86
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	2·93	4·01
Llandudno	*Carnarvon*	53 20	3 50	72	1·97	2·27
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	3·01	5·31
Hawick (Branxholm)	*Roxburgh*	55 24	2 51	457	2·55	4·67
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	...	3·07
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	3·47	5·85
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	2·33	4·03
Tighnabruaich	*Argyll*	55 55	5 14	50	4·36	7·47
Mull (Quinish)	,,	56 36	6 13	35	4·23	5·90
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	1·92	3·88
Braemar	*Aberdeen*	57 0	3 24	1114	2·42	...
Aberdeen (Cranford)	,,	57 8	2 7	120	2·43	4·09
Cawdor	*Nairn*	57 31	3 57	250	2·16	3·12
Fort Augustus (S. Benedict's)	*E. Inverness*	57 9	4 41	68	3·68	5·05
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	6·38	12·13
Dunrobin Castle	*Sutherland*	57 59	3 56	14	2·47	4·34
Castletown	*Caithness*	58 35	3 23	100	...	2·98
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	4·03	5·97
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	2·55	3·79
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	2·17	3·48
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	2·38	3·58
Dublin (FitzWilliam Square)	*Dublin*	53 21	6 14	54	1·85	2·94
Ballinasloe	*Galway*	53 20	8 15	160	2·45	3·83
Clifden (Kylemore House)	,,	53 32	9 52	105	5·67	7·08
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	3·95	6·74
Collooney (Markree Obsy.)	*Sligo*	54 11	8 27	127	2·99	5·33
Seaforde	*Down*	54 19	5 50	180	2·56	4·84
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	3·06	4·60

RAINFALL TABLE FOR MARCH, 1908—*continued.*

RAINFALL OF MONTH (*con.*)					RAINFALL FROM JAN. 1.				Mean Annual 1870-1899.	STATION.
Diff. from Av. in.	% of Av.	Max. in 24 hours. in.	Date.	No. of Days	Aver. 1870-99. in.	1908. in.	Diff. from Aver. in.	% of Av.	in.	
+ ·75	146	·83	25	18	5·13	5·98	+ ·85	117	25·16	Camden Square
+ ·27	114	·51	5	20	6·10	4·86	—1·24	80	28·36	Tenterden
+1·52	185	·89	3	17	6·74	5·87	— ·87	87	29·93	West Dean
+1·50	185	·51	5	15	6·22	5·93	— ·29	95	27·10	Hartley Wintney
+1·27	183	·89	25	19	4·88	5·41	+ ·53	111	24·66	Hitchin
+1·01	162	·74	25	20	5·40	5·53	+ ·13	102	26·75	Addington
+ ·37	123	·26	1	18	4·89	4·80	— ·09	98	25·39	Westley
+ ·91	155	·35	1	23	4·81	5·54	+ ·73	115	25·40	Brundall
+1·10	146	·71	24	18	9·42	7·38	—2·04	78	39·00	Winterbourne Stpltn.
+ ·68	128	·81	5	19	8·51	6·18	—2·33	73	35·00	Torquay
+2·64	209	·73	30	20	9·12	10·85	+1·73	119	38·85	Polapit Tamar
+ ·78	140	·51	5	19	6·58	5·28	—1·30	80	30·75	Bath
+1·52	182	·75	24	19	6·45	6·04	— ·41	94	29·85	Stroud
+1·36	167	·83	24	21	7·09	6·55	— ·54	92	33·04	Wolstaston
+ ·91	152	·54	24	18	6·08	4·47	—1·61	73	29·21	Coventry
+ ·81	160	·36	25	17	4·50	4·68	+ ·18	104	23·30	Boston
+1·25	181	·72	25	20	4·87	5·23	+ ·36	107	24·70	Hodsock Priory
+1·23	183	·46	24	19	5·10	5·27	+ ·17	103	26·18	Derby
+ ·78	127	·61	7	20	8·93	11·88	+2·95	133	42·43	Bolton
+1·97	206	·77	25	19	5·37	6·77	+1·40	126	26·96	Ribston Hall
+1·31	126	1·02	8	25	16·10	19·00	+2·90	118	60·96	Arncliffe Vic.
+ ·38	121	·26	4, 6	22	5·45	5·70	+ ·25	105	27·02	Hull
+1·27	160	1·03	6	21	5·64	6·58	+ ·94	117	27·99	Newcastle
+1·06	110	1·50	8	21	36·86	37·88	+1·02	103	132·68	Seathwaite
+ ·32	111	·75	24	21	9·77	8·37	—1·40	86	42·81	Cardiff
+1·83	160	1·03	5	18	11·86	10·26	—1·60	87	47·88	Haverfordwest
+1·08	137	1·39	24	18	9·83	12·44	+2·61	126	45·41	Gogerddan
+ ·30	115	·49	24	21	6·51	8·22	+1·71	126	30·98	Llandudno
+2·30	176	1·10	24	12	11·17	13·70	+2·53	123	43·43	Cargen
+2·12	183	·71	30	21	8·36	10·33	+1·97	124	34·80	Branxholm
...	...	1·04	24	22	...	6·20	...	...	...	Edinburgh
+2·38	169	·98	24	24	12·39	15·38	+2·99	124	48·87	Girvan
+1·70	173	·82	24	20	8·11	11·10	+2·99	137	35·80	Glasgow
+3·11	171	1·46	8	17	14·79	20·61	+5·82	140	57·90	Tighnabruaich
+1·67	139	·95	8	19	14·58	16·71	+2·13	115	57·53	Quinish
+1·96	202	1·27	24	20	6·12	6·09	— ·03	100	28·95	Dundee
...	...	...	...	...	8·03	...	...	...	36·07	Braemar
+1·66	168	·61	24	23	7·18	6·94	— ·24	97	33·01	Aberdeen
+ ·96	144	·85	24	14	6·16	8·27	+2·11	134	29·37	Cawdor
+1·37	137	·90	27	17	12·66	15·55	+2·89	123	43·71	Fort Augustus
+5·75	190	1·27	1	25	21·90	34·30	+12·40	156	86·50	Bendamph
+1·87	175	1·16	24	17	7·48	12·76	+5·28	171	31·60	Dunrobin Castle
...	...	·89	24	21	...	10·44	...	...	...	Castletown
+1·94	148	·84	30	26	16·04	13·53	—2·51	84	58·11	Killarney
+1·24	149	·75	5	23	9·91	7·84	—2·07	79	39·30	Waterford
+1·31	160	·81	5	24	7·34	8·29	+ ·95	113	33·47	Hurdlestown
+1·20	150	·79	5	22	8·10	8·66	+ ·56	107	35·19	Abbey Leix
+1·09	159	·70	5	22	5·99	6·37	+ ·38	106	27·75	Dublin
+1·38	156	·85	5	24	8·42	9·26	+ ·84	110	37·04	Ballinasloe
+1·41	125	1·25	21	21	19·61	19·79	+ ·18	101	80·23	Kylemore House
+2·79	170	1·37	30	25	12·96	17·72	+4·76	137	50·50	Enniscoe
+2·34	178	·76	30	24	9·44	14·58	+5·14	155	41·83	Markree Obsy.
+2·28	189	1·10	5	24	9·16	10·01	+ ·85	109	38·61	Seaforde
+1·54	150	·59	8	27	9·35	12·06	+2·71	129	41·20	Londonderry

SUPPLEMENTARY RAINFALL, MARCH, 1908.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Warlingham, Redvers Road	3·50	XI.	Rhayader, Tyrmynydd	5·34
,,	Ramsgate	1·90	,,	Lake Vyrnwy	5·98
,,	Steyning	2·53	,,	Llangyhanfal, Plâs Draw	3·89
,,	Hailsham	3·38	,,	Criccieth, Talarvor	3·25
,,	Totland Bay, Aston House	2·98	,,	Llanberis, Pen-y-pass	13·52
,,	Emsworth, Redlands	2·51	,,	Lligwy	2·16
,,	Stockbridge, Ashley	3·85	,,	Douglas, Woodville	3·64
,,	Reading, Calcot Place	2·90	XII.	Stoneykirk, Ardwell House	3·53
III.	Harrow Weald, Hill House.	3·21	,,	Dalry, The Old Garroch	8·01
,,	Oxford, Magdalen College	2·34	,,	Langholm, Drove Road	7·02
,,	Pitsford, Sedgebrook	3·06	,,	Moniaive, Maxwelton House	7·08
,,	Huntingdon, Brampton	2·55	XIII.	N. Esk Reservoir [Penicuick]	4·80
,,	Woburn, Milton Bryant	2·58	XIV.	Maybole, Knockdon Farm	3·99
,,	Wisbech, Bank House	1·68	XV.	Campbeltown, Witchburn	5·63
IV.	Southend Water Works	1·86	,,	Inveraray, Newtown	6·92
,,	Colchester, Lexden	1·66	,,	Ballachulish House	9·84
,,	Newport, The Vicarage	2·36	,,	Islay, Eallabus	5·06
,,	Rendlesham	1·57	XVI.	Dollar Academy	4·59
,,	Swaffham	2·16	,,	Loch Leven Sluice	4·15
,,	Blakeney	2·22	,,	Balquhidder, Stronvar	8·40
V.	Bishops Cannings	...	,,	Perth, Pitcullen House	3·97
,,	Ashburton, Druid House	5·44	,,	Coupar Angus Station	3·41
,,	Honiton, Combe Raleigh	3·88	,,	Blair Atholl	3·93
,,	Okehampton, Oaklands	5·04	,,	Montrose, Sunnyside Asylum	3·30
,,	Hartland Abbey	3·35	XVII.	Alford, Lynturk Manse	3·78
,,	Lynmouth, Rock House	4·46	,,	Keith Station	3·37
,,	Probus, Lamellyn	5·17	XVIII.	N. Uist, Lochmaddy	4·89
,,	North Cadbury Rectory	2·88	,,	Alvey Manse	4·55
VI.	Clifton, Pembroke Road	3·06	,,	Loch Ness, Drumnadrochit.	5·36
,,	Ross, The Graig	3·11	,,	Glencarron Lodge	6·20
,,	Shifnal, Hatton Grange	3·13	,,	Fearn, Lower Pitkerrie	2·25
,,	Blockley, Upton Wold	3·31	XIX.	Invershin	3·78
,,	Worcester, Boughton Park.	2·92	,,	Altnaharra	4·05
VII.	Market Overton	2·73	,,	Bettyhill	3·81
,,	Market Rasen	2·20	XX.	Dunmanway, The Rectory	6·48
,,	Bawtry, Hesley Hall	2·85	,,	Cork	4·00
,,	Buxton, Lismore House	4·05	,,	Darrynane Abbey	6·02
VIII.	Neston, Hinderton Lodge	3·12	,,	Glenam [Clonmel]	3·86
,,	Southport, Hesketh Park	2·49	,,	Ballingarry, Gurteen	3·42
,,	Chatburn, Middlewood	3·47	,,	Miltown Malbay	3·23
,,	Cartmel, Flookburgh	3·48	XXI.	Gorey, Courtown House	3·24
IX.	Langsett Moor, Up. Midhope	4·32	,,	Moynalty, Westland	4·14
,,	Scarborough, Scalby	3·45	,,	Athlone, Twyford	3·21
,,	Ingleby Greenhow	2·87	,,	Mullingar, Belvedere	3·16
,,	Mickleton	3·19	XXII.	Woodlawn	3·96
X.	Bardon Mill, Beltingham	3·68	,,	Westport, St. Helens	5·43
,,	Ewesley, Fallowlees	4·05	,,	Mohill	3·95
,,	Ilderton, Lilburn Cottage	3·94	XXIII.	Enniskillen, Portora	4·14
,,	Keswick, York Bank	5·96	,,	Dartrey [Cootehill]	4·18
XI.	Llanfrechfa Grange	4·23	,,	Warrenpoint, Manor House	4·73
,,	Treherbert, Tyn-y-waun	7·58	,,	Banbridge, Milltown	3·30
,,	Carmarthen, The Friary	4·72	,,	Belfast, Springfield	4·71
,,	Castle Malgwyn [Llechryd].	5·03	,,	Bushmills, Dundarave	4·06
,,	Plynlimon	7·70	,,	Stewartstown, Ballyclog	3·82
,,	Crickhowell, Ffordlas	4·50	,,	Killybegs	5·95
,,	New Radnor, Ednol	4·64	,,	Horn Head	5·00

METEOROLOGICAL NOTES ON MARCH, 1908.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Temp. for Temperature; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; TS for Thunderstorm; R for Rain; H for Hail; S for Snow; F for number of days Frost in Screen; f on Grass.

LONDON, CAMDEN SQUARE.—Much R and S fell in the early part, followed by strong winds from 8th to 11th. Changeable weather, with a good deal of R and low temp. characterised the latter part. Mean temp. 41°·1, or 1°·0 below the average; shade max. 58°·1 on 24th, min. 25°·6 on 15th. F 10, f 22. Duration of sunshine 97·6* hours, and of R 76·4 hours.

TENTERDEN.—Shade max. 58°·0 on 23rd and 24th, min. 27°·5 on 14th and 20th. F 13, f 22.

TOTLAND BAY.—Duration of sunshine 135·5* hours. Shade max. 53°·3 on 23rd, min. 28°·7 on 5th. F 5, f 20.

WEST DEAN.—Cold and rough with heavy S measuring 6¼ in., without drift, and causing much damage to trees and shrubs. Shade max. 54°·0 on 23rd, min. 19°·0 on 5th. F 20, f 24.

TORQUAY.—Duration of sunshine 149·2* hours. Mean temp. 43°·2, or 1°·0 below the average. Shade max. 56°·9 on 23rd, min 29°·2 on 5th. F 2, f 17.

NORTH CADBURY.—Shade max. 58°·0 on 23rd, min. 25°·5 on 5th. F 9, f 21.

CLIFTON.—R on nearly every day to 16th, and S on 4 days. Then dry and frosty till 21st, and afterwards unsettled, with heavy R and some fine intervals. R ·65 in. above the average.

ROSS.—Shade max. 57°·0 on 23rd, min. 25°·0 on 5th. F 12, f 21.

BUXTON.—R ·12 in. above the average of 35 years. Duration of sunshine 77·5* hours. Mean temp. 35°·7, or 2°·8 below the average. Shade max. 50°·8 on 23rd, min. 20°·3 on 5th. F 18, f 26.

BOLTON.—Duration of sunshine 51·0* hours, or 25·1 hours below the average. Mean temp. 38°·2, or 1°·6 below the average. Shade max. 53°·5 on 23rd, min. 28°·4 on 5th.

SOUTHPORT.—Mean temp. 40°·1, or 1°·4 below the average. Duration of sunshine 120* hours, or 11 hours above the average. R ·32 in. above the average. Duration of R 88·2 hours. Shade max. 53°·7 on 27th, min. 25°·0 on 20th.

HULL.—Duration of sunshine 38 hours. Shade max. 58°·0 on 24th, min. 26°·0 on 15th. F 12, f 22.

HAVERFORDWEST.—Cold, wet and stormy. Agricultural operations were well advanced, but vegetation was backward. Duration of sunshine, 124·9* hours. Shade max. 52°·4 on 23rd, min. 24°·1 on 5th. F 9, f 14.

LLANDUDNO.—Cold and wet, with excessive R. Vegetation at a standstill. Shade max. 53°·2 on 8th, min. 28°·2 on 20th.

DOUGLAS.—Persistently wet, often very cold, and exceedingly stormy. The ground was full of water, and gave no chance of a dry seed bed. The outlook was as cheerless as the retrospect.

DUMFRIES.—An exceptionally wet March; 4·03 in. of R fell in last 8 days.

EDINBURGH.—Shade max. 53°·2 on 23rd, min. 28°·5 on 5th. F 7, f 20.

COUPAR ANGUS.—R 60 per cent. above the average. A flood occurred on 24th, when 1·07 in. fell. Mean temp. 37°·2, or 1°·7 below the average. Shade max. 50°·5 on 28th, min. 26°·0 on 13th.

ABERDEEN.—Cold, wet and stormy, with S. and S.W. winds. Spring work very backward. Shade max. 50°·0 on 28th, min. 24°·0 on 20th. F 18.

FORT AUGUSTUS.—Shade max. 52°·4 on 23rd, min. 24°·8 on 21st. F 15.

CASTLETOWN.—Shade max. 52°·0 on 23rd, min. 24°·0 on 15th and 21st. F 19, f 23.

CORK.—R was 1·33 in. above the average, and mean temp. 3°·6 below. Shade max. 52°·0 on 23rd, min. 29°·0 on 2nd. F 9, f 19.

DUBLIN.—Shade max. 57°·0 on 8th, min. 30°·0 on 5th. F 3, f 16.

MARKREE.—Shade max. 54°·1 on 26th, min. 24°·8 on 4th and 26th. F 11, f 26.

* Campbell-Stokes.

Climatological Table for the British Empire, October, 1907.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	68·2	1	37·1	24, 26	59·0	45·0	48·6	91	104·1	32·7	2·52	22	7·8
Malta	90·5	5	57·3	20	77·3	67·8	62·7	74	147·6	...	5·34	7	4·6
Lagos	88·0	25	70·0	2, 8	84·8	73·1	73·8	81	159·0	67·0	8·30	20	7·9
Cape Town	87·5	31	45·0	17	68·6	52·7	49·0	65	...	...	1·20	13	5·5
Durban, Natal ...	83·5	23	52·8	26	74·2	59·7	...	...	141·7	...	4·56	18	6·7
Johannesburg	84·6	23	43·0	6	71·7	49·7	51·7	77	151·8	37·6	2·38	11	3·9
Mauritius	87·8	31	57·2	15	81·1	65·1	61·4	68	148·1	47·2	·67	12	6·5
Calcutta...	93·8	9	64·8	29	90·7	74·2	72·5	74	153·1	59·5	1·06	1	2·4
Bombay...	92·8	29	73·8	31	88·6	77·5	75·5	80	136·2	64·8	·02	1	2·3
Madras	99·3	15	71·4	14	88·6	75·3	73·4	81	145·4	68·9	11·83	16	5·1
Kodaikanal	68·5	19	48·1	28	62·3	51·4	51·0	85	137·6	40·6	6·24	21	7·1
Colombo, Ceylon ...	87·5	20	71·8	10	85·5	75·1	75·1	84	161·1	70·3	14·73	30	6·6
Hongkong	87·1	22	67·7	31	83·4	75·4	72·3	80	141·5	...	8·97	17	6·6
Melbourne	89·3	29	38·3	6	68·0	48·4	42·1	60	144·4	30·6	1·51	9	5·1
Adelaide	97·7	29	41·2	4	72·7	50·8	46·7	57	150·7	38·0	1·71	13	3·7
Coolgardie	92·0	27	37·4	2	77·6	49·8	40·0	44	153·4	34·2	·15	2	2·2
Sydney	90·1	1	49·9	4	72·9	57·5	51·6	62	127·6	39·9	·59	5	4·5
Wellington	63·0	3, 27	38·0	1	57·5	47·1	43·8	73	115·0	27·0	2·79	15	7·0
Auckland	68·0	23	44·0	5	62·0	51·5	47·7	72	128·0	38·0	5·02	18	5·6
Jamaica, Negril Point.	89·9	7	68·9	5	87·4	71·8	72·8	78	...	...	4·25	12	6·5
Trinidad	90·0	sev.	65·0	3, 4	89·3	68·8	75·1	87	160·0	62·0	7·65	13	...
Grenada	89·0	31	74·0	18, 30	87·8	75·4	74·0	80	142·0	...	2·90	15	6·5
Toronto	70·9	3	24·0	26	53·6	36·3	...	...	86·2	17·8	1·98	7	...
Fredericton	67·0	18	17·3	27	51·8	31·9	...	...	...	...	4·15	6	...
St. John's, N.B. ...	60·3	29	27·0	31	52·1	39·2	...	...	...	...	4·19	16	...
Victoria, B.C.	68·0	10	35·5	18	57·7	45·4	...	89	...	...	·73	15	7·0
Dawson	49·0	3	-15·0	16	32·0	19·7	...	...	...	...	4·09	17	6·7

MALTA.—Mean temp. of air 72°·0. Average hours bright sunshine 7·1.

Natal.—R ·10 in. above 30 years' average.

Johannesburg.—Bright sunshine 276·2 hours.

Mauritius.—Mean temp. of air 0°·6 above, of dew point 0°·4 below; relative humidity 2·1 per cent., and R ·88 in., below averages. Mean hourly velocity of wind 10·2 miles, or 1·8 below average.

KODAIKANAL.—Bright sunshine 124 hours.

COLOMBO.—Mean temp. of air 78°·6 or 1°·5 below, of dew point 2°·0 above, and R ·03 in. above, averages. Mean hourly velocity of wind 5·1 miles. TSS on 3 days.

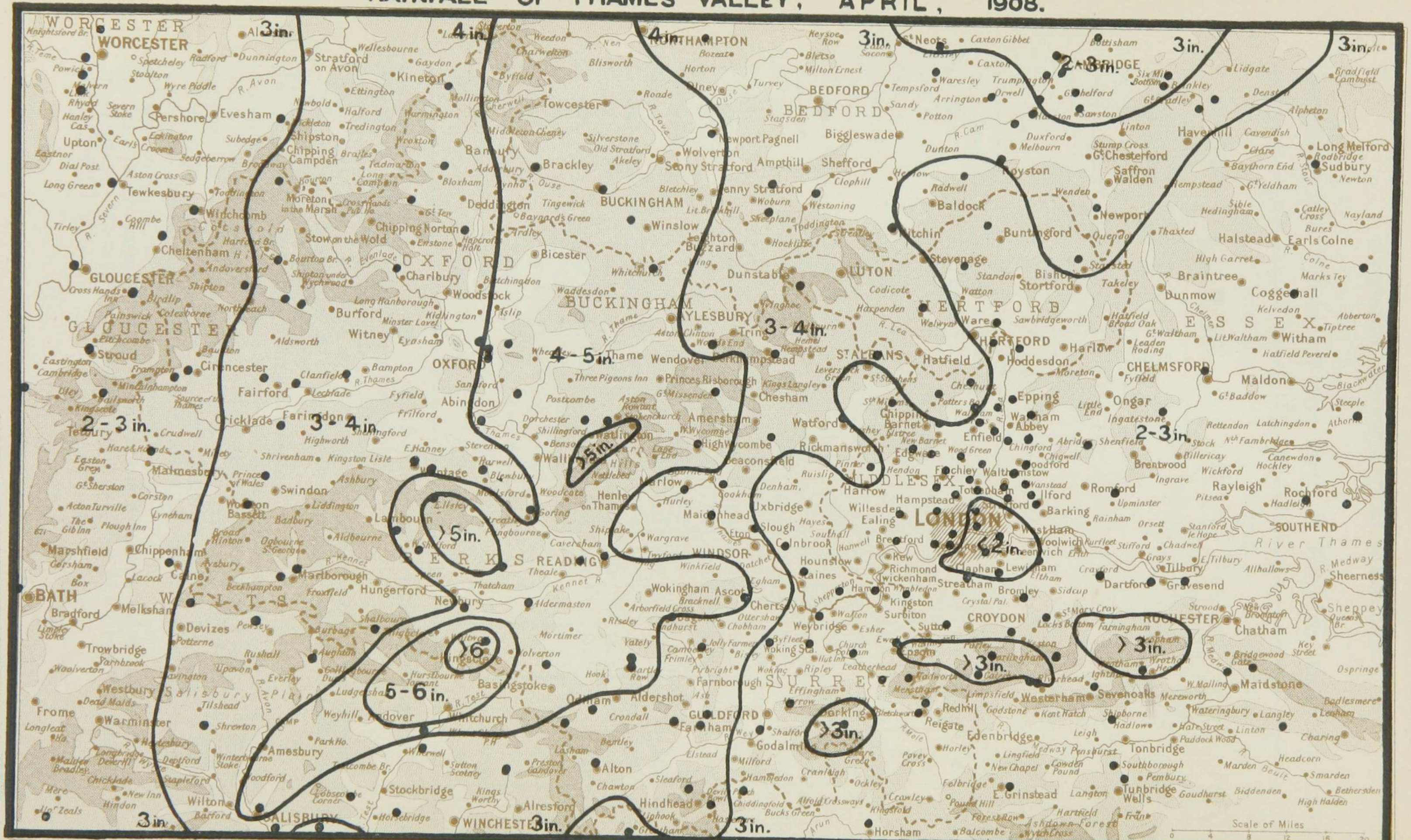
HONGKONG.—Mean temp. of air 79°·0. Bright sunshine 191·2 hours, or 24 hours below average. Mean hourly velocity of wind 13·6 miles. R 4·23 in. above average.

Adelaide.—Mean temp. of air 0°·2 below, R ·05 in. below averages. Bright sunshine 256 hours, or 32 hours above average.

Sydney.—Mean temp. of air 1°·8 above, and R 2·30 in. below averages.

Wellington.—Mean temp. of air 2°·0 below, and R 1·44 in. below averages. Bright sunshine 165·2 hours.

RAINFALL OF THAMES VALLEY, APRIL, 1908.



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