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Georg von Neumayer.

1826—1909.

THE characteristic and beautiful portrait in the frontispiece was to have appeared in this number of the Magazine, in illustration of the article by Mr. Harries, describing a recent visit to Dr. von Neumayer, and it is with the deepest regret that we have to preface that article with this notice. The personality of Dr. Neumayer was exceptionally attractive, his courtesy belonged to the stately manners of a past generation, and lent to the generous kindness of his disposition a gracious dignity which won the hearts of all who met him. It was our good fortune to have known him well, and to have been associated with him in the work of international congresses and scientific meetings in England and in Germany, especially in the furtherance of Antarctic exploration, a subject which engaged him for nearly fifty years, and always lay very near his heart. His efforts in this direction were set out in detail in a volume, "Auf zum Südpol," which is almost an autobiography. We have summarised the narrative in "The Siege of the South Pole," pp. 339-342.

Dr. von Neumayer was a disciple of Maury, and the glamour of the sea was always strong upon him, and has been transmitted to the oceanographers who were in their turn his disciples, foremost amongst them Professor Otto Krümmel, of Kiel, and Professor Gerhard Schott, of Hamburg. Dr. Neumayer paid a special visit to London in 1898, in order to take part in a great meeting at the Royal Society to advocate the resumption of Antarctic exploration, and on many other occasions he visited this country in connection with his magnetic researches and his meteorological work.

When Mr. Harries sent us his article about six months ago, we submitted a proof to Dr. von Neumayer, and his long silence suggested that his wonderfully maintained health had begun to give way; but he wrote returning it after revision on April 14th, though saying it was hardly to his taste to see himself praised and appreciated so highly in his lifetime. He explained the long delay in these words:—

"The article reached me, unfortunately, at a time when I was suffering from a severe attack of a bronchial nature, which shortly afterwards was followed by the illness of my sister, with whom I have

been living next door for many years. At the commencement of the year my dear sister died, and left me quite isolated and depressed. Again, my former illness set in, and even at the present moment I am far from being well." He died on May 24th universally mourned.

Dr. von Neumayer was unmarried, and devoted himself to his scientific work and to unobtrusive charity. At the time of the last severe outbreak of cholera in Hamburg he returned there from a holiday, in order by his presence to give confidence to the employes at the observatory, and to assist in commending sanitary precautions amongst the poor. He told us how in one street, in the poorer quarter of the city, through which he had to pass daily, he induced the people to fit wire screens to their windows and doors to exclude flies, which he regarded as the chief carriers of infection, and not a single case of cholera occurred in the houses so protected.

A VISIT TO DR. VON NEUMAYER.

By HENRY HARRIES.

DURING the Jubilee Meeting of the German Meteorological Society, at Hamburg, last October, one revered name was on every lip—the Wirkliche Geheimer Rat Excellenz Professor Dr. von Neumayer, or in the English equivalent, His Excellency the Right Honourable George Balthasar von Neumayer. Not only had he for many years been the successful Director of the Deutsche Seewarte, but he had been instrumental in organising the Society itself, having been elected its first President in November, 1883. To the great regret of everybody, however, he was not present in person at the special celebration of the twenty-fifth anniversary of the Society in the city of its birth, but his spirit exercised a magic influence on the assembly. It was obvious from the repeated references to him in various speeches by his successor at the Seewarte, Admiral Herz, by the President of the Society, by the Burgomaster of Hamburg, and others, that Dr. von Neumayer was a Grand Old Man of the Fatherland, honoured by the Emperor, idolised by meteorologists, and held in the highest esteem by the Senate and the citizens of Hamburg, where he laboured so long to render meteorology of real practical utility to navigators.

For more than a score of years I have been familiar with this great personality. When, therefore, the meeting of the Society came to a close, and the train bore me southward on a long journey to the Taunus and the Rheingau, I regarded it as a pleasurable duty to devote a day to travel still further south, into the heart of the Bavarian Palatinate, to pay my respects to Dr. von Neumayer in his retirement, at Neustadt in the Haardt. The partiality which his Excellency shows for this neighbourhood is easily explained. Not far from Neustadt, at Kirchheimbolanden, Georg Balthasar Neumayer first saw the light on June 21st, 1826, and during his

long career he has often visited, and has sometimes resided for years, amongst the scenes of his childhood's days. Now he has returned there to enjoy the calm restful evening of life. "Time's rude hand," has dealt very gently with him. Notwithstanding his fourscore and three years, he is still hale and hearty. The leonine, Beethoven-like features, and the flowing locks of days long, long ago, have not departed,—they are still there, adding, if it were possible, increased dignity to the noble aspect of the venerable figure. All of us who have known him personally will appreciate the opinion of him in the early years of his career, expressed by one of the Royal Society's cloak-room attendants. Throughout his life his one weakness has been his throat, so that, summer and winter, he wears a "muffler" out of doors. On one of his visits to London he attended a *Conversazione* of the Royal Society. On arrival at the Society's rooms he divested himself of all the usual encumbrances, excepting the muffler, which he forgot to remove, and strode majestically into the reception room. While in the act of being presented to the President, he was greeted by Dr. Sharpey with—"I must do a kind service to you; you have still your yellow wrap round your throat!" After the meeting was over he asked the attendant why he had not taken off the wrap with the other things. "Well, sir," replied the man, "I did not like to say anything, I thought you were some great foreign prince!" That was the Neumayer of a former generation—it is also the Neumayer of to-day.

Still vivacious and of vigorous intellect he plied me with questions on all topics of interest—the Hamburg meeting, the welfare of numbers of English men of science known to him either personally or by repute, the future of meteorology in view of wireless telegraphy and the study of the upper regions of the atmosphere, and other matters. Then followed an inspection of the treasures of the establishment. First was a large portfolio containing series of sketches depicting scenes or incidents in his long life, presented to him on his seventieth birthday. A sketch of Kirchheimbolanden, his birth-place, and of the house there, in which he was born, naturally came first. After his student days at Munich, he was desirous of gaining a practical acquaintance with maritime observations and nautical astronomy, and he therefore undertook a voyage to South America when he was twenty-four years old. Then he went to Trieste to enter the Imperial Navy as practical navigator and hydrographer, but left there for Hamburg, in 1851. He had, however, developed a love for the sea, and in the following year he sailed for the Southern ocean again, returning in 1854. Two years later he could not resist the call of Australia, and in 1857 he succeeded in organising at Melbourne, the Flagstaff Observatory for the study of magnetical and meteorological problems. Here he worked hard, and to this day he prides himself, and justly so, on his magnetic survey of Victoria. Laden with information he, in 1864, boarded the famous Aberdeen clipper "Garrawald" and sailed for England, where the nature of his

work brought him into contact with Sir Edward Sabine and other distinguished men of science. Returning to his native Palatinate, he spent about five years working up the Melbourne records, and the authorities at Berlin recognising the value of his researches promoted him to the post of Hydrographer to the Navy, in 1872; and he became Director of the Seewarte at Hamburg in 1876. On attaining the age of three score years and ten he desired to be relieved of his duties, but the Imperial authorities would not hear of his retirement until 1903, when he was nearing the close of his 77th year. It was from this long and varied record that Dr. von Neumayer's friends at Hamburg selected scenes for illustration, life at home, at sea, in Australia, at College, at work, and in authority—an interesting series indicating the immense changes that have taken place in the world within the span of a single life.

But these are not the only reminders of the past by which he lays great store. The residence is decorated with numerous other pictures and works of art of interest to men of science. A few only need be mentioned to afford a general idea of the whole. There is an oil painting of Sir William Herschell, a life-size photograph of Buys Ballot (head and shoulders), medallions of Dove (by Blaeser) and Donders, a bronze statue of Gauss (a reduced copy of the great monument by Schaper at Brunswick), and scenes in Victoria, one of the Mount Kosciusko region, with the Neumayer magnetic survey party in the foreground.

When the inspection of these and other treasures was over, my host was ready to take me for a walk to see the neighbourhood—"up the hill at the back of the town, so as to have the best view." It was a beautifully fine day, with the sun shining bright and warm from a cloudless sky, so that we proceeded at a very leisurely pace. My host was in excellent spirits, and soon showed that age has in no way affected his memory, for he not only spoke about many English and other scientific worthies whom he has known, but he also discussed the writings of modern workers, for he keeps himself in touch with the progress of the science of to-day by studying the latest publications.

The recital of anecdotes of personal experiences in Australia and elsewhere carried us away, so that we were oblivious of the passage of time. The day had waned, the sun had set, and it became necessary for me to part from my genial and delightful friend to catch the last train going northward, his last words being, "Greetings to all my friends and acquaintances in England."



ROYAL METEOROLOGICAL SOCIETY.

THE first of the afternoon meetings of this Society for the present session, was held in the Society's Rooms, 70, Victoria Street, Westminster, on Wednesday, May 19th, Mr. H. Mellish, President, in the chair.

Colonel H. E. Rawson, C.B., read a paper on "The Anticyclonic Belt of the northern hemisphere." In a previous communication the author brought forward some facts regarding the anticyclonic belt of the southern hemisphere, derived from an examination of the South African records from the year 1841 to 1906. He found that the indications of a cyclical oscillation of the belt to and from the equator over South Africa were strong enough to encourage the belief that an analysis of Australian records on the one side, and of Argentine records on the other, would prove that all the action centres of the atmosphere were moving together over this wide area, and that a similar oscillation existed in the northern hemisphere. Colonel Rawson subsequently found that investigations of Mr. H. C. Russell and Dr. W. J. S. Lockyer supported his conclusion that there is a period of about 9·5 years between the greatest north and greatest south position of the anticyclonic belt in the southern hemisphere, the double oscillation thus taking 19 years. He has since extended the enquiry into the movements of the action centres in the northern hemisphere, with a view to ascertaining whether they show any similar oscillation to and from the equator, which is not to be explained by seasonal changes of position. Dealing with the Nile floods, he draws the inference that the high-pressure systems which affect North-east Africa, are farther north when the floods are in excess, and nearer to Egypt when they are deficient. He has also made an analysis of the tracks of the hurricanes which passed north and south of Manila Observatory, and found that these throw an interesting light upon the oscillations of the action-centres of the atmosphere.

Captain M. W. C. Hepworth said that the positions north and south of the anticyclones of the great oceans had doubtless a great effect in determining the paths of depressions, travelling eastward across the adjacent land areas, which were responsible for a good deal of the weather experienced there. He thought however that the oscillations east and west would have as great, and perhaps a greater, effect on the conditions in those areas than the oscillations north and south.

Dr. W. J. S. Lockyer said that at the Solar Physics Observatory they had discovered a short period pressure variation of about 4 years, India representing one type, and Cordoba the reverse type; they called it a short period barometric see-saw. Australia and India went together, and were opposed to Cordoba. When all the short period changes were eliminated, they obtained longer variations. He had expected to find the long period variations for India and Australia alike, but such was not the case, Australia showed a 19 years' variation, South America indicated also a 19 year change inverse in

form to the Australian one, but the epochs of maxima and minima did not coincide.

Dr. W. N. Shaw, Capt. D. Wilson-Barker, and the President, also took part in the discussion.

Colonel Rawson, in reply, said that if they examined charts of the ocean currents of the southern hemisphere they would find that winds were blowing for such length of time over a distinct area, that the normal ocean currents were modified and in some cases reversed. He was of opinion that the permanent systems squeezed out from themselves the travelling anticyclones, which went on to feed the adjoining system. Latitude must not be neglected when looking for evidences of the 19 year cycle.

A paper by Mr. A. Walter, of the Royal Alfred Observatory, Mauritius, on "Errors of Estimation in Thermometric Observations," was read by the Secretary. In examining the returns from a newly inaugurated series of second-order meteorological stations in Mauritius, it was noticed that a large percentage of the thermometer readings were in whole or half degrees. This led the author to analyse the returns, and he gave in the paper the frequency curves of the various tenths recorded by observers, showing how certain fractions in subdividing a degree on the thermometer scale came more often than others, though, in fact, the mercury must in a long series of observations have stood an equal number of times at each tenth.

Mr. W. W. Bryant, Mr. W. Marriott, Mr. R. G. K. Lempfert and Mr. R. Inwards took part in the discussion.

The following gentlemen were elected Fellows of the Society:—Mr. J. C. Carson, Capt. R. P. Craven, Lieut. E. J. Headlam, F.R.G.S., and Mr. A. O. Lees.

THE WEATHER OF MAY, 1909.

By FRED. J. BRODIE.

LAST month opened with as cheerless a specimen of a May Day as could well be imagined. With a current of air pouring down in an unbroken stream from the Arctic Sea, the thermometer over a large portion of the United Kingdom failed to rise within 10° of its normal level, the wintry temperature being accompanied in many places by showers of hail, sleet or snow. During the ensuing night (that of the 1st—2nd) a sharp frost occurred in west, northern and central districts, the thermometer in the screen falling to between 5° and 8° below the freezing point. On the surface of the grass as many as 12° of frost were registered in several localities, and as far south even as Greenwich. At Burnley the exposed thermometer sank to a minimum of 19° , and at West Linton to 18° , while at Llangammarch Wells it went as low as 14° .

After this inauspicious start an anticyclone spread in from the Atlantic, and from the 2nd to about the 10th a spell of exceptionally

RAINFALL OF THAMES VALLEY,
MAY, 1909.



Watershed of River Thames above Teddington, and River Lee above Felldes Weir.

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fine weather was experienced. Over the country as a whole the amount of bright sunshine registered during the week ending the 8th was as large as in any calendar week since the general establishment of recording instruments in 1881, and at most places in the south and east of England it was quite the largest. Owing, however, to the prevalence of winds from some easterly quarter, the shade temperatures registered about this time were not particularly high, few places reporting maxima appreciably above 70° . Along our east coasts, where the air flowed in from the cold surface waters of the North Sea, the thermometer, in fact, seldom reached 60° , and was often not much above 55° . In all districts the clearness of the atmosphere was favourable for the progress of brisk nocturnal radiation, and, although no very sharp frosts were recorded, the minimum readings were generally low, and the daily range of temperature consequently large.

One of the most constant phenomena in our very variable climate is the appearance of a spell of cold weather about the second week in May. The month under review acted in this respect quite in accordance with precedent, and after about the 11th a harsh wind from the northward set in, the polar current being accompanied in all districts by much cloud, and on the 13th and 14th by showers of sleet and snow, which found their way, in the form of a few fleeting flakes, as far south as Rothamsted and London. Between the 13th and 16th the thermometer in many parts of the Kingdom failed to reach 50° , the night temperatures being in several places well below the freezing point. In the screen, readings as low as 22° were recorded at West Linton, and 24° at Balmoral, Poltalloch and Cally (Kirkcudbright); while on the surface of the ground the thermometer fell to 20° or less in many northern and central parts of Great Britain, to 17° at West Linton and Birmingham (Edgbaston), and to 13° at Llangammarch Wells.

After the middle of the month the wind, which became for a time rather variable, ultimately got round to south, and with the reappearance of almost continuous sunshine the thermometer rose briskly, the highest temperatures of the month occurring very generally on the 21st and 22nd. In Ireland and Scotland the shade maxima were very little above 70° , but in many parts of England the thermometer rose to 80° or more, a reading of 84° being registered at Greenwich on the 22nd. In the closing week the extension of cyclonic systems from the Atlantic resulted in winds mainly from between west and south, and in somewhat broken weather, considerable falls of rain being experienced in many districts on the 25th. In the south and east of England, however, the showers were interspersed with long intervals of bright sunshine, and over the country generally the thermometer remained at a fairly high level, the shade maxima of the 31st being above 70° in many parts of England and as high as 76° at Greenwich.

The mean temperature of the month differed but little from the average, a slight defect being reported in Scotland, and an equally

small excess in most parts of England and Ireland. The leading feature in the weather was, without doubt, the extraordinary prevalence of bright sunshine over England, and especially over the southern and eastern counties. In the latter districts the total number of hours was by far the largest ever observed in May, and in very many places, including London, it was by far the largest observed in any month of the year back to 1881. At some stations in the Isle of Wight and on the coasts of Hampshire and Sussex slightly over 350 hours were registered, giving a mean for the whole month of rather over 11·14 hours per day. In the early part of June the sunshine recorder, after this very remarkable display of energy decided upon enjoying a brief period of repose, and for five days, beginning with the 2nd, the instrument at Westminster failed to register a single gleam.

RAINFALL AND THE DESIGN OF SEWERS.

A VALUABLE paper bearing on the influence of rainfall on the design of sewers was read before the Society of Engineers at the Royal United Service Institution, on May 3rd, by Mr. C. A. Battiscombe. The author laid special stress upon the capacity of sewerage systems required to adequately cope with storm-waters, and pointed out that, owing to the necessity of allowing for a maximum flow following exceptionally heavy rainfall, no inference could safely be drawn from the average annual precipitation of the locality in question, or upon the average rate of fall per hour, could that be ascertained. Experiments had been carried out with the object of ascertaining the amount of water which might be expected to escape the sewers either by being re-evaporated or by percolation through the soil. The former was considered to be an almost negligible quantity between the commencement of a storm and the dispersal of the water deposited; the absorption requires to be calculated by reference to the proportional areas of permeable and impermeable surface in the area to be drained. The opinion was expressed that the maximum fall of rain which should be considered need not exceed 3·00 in. per hour for a period of twenty minutes, and that, after making due allowance for absorption, sewers need in no case be constructed of dimensions capable of discharging more than that amount of water. Exceptions would have to be made in the case of extreme gradients owing to the increased rate of flow-off under such conditions.

A vigorous discussion followed, in the course of which the author's estimate of the required capacity of drains was challenged as unnecessarily high. It was also urged that any generalization as to the relation of flow to rainfall was exceedingly dangerous owing to the great diversity of conditions presented by different localities. With regard to the heaviest rainfall which might be considered possible in such a short period as an hour, a large number of authenticated instances of rainfalls far in excess of the suggested maximum were

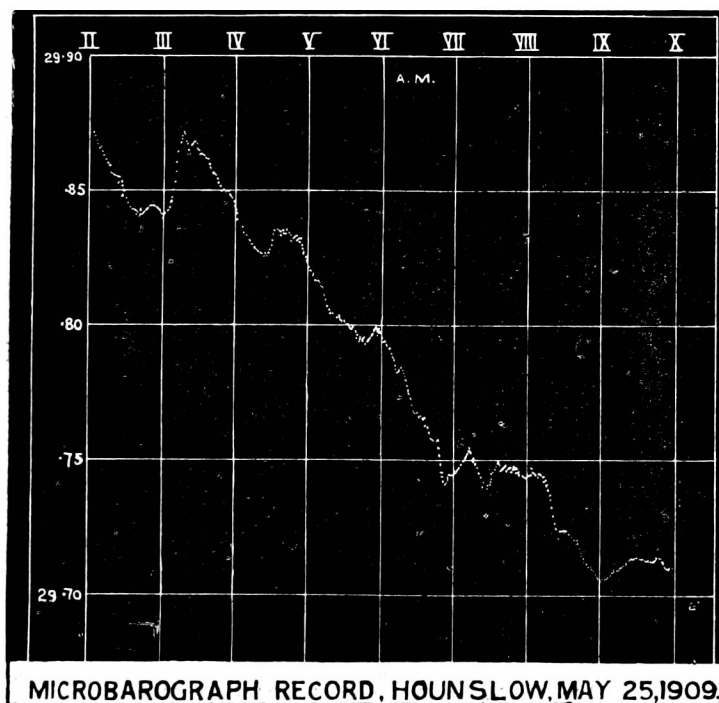
quoted, and it was suggested that much light might be thrown upon the meteorological aspect of this somewhat difficult problem by the detailed study of the accumulated data published each year in *British Rainfall*. Maps of the geographical distribution of thunderstorm rains also have an important bearing on the subject. It was suggested that owing to the small area usually affected by the most intense rainfall in thunderstorms, the size of the drainage area might well be taken into consideration in deciding upon the required capacity, and that this might possibly be safely reduced in the case of very large systems. Emphasis was laid by several speakers upon the extreme desirability of the more extended use of self-recording rain gauges by engineers concerned with the planning of sewerage systems.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

RAPID BAROMETRIC FLUCTUATIONS.

THE accompanying Micro-barograph tracing shows the rapid fluctuations of atmospheric pressure during the heavy rainstorm of Tuesday morning, May 25th. The rapid rise shortly after three o'clock was



coincident with the commencement of the heavy downpour. The trace was obtained from a "Thread-recording" aneroid movement, marking once per minute.

T. J. MURDAY.

Hounslow, May 25th, 1909.

ODOUR FROM THE RAINBOW.

MORE than half a century ago a singular controversy took place in the press regarding the existence of this supposed emanation.

Its occurrence was affirmed on the authority of many writers of the past, *e.g.*, Pliny (Lib. XII., c. 24), Aristotle (Prob. Quest. XII), a Greek writer referred to by Coleridge (in his "Table Talk"), Georgius de Rhodes (in his "Peripatetic Philosophy"), Bacon (in his "Sylva"), Browne (in "Britannia's Pastorals"), and more lately by Robert Snow (in one of his "Poems"); thus showing a belief held in different countries, over many centuries.

Everyone is familiar at a certain season of the year with the increase of scent given by plants and shrubs on a warm evening after the air has been newly washed by rain, and this would *coincide* often with the appearance of a rainbow; but the suggestion of the above authors is that the perfume is actually produced by the rainbow itself. Are any other instances of this belief on record?

Upton, Slough, 18th May, 1909.

RICHARD BENTLEY.

REMARKABLE RECORD OF BRIGHT SUNSHINE.

THE number of hours of bright sunshine registered at the Falmouth Observatory, by the Campbell-Stokes' Bright Sunshine Recorder belonging to the Meteorological Office, during the 22 consecutive days from the 30th April to the 21st May, inclusive, was 262·1, representing a daily average of 11·9 hours. The total is 66 hours in excess of the sunshine of last month—which was itself unusually sunny. The longest duration was 14·4 hours on the 19th, the least 8·5 on the 6th and 15th; only three days had less than 10 hours' sunshine, and 13 more than 12 hours.

WILSON LLOYD FOX.

Falmouth, 24th May, 1909.

[The sunshine of the neighbourhood of London has suffered some neglect on account of the fact that quotations are usually made from some point within the daily influence of smoke. The record kept at Mill Hill, 6 miles north of Camden Square, for the 22 days in question, showed a total of 227·5 hours, an average of 10·3 per day, the longest duration was 13·4 hours on the 19th, the least 3·1 hours on the 17th; 10 days had less than 10 hours sunshine, and 8 more than 12 hours; but trees cut off the sunshine from the recorder at 6.15 p.m., and, but for this, 8 hours more would probably have been recorded in the 22 days.—Ed., *S.M.M.*]

HOT WIND AT LYNMOUTH.

I do not know whether it is anything unusual, but on May 20th we had a very strong *hot* wind here from the south-south-east; so strong that I was told that people could hardly stand at Lynton. The

barometer was falling very slightly, being 30·19 in. at 9 a.m., and 30·06 in. at the same hour on the 21st. I did not hear of any thunderstorms locally afterwards.

Personally I have never felt such a hot wind before.

T. H. MEAD-BRIGGS.

Rock House, Lynmouth, 1st June, 1909.

METEOROLOGICAL NEWS AND NOTES.

MR. E. H. SHACKLETON, who arrived in London on June 14th from his great expedition towards the South Pole, has promised a communication on the meteorological results of his expedition for an early number of this Magazine.

THE ROYAL METEOROLOGICAL SOCIETY is arranging at the forthcoming Show of the Royal Agricultural Society, to be held at Gloucester from June 22nd to 26th, a Meteorological Section in connection with the Agricultural Education Exhibition. Mr. W. Marriott will give an address on "The method of taking Weather Observations," each day, and this will be followed by the ascent of pilot balloons for obtaining records in the upper air. We hope that all rainfall observers and others interested in meteorology who may visit the Show, will make a point of inspecting the Meteorological Section, and of making themselves known to Mr. Marriott or his assistants, who will be happy to explain in detail any matters of special interest.

PROFESSOR FILIP AKERBLOM has been appointed to the vacant directorship of the Meteorological Observatory of Upsala, Sweden.

SNOW ON APRIL⁷ 31ST was reported from stations in all parts of Great Britain and in the north-east of Ireland. At Lynturk in Aberdeenshire the depth was given at three-quarters of an inch.

SPELLING REFORM IN THE UNITED STATES introduces some quaint words, even in the *Monthly Weather Review*, and we need not feel surprised in finding that dissenting meteorological bodies adopt a characteristic orthography. One of these sends us a postcard from Kansas City, which shows its contempt for the Capital by calling itself the "international weather bureau," and amongst other interesting matter assures us "the planet, jupiter, repelling the earth nearer the sun until may 12th will be the warm tendency in spring-time to prevent injury to fruit in general. june will average cool for june weather." But alas there is room for lurking doubt for "except when counter-acted by positions of unknown planets, the above forecasts (based upon grover's new principles, heat, or repulsion, the force of gravitation) will be found to be practically correct."

ON M. ANGOT'S STUDIES ON THE TEMPERATURE OF FRANCE.*

By L. C. W. BONACINA.

THE study made by M. Angot upon the mean temperature of the air in France may be considered analogous to the work accomplished by Dr. Buchan upon the mean temperature of the British Islands. For the production of isothermal maps showing the mean temperature for each of the twelve months of the year, for the whole year, and the range of mean temperature between the hottest and coldest months over the area of France, he has utilized observations made at 148 stations, out of which 58 are in France, 40 in the southern half of Britain, and the remainder in Holland, Belgium, Western Germany and Austria, Switzerland, Northern Italy and Northern Spain. The period covered by the observations is the 50 years 1851-1900; and although comparatively few of the stations have furnished homogeneous observations for the whole period, those with fragmentary records have been reduced to the fifty years by a method involving comparison with the nearest stations possessing complete observations. The rough daily means† of temperature for the building up of monthly and annual means, have been reduced to the true mean of the twenty-four hours by applying a correction depending upon what combination of hours was used at the several stations in making the daily observations. At most of the stations care has been exercised in obtaining a suitable site for installing the thermometers, which are sheltered by a Stevenson screen, or one answering its purpose; but at the stations in the north of Italy the observations were made with thermometers placed outside windows, in the midst of towns, and consequently the readings from that region are for a double reason too high. All the readings for the production of the isothermal maps have been reduced to the level of the sea, and this was also, I believe, the procedure adopted by Dr. Buchan in the case of the British Islands. It is known as the result of diverse observations made in many parts of Europe that the average rate of decrease of temperature with the elevation of the land is, roughly, $0^{\circ}55$ C. per 100 metres, or 1° F. per 300 feet. The rate varies according to the time of year, $0^{\circ}55$ C. per 100 metres representing the mean decrease for the whole year, with a range from $0^{\circ}37$ C. in December, to $0^{\circ}70$ C. in April and May. This law which holds good up to a height of about 500 metres, but becomes uncertain above it, is represented by the expression:—

$$Dt = 0^{\circ}55 + \cdot 15 \sin (m. + 300^{\circ}) + \cdot 05 \sin (2m. + 260^{\circ}).$$

* *Annales du Bureau Central Météorologique de France; Mémoires*, 1903; "Études sur le Climat de la France; Température Moyenne;" par A. Angot.

† *Annales du Bureau Central Météorologique de France; Mémoires*, 1902; "Variation Diurne de la Température," par A. Angot.

where *m.* represents time expressed in angles onwards from the 1st of January, the period of variation, namely the year, being denoted by 360° , and the periods January, January-February, January-February-March, &c., by corresponding angles. On the strength of this law, therefore, corrections of monthly mean temperatures for altitude can be made; and it is not a little remarkable that a relation so precise should be found to exist when one remembers that the temperature gradient varies greatly in individual cases, sometimes becoming inverted and depending not only upon meteorological conditions but also upon the general relief of the land, and the *manner* in which it rises from one contour line to another. The propriety of reducing temperature observations to sea-level is a matter open to much discussion, and is a philosophical question to which it behoves meteorologists to give further consideration. In the first place, the case of temperature is not analogous to that of pressure. The object with which we take daily barometer readings, namely, to understand the distribution of atmospheric pressure with accompanying weather systems, and to deduce forecasts therefrom, necessitates the reduction of the readings to a common level—for convenience, that of the sea. But we study the temperature of the air for climatological purposes; and since altitude as a climatic factor and temperature modifier ranks second in importance only to latitude, it is not surely permissible to correct the recorded temperature of a locality for its altitude. If we make this correction we are really defeating our object, which is to ascertain the actual temperature of the air from *all* causes, not so local in their action as to be devoid of geographical signification. Apparently both Dr. Buchan in Britain, and M. Angot in France, were compelled to reduce temperature readings to sea-level in preparing their isothermal maps, on account of the impossibility of obtaining concurrent isothermal lines on a map, especially in the case of highly mountainous regions, without making this correction, unless there is a far greater number of observing stations than is usually available.


It is clear that to draw isothermal lines corrected for altitude across mountainous tracts like Wales, the Scottish Highlands, or Switzerland, is quite devoid of signification—countries where even the lowest ground is usually far above sea-level. In the case, however, of a comparatively level country like France, with which M. Angot's work is primarily concerned—where there are numerous local inequalities of surface in broad plains, not forming any pronounced system of relief—there is more to be said for the practice of reducing temperature readings to sea-level. Bearing in mind, therefore, that M. Angot's isothermal lines of France and neighbouring countries are to some extent artificial, although probably maintaining the trend and shape of the *natural* isothermal lines, some of the main facts of the distribution of mean temperature in France and neighbouring countries may be here stated. The coldest month of the year is January over all parts of the area considered

except the relatively warm western coasts of France and Britain, where it is February. This indicates that while the lowest mean temperature of the air lags nearly a month behind the winter solstice over the land, it lags nearly two months behind the lowest sun over the sea. In January the mean temperature ranges from about 45° F. on the Riviera, the north-west coast of France and south-west coast of Britain, to about 34° F. over eastern France, 32° F. over western Germany, and 31° F. over parts of the Po valley in northern Italy. In February the area of greatest cold has been transferred from northern Italy northwards to western Germany and eastern France, and the cold in north Italy is very much less severe than in January, showing that while more southern countries often experience severe cold in the *depth* of winter, they are the first to feel the influence of the returning sun in spring. By March the coldest area has shifted to Holland, Belgium and England, the southern half of the latter country forming the northern boundary of the region under discussion. March is the equinoctial month, and the isothermal lines which in January and February ran across France from N.W. to S.E., now run nearly E. and W., indicating that in this month the land becomes as hot as the sea—in other words, that in March the transition from a winter to a summer distribution of temperature takes place. In the northern latitude of Britain, however, the land is still colder than the neighbouring sea. April is the first month with a distinct summer distribution of temperature, the lines across France now running from S.W. to N.E. in the direction of the great land area to the east and north-east of France. England and northern Holland are very conspicuously the coldest region in April. The months of May and June show a steady intensification of the heat of summer, and a more and more marked summer distribution with respect to land and sea. In July—the hottest month of the year—the mean temperature increases rapidly eastward, south-eastward and southward from a little below 60° F. on the south-west coasts of Britain and a little above 60° F. on the north-west coast of France to a maximum of over 75° F. in the plain of northern Italy—the very region which was so cold in January. In August a decided leakage of heat is apparent over the land, but the cool western seaboard stations which were colder in February than in January are a little warmer in August than in July. The retardation of the highest mean air temperature behind the highest sun in June is therefore two months over the sea, but only one month over the land. The equinoctial month of September points to the transition from a summer to a winter distribution of temperature in the middle latitude of France; but in the northern region of England—the first to get cold in autumn and the last to get warm in spring—the land is already distinctly colder than the sea. In October the temperature distribution is quite that of winter, and in November and December a rapid strengthening of the cold of winter takes place.

The fall of temperature between September and October is greater

than the rise between March and April, and represents a greater change than occurs between any other two consecutive months. It may, perhaps, be possible to explain on physical principles why the Earth should lose heat in autumn more rapidly than it gains it in spring, but the causes cannot be discussed in this paper. The map showing the mean annual temperature brings out very clearly the influence of latitude, and the lines run approximately due E. and W. One important and interesting feature is that the trend of the isothermal lines distinctly shows on the balance of the year the land to be hotter than the sea south of the 45th parallel, which passes through northern Italy and the southern half of France, but the sea hotter than the land north of 45° N. This affords evidence in support of belief founded on theory that the 45th parallel of north latitude, forming the middle of the temperate zone and coinciding approximately with the mean annual isotherm of 55° F.,* may be regarded as separating what one may describe as the warm temperate countries of Europe from the cold temperate countries. The map of the amplitude of the annual variation of mean temperature shows that the range of air temperature between January and July is from about 15° F. on the coasts of Ireland, Cornwall and Brittany, to about 30° F. in eastern France and western Germany, and to over 40° F. in the plain of northern Italy. The boundaries of the area in question as given in the first part of this article must, of course, be borne in mind in studying these comparisons. If the area extended just a little further eastward into Germany and Austria, the coldest region in January would doubtless be no longer in northern Italy. Finally, the mean annual temperature of the whole of France, as determined by the measurement of areas bounded by the different isothermal lines with the planimeter, is given by M. Angot as 53° F. (reduced to sea-level). France is thus considerably warmer than Britain—the mean temperature of England and Ireland may be put at 49° F., and of Scotland at 47° F. The existence of mountain and hill ranges and elevated land in general causes the mean temperatures to be, of course, higher in reality than these figures indicate. M. Angot's maps unfortunately do not show us the modification imposed upon the mean temperature of France by such great mountain systems as the Alps, the Vosges, the Cevennes, the Auvergne and the Pyrenees, except in so far as these systems must necessarily exert an influence upon the temperature conditions prevailing at lower-lying observing stations in their neighbourhood—an influence which the reduction of figures to sea-level cannot eliminate.

* A mean annual temperature of 55° F. is usually regarded as more temperate than any other.



RAINFALL TABLE FOR MAY, 1909.

STATION.	COUNTY.	Lat. N. ° /	Long. W. [°E.] ° /	Height above Sea. ft.	RAINFALL OF MONTH.	
					Aver. 1870-99. in.	1909. in.
Camden Square.....	London.....	51 32	0 8	111	1'72	1'80
Tenterden.....	Kent.....	51 4	*0 41	190	1'72	1'16
West Dean.....	Hampshire.....	51 3	1 38	137	1'86	1'98
Hartley Wintney.....	".....	51 18	0 53	222	1'79	1'40
Hitchin.....	Hertfordshire.....	51 57	0 17	238	1'87	1'82
Winslow (Addington).....	Buckinghamshr.....	51 58	0 53	309	2'06	1'92
Bury St. Edmunds (Westley).....	Suffolk.....	52 15	*0 40	226	1'85	1'21
Brundall.....	Norfolk.....	52 37	*1 26	66	1'74	1'30
Winterbourne Steepleton.....	Dorset.....	50 42	2 31	316	2'02	1'20
Torquay (Cary Green).....	Devon.....	50 28	3 32	12	1'96	'90
Polapit Tamar [Launceston].....	".....	50 40	4 22	315	1'98	1'50
Bath.....	Somerset.....	51 23	2 21	67	2'09	1'56
Stroud (Upfield).....	Gloucestershire.....	51 44	2 13	226	2'10	1'22
Church Stretton (Wolstaston).....	Shropshire.....	52 35	2 48	800	2'62	'88
Coventry (Kingswood).....	Warwickshire.....	52 24	1 30	340	2'11	1'54
Boston.....	Lincolnshire.....	52 58	0 1	25	1'73	'90
Worksop (Hodsock Priory).....	Nottinghamshire.....	53 22	1 5	56	2'01	1'40
Derby (Midland Railway).....	Derbyshire.....	52 55	1 28	156	1'96	1'84
Bolton (Queen's Park).....	Lancashire.....	53 35	2 28	390	2'46	3'44
Wetherby (Ribston Hall).....	Yorkshire, W.R.....	53 59	1 24	130	1'90	1'66
Arncliffe Vicarage.....	".....	54 8	2 6	732	3'36	3'53
Hull (Pearson Park).....	"..... E.R.....	53 45	0 20	6	1'95	1'33
Newcastle (Town Moor).....	Northumberland.....	54 59	1 38	201	1'89	1'79
Borrowdale (Seathwaite).....	Cumberland.....	54 30	3 10	423	7'26	5'73
Cardiff (Ely).....	Glamorgan.....	51 29	3 13	53	2'55	1'88
Haverfordwest (High Street).....	Pembroke.....	51 48	4 58	95	2'53	1'46
Aberystwyth (Gogerddan).....	Cardigan.....	52 26	4 1	83	2'44	1'79
Llandudno.....	Carnarvon.....	53 20	3 50	72	1'85	'94
Cargen [Dumtries].....	Kirkcudbright.....	55 2	3 37	80	2'60	2'18
Hawick (Branksholm).....	Roxburgh.....	55 24	2 51	457	2'17	1'80
Edinburgh (Royal Observatory).....	Midlothian.....	55 55	3 11	442	...	1'59
Girvan (Pinmore).....	Ayr.....	55 10	4 49	207	2'73	1'55
Glasgow (Queen's Park).....	Renfrew.....	55 53	4 18	144	2'36	2'15
Inveraray (Newtown).....	Argyll.....	56 14	5 4	17	3'04	5'20
Mull (Quinish).....	".....	56 36	6 13	35	2'91	3'62
Dundee (Eastern Necropolis).....	Forfar.....	56 28	2 57	199	1'88	3'86
Braemar.....	Aberdeen.....	57 0	3 24	1114	2'29	3'15
Aberdeen (Cranford).....	".....	57 8	2 7	120	2'20	2'23
Cawdor.....	Nairn.....	57 31	3 57	250	2'03	2'59
Fort Augustus (S. Benedict's).....	E. Inverness.....	57 9	4 41	68	2'32	3'15
Loch Torridon (Bendamph).....	W. Ross.....	57 32	5 32	20	5'05	5'29
Dunrobin Castle.....	Sutherland.....	57 59	3 56	14	2'02	2'20
Castletown.....	Caithness.....	58 35	3 23	100	...	1'95
Killarney (District Asylum).....	Kerry.....	52 4	9 31	178	2'95	2'45
Waterford (Brook Lodge).....	Waterford.....	52 15	7 7	104	2'11	2'10
Broadford (Hurdlestown).....	Clare.....	52 48	8 38	167	2'09	1'92
Abbey Leix (Blandsfort).....	Queen's County.....	52 56	7 17	532	2'27	2'00
Dublin (Fitz William Square).....	Dublin.....	53 21	6 14	54	1'94	1'47
Mullingar (Belvedere).....	Westmeath.....	53 29	7 22	367	2'40	2'23
Ballinasloe.....	Galway.....	53 20	8 15	160	2'49	1'84
Crossmolina (Enniscoe).....	Mayo.....	54 4	9 18	74	2'93	2'21
Collooney (Markree Obsy.).....	Sligo.....	54 11	8 27	127	2'61	2'08
Seaforde.....	Down.....	54 19	5 50	180	2'45	2'01
Londonderry (Creggan Res.).....	Londonderry.....	54 59	7 19	320	2'48	3'07
Omagh (Edenfel).....	Tyrone.....	54 36	7 18	280	2'43	2'57

RAINFALL TABLE FOR MAY, 1909—continued.

RAINFALL OF MONTH (con.)					RAINFALL FROM JAN. 1.				Mean Annual 1870- 1899.	STATION.
Diff. from Av. in.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1870-99. in.	1909. in.	Diff. from Aver. in.	% of Av.		
		in.	Date.						in.	
+ .08	105	.57	24	9	8.54	7.75	— .79	91	25.16	Camden Square
— .56	67	.28	16†	7	9.59	8.70	— .89	91	28.36	Tenterden
+ .12	106	.81	31	9	10.59	8.53	— 2.06	81	29.93	West Dean
— .39	78	.78	24	9	9.70	8.36	— 1.34	86	27.10	Hartley Wintney
— .05	97	.54	24	9	8.37	7.79	— .58	93	24.66	Hitchin
— .14	93	.65	27	12	9.29	7.06	— 2.23	76	26.75	Addington
— .64	65	.55	25	9	8.28	6.70	— 1.58	81	25.39	Westley
— .44	75	.80	25	10	8.23	6.61	— 1.62	80	25.40	Brundall
— .82	59	.50	24	6	14.04	10.83	— 3.21	77	39.00	Winterbourne Stpltn
— 1.06	46	.42	24	7	12.92	10.31	— 2.61	80	35.00	Torquay
— .48	76	.93	26	10	13.33	12.89	— .44	97	38.85	Polapit Tamar
— .53	75	.69	26	6	10.72	8.75	— 1.97	82	30.75	Bath
— .88	58	.44	26	9	10.60	8.80	— 1.80	83	29.85	Stroud
— 1.74	34	.33	24	8	11.85	9.45	— 2.40	80	33.04	Wolstaston
— .57	73	.66	24	12	10.15	8.13	— 2.02	80	29.21	Coventry
— .83	52	.45	25	8	7.82	6.98	— .84	89	23.30	Boston
— .61	70	.36	25	11	8.57	7.82	— .75	91	24.70	Hodsock Priory
— .12	94	.57	24	12	8.78	8.32	— .46	95	26.18	Derby
+ .98	140	.65	24	13	13.54	15.28	+ 1.74	113	42.43	Bolton
— .24	87	.50	25	13	9.25	10.13	+ .88	110	26.96	Ribston Hall
+ .17	105	1.00	25	12	22.78	22.98	+ .20	101	60.96	Arneliffe Vic.
— .62	68	.57	25	12	9.12	8.36	— .76	92	27.02	Hull
— .10	95	1.03	25	11	9.32	12.47	+ 3.15	134	27.99	Newcastle
— 1.53	79	1.17	30	15	50.39	44.43	— 5.96	88	132.68	Seathwaite
— .67	74	.89	26	7	14.66	11.53	— 3.13	79	42.81	Cardiff
— 1.07	58	.51	24	8	17.06	14.21	— 2.85	83	47.88	Haverfordwest
— .65	73	.56	24	9	14.66	12.59	— 2.07	86	45.41	Gogerddan
— .91	51	.47	24	10	10.18	9.28	— .90	91	30.98	Llandudno
— .42	84	.98	25	7	16.07	19.65	+ 3.58	122	43.43	Cargen
— .37	83	.89	25	13	12.45	14.29	+ 1.84	115	34.80	Branxholm
...	...	.67	25	13	...	11.77	...	...	...	Edinburgh
— 1.18	57	.39	25	15	17.57	16.93	— .64	96	48.87	Girvan
— .21	91	.47	25	13	12.24	15.08	+ 2.84	123	35.80	Glasgow
+ 2.16	171	.80	30	19	22.93	25.03	+ 2.10	109	57.90	Inveraray
+ .71	124	.53	28	18	20.29	19.39	— .90	96	57.53	Quinish
+ 1.98	205	1.63	25	14	9.94	12.86	+ 2.92	129	28.95	Dundee
+ .86	138	...	...	...	12.50	12.92	+ .42	103	36.07	Braemar
+ .03	101	.65	25	16	11.60	13.91	+ 2.31	120	33.01	Aberdeen
+ .56	128	.49	11	15	9.68	11.35	+ 1.67	117	29.37	Cawdor
+ .83	136	.63	25	18	17.02	13.84	— 3.18	81	43.71	Fort Augustus
+ .24	105	.67	28	24	31.26	31.04	— .22	99	86.50	Bendampf
+ .18	109	.38	11	17	11.31	13.79	+ 2.48	122	31.60	Dunrobin Castle
...	...	.31	18	19	...	11.77	...	...	...	Castletown
— .50	83	.63	25	16	22.70	19.67	— 3.03	87	58.11	Killarney
— .01	100	.81	24	9	14.58	14.25	— .35	98	39.30	Waterford
— .17	92	.52	24	10	11.60	15.42	+ 3.82	133	33.47	Hurdlestown
— .27	88	.62	31	10	12.77	13.60	+ .83	107	35.19	Abbey Leix
— .47	76	.38	17	12	9.93	10.09	+ .16	102	27.75	Dublin
— .17	93	.65	24	9	12.77	14.87	+ 2.10	117	36.48	Mullingar.
— .65	74	.55	24	11	13.23	13.45	+ .22	102	37.04	Ballinasloe
— .72	75	.47	30	18	18.79	19.27	+ .48	103	50.50	Enniscoe
— .53	80	.45	24	17	14.35	15.55	+ 1.20	108	41.83	Markree Obsy.
— .44	82	.56	24	13	14.20	16.57	+ 2.37	117	38.61	Seaforde
+ .59	124	.68	16	17	14.15	18.63	+ 4.48	132	41.20	Londonderry
+ .14	106	.38	17	18	12.98	16.47	+ 3.49	127	37.85	Omagh

SUPPLEMENTARY RAINFALL, MAY, 1909.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Warlingham, Redvers Road	1.47	XI.	Rhayader, Tyrmynydd	2.66
„	Ramsgate	1.08	„	Lake Vyrnwy	1.78
„	Steyning.....	1.74	„	Llangyhanfal, Plás Draw....	.55
„	Hailsham	1.27	„	Llwydiarth Esgob	1.71
„	Totland Bay, Aston House.	1.38	„	Snowdon, Cwm Dyli	3.45
„	Stockbridge, Ashley	2.07	„	Lligwy .....	.94
„	Grayshott	2.50	„	Douglas, Woodville	1.45
„	Reading, Calcot Place.....	1.87	XII.	Stoneykirk, Ardwell House	1.07
III.	Harrow Weald, Hill House.	1.47	„	Dalry, The Old Garroch ...	2.82
„	Oxford, Magdalen College..	2.22	„	Langholm, Drove Road	2.69
„	Pitsford, Sedgebrook.....	1.31	„	Moniaive, Maxwellton House	2.54
„	Huntingdon, Brampton.....	1.03	XIII.	N. Esk Reservoir [Penicuik]	2.50
„	Woburn, Milton Bryant.....	1.65	XIV.	Maybole, Knockdon Farm..	1.75
„	Wisbech, Monica Road.....	1.15	XV.	Campbeltown, Witchburn...	2.65
IV.	Southend Water Works.....	1.10	„	Glenreasdell Mains	2.43
„	Colchester, Lexden.....	.66	„	Ballachulish House.....	6.17
„	Newport, The Vicarage.....	1.22	„	Islay, Eallabus	3.01
„	Rendlesham	1.19	XVI.	Dollar Academy	3.67
„	Swaffham	1.22	„	Loch Leven Sluice	2.35
„	Blakeney .....	.52	„	Balquhiddy, Stronvar	5.29
V.	Bishops Cannings	1.11	„	Perth, The Museum	3.10
„	Ashburton, Druid House ...	1.43	„	Coupar Angus	3.07
„	Honiton, Combe Raleigh ...	1.64	„	Blair Atholl	2.65
„	Okehampton, Oaklands.....	1.99	„	Montrose, Sunnyside Asylum	2.47
„	Hartland Abbey	1.33	XVII.	Alford, Lynturk Manse ...	3.46
„	Lynmouth, Rock House ...	1.56	„	Keith Station	2.86
„	Probus, Lamellyn .....	.89	XVIII.	N. Uist, Lochmaddy	3.30
„	North Cadbury Rectory ..	.90	„	Alvey Manse	2.54
VI.	Clifton, Pembroke Road ...	1.77	„	Loch Ness, Drumnadrochit.	2.74
„	Ross, The Graig .....	.97	„	Glencarron Lodge	4.77
„	Shifnal, Hatton Grange.....	1.05	„	Fearn, Lower Pitkerrie.....	1.83
„	Blockley, Upton Wold	1.06	XIX.	Invershin	2.23
„	Worcester, Boughton Park.	1.12	„	Altnaharra	1.85
VII.	Market Overton	2.06	„	Bettyhill	1.49
„	Market Rasen .....	.85	XX.	Dunmanway, The Rectory..	2.96
„	Bawtry, Hesley Hall.....	1.36	„	Cork	1.80
„	Buxton.....	2.64	„	Mitchelstown Castle	2.66
VIII.	Neston, Hinderton Lodge...	1.10	„	Darrynane Abbey	3.41
„	Southport, Hesketh Park...	1.40	„	Glenam [Clonmel]	3.06
„	Chatburn, Middlewood	1.93	„	Ballingarry, Gurteen	2.91
„	Cartmel, Flookburgh	2.30	„	Miltown Malbay.....	1.85
IX.	Langsett Moor, Up. Midhope	2.04	XXI.	Gorey, Courtown House ...	1.56
„	Scarborough, Scalby	1.90	„	Moynalty, Westland	1.94
„	Ingleby Greenhow	1.47	„	Athlone, Twyford	1.77
„	Mickleton.....	1.07	XXII.	Woodlawn	1.44
X.	Bardon Mill, Beltingham ...	1.06	„	Westport, St. Helens	1.92
„	Ewesley, Font Reservoir ..	1.75	„	Mohill	2.42
„	Ilderton, Lilburn Cottage...	1.55	XXIII.	Enniskillen, Portora	3.03
„	Keswick, The Bank	1.88	„	Dartrey [Cootehill].....	1.93
XI.	Llanfrechfa Grange.....	1.79	„	Warrenpoint, Manor House	2.23
„	Treherbert, Tyn-y-waun ...	2.85	„	Banbridge, Milltown	1.24
„	Carmarthen, The Friary....	1.85	„	Belfast, Springfield	1.51
„	Castle Malgwyn [Llechryd].	1.53	„	Bushmills, Dundarave	2.14
„	Plynlimon.....	4.20	„	Sion House	2.19
„	Crickhowell, Ffordlas.....	1.50	„	Killybegs	3.45
„	New Radnor, Ednol	1.62	„	Horn Head	1.91

METEOROLOGICAL NOTES ON MAY, 1909.

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.—Fine, dry and sunny generally, there being but little R until 24th, but on this and the three succeeding days 1.53 in., or 85 per cent. of the total for the month, fell. The duration of sunshine, 276.1* hours, was the greatest for any month since the record began, and there were no sunless days. Duration of R, 28.3 hours. Mean temp. 54.5 or 0.5 above the average. Shade max. 83.7 on 22nd; min. 33.5 on 16th. F 0, f 8.

TENTERDEN.—Duration of sunshine 317.0† hours, was remarkable. Shade max. 80.5 on 22nd; min. 33.0 on 16th. F 0, f 7.

TOTLAND BAY.—The sunniest month on record; duration of sunshine 350.7* hours, or 147.2 hours above the average. Shade max. 71.2 on 21st; min. 36.6 on 3rd. F 0, f 6.

PITSFORD.—R .74 in. below the average. Mean temp. 47.1. Shade max. 83.5 on 23rd; min. 30.2 on 3rd and 13th. F 10.

TORQUAY.—Duration of sunshine, 315.1* hours, or 90.7 hours above the average. Mean temp. 53.0. Shade max. 73.2 on 12th; min. 36.0 on 3rd. F 0, f 2.

NORTH CADBURY.—The least cloudy month in 13 years with an absolute drought from 1st to 17th. Shade max. 83.0 on 21st, and the highest recorded in May in 13 years; min. 33.0 on 2nd and 15th. F 0, f 10.

ROSS.—Shade max. 82.0 on 24th; min. 31.5 on 2nd and 15th. F 2, f 6.

HODSOCK PRIORY.—Shade max. 78.3 on 21st; min. 29.1 on 13th. F 6, f 17.

SOUTHPORT.—R .70 in. below the average of 35 years. Duration of sunshine 284.8* hours, or 75.1 hours above the average. Duration of R 27.8 hours. Mean temp. 50.8, or 0.3 above the average. Shade max. 78.4 on 21st; min. 31.2 on 16th. F 1, f 14.

HULL.—Duration of sunshine 163.4* hours. S early on 15th. Shade max. 79.0 on 22nd; min. 31.0 on 1st. F 1, f 16.

HAVERFORDWEST.—Duration of sunshine 295.2* hours. Shade max. 72.3 on 20th; min. 32.1 on 16th. F 0, f 4.

LLANDUDNO.—Duration of sunshine, 282.9* hours, was much above the average. Shade max. 74.2 on 20th; min. 32.4 on 16th. F 0.

DOUGLAS.—Brilliantly fine days with cold N.E. winds and dry, frosty nights until 20th. Warmer thereafter with welcome R to which vegetation responded. A trying time to farm and garden and more R urgently needed.

CARGEN.—Shade max. 72.0 on 20th; min. 27.0 on 16th; F 4.

EDINBURGH.—Shade max. 70.4 on 22nd; min. 29.3 on 15th. F 2, f 7.

DUNDEE.—Shade max. 72.8 on 22nd; min. 30.0 on 15th. F 3.

FORT AUGUSTUS.—Shade max. 70.0 on 22nd; min. 27.0 on 15th and 16th. F 4.

WATERFORD.—The first 16 days were rainless but there were late frosts which "burnt" potatoes etc. Shade max. 73.5 on 11th; min. 30.0 on 2nd and 17th. F 3.

DUBLIN.—Dry until 21st after which R fell frequently, though not heavily. The fall on 17th, .38 in., was the product of a local downpour of cold R, H and ice fragments. Mean temp. 52.6, or 0.4 above the average. Shade max. 72.7 on 21st; min. 33.1 on 2nd. F 0, f 3.

MARKREE.—Shade max. 71.0 on 9th; min. 26.6 on 2nd. F 4, f 11.

WARRENPOINT.—Shade max. 69.0 on 11th and 13th; min. 27.0 on 1st. F 5, f 7.

* Campbell-Stokes.

† Jordan.

Climatological Table for the British Empire, December, 1908.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
London, Camden Square	52·9	13	14·4	30	44·2	36·4	38·2	91·100	60·0	...	inches 1·89	16	8·9
Malta	66·0	2	46·8	30	60·0	52·1	47·5	76	135·2	...	7·34	20	5·1
Lagos	90·0	sev.	71·0	12	88·3	74·1	74·1	75	150·0	60·0	·33	1	7·5
Cape Town	95·6	19	47·8	3	78·6	58·7	56·9	67	...	...	·43	4	3·2
Durban, Natal	88·7	8	61·6	19	81·9	67·2	...	...	150·6	...	3·45	19	5·6
Johannesburg	84·2	26	48·8	19	76·0	55·7	57·0	76	157·0	46·9	2·06	13	4·8
Mauritius	89·1	3	68·1	16	86·0	71·3	69·5	76	162·0	59·0	5·91	17	6·8
Calcutta... ..	83·2	26	49·5	20	78·3	53·3	51·4	63	135·8	42·0	·00	0	1·4
Bombay... ..	87·1	27	64·3	25	83·8	68·1	62·2	65	133·0	57·4	·00	0	0·4
Madras	85·4	25	62·4	8	82·4	68·4	65·7	75	137·1	58·7	2·28	4	4·4
Kodaikanal	70·5	20	38·0	10	63·3	46·5	42·4	66	120·3	20·5	1·77	4	4·9
Colombo, Ceylon	90·0	12*	70·2	9	86·3	72·7	70·8	77	151·2	65·2	1·09	11	5·3
Hongkong	79·8	6	51·6	9	67·9	59·5	55·8	76	131·9	...	4·29	9	7·5
Melbourne	95·4	1	45·9	20	79·6	56·9	48·4	49	158·6	40·2	·63	6	5·1
Adelaide	107·8	7	49·1	26	86·6	60·3	51·5	46	164·0	41·0	·72	3	3·3
Coolgardie	111·0	29	50·4	21	95·6	62·8	49·7	36	172·0	48·9	·27	2	2·0
Perth	104·7	27	49·8	16	83·5	60·3	56·3	58	161·0	40·9	·11	2	3·5
Sydney	96·1	30	57·4	9	80·3	63·9	58·6	60	137·0	47·1	1·58	16	4·9
Wellington	71·0	12†	46·4	12	63·9	52·7	49·4	72	125·0	37·0	2·87	11	6·9
Auckland	74·0	25	50·0	9	68·0	56·0	52·7	72	137·0	46·0	4·49	14	4·9
Jamaica, Kingston	91·4	1	64·7	10	87·6	68·6	65·4	73	...	...	4·83	6	2·8
Trinidad	90·0	19†	67·0	24	86·1	69·5	71·1	86	158·0	58·0	8·68	23	...
Grenada	85·2	4	70·0	23	82·4	73·5	71·3	81	140·6	...	13·17	27	5·5
Toronto	49·3	1	6·0	10	35·2	23·0	...	...	60·5	3·0	2·06	19	...
Fredericton	48·0	1, 7, 8	-20·0	23	26·0	6·5	...	83	...	...	3·56	14	4·8
St. John's, N.B.	50·2	7, 8	-4·3	23	32·9	15·5	...	...	...	...	4·44	17	5·5
Victoria, B.C.	52·0	25	28·3	4	43·3	36·3	...	86	...	...	4·88	15	6·9
Dawson	25·0	10	-49·0	29	-1·5	-14·6	...	...	...	...	1·96	13	...

* and 13. † and 16. ‡ and 20.

MALTA.—Mean temp. of air 55°·3. Average bright sunshine 4·8 hours per day.

Johannesburg.—Bright sunshine 245 hours.

Mauritius.—Mean temp. of air 0°·1 below, dew point 1°·9, and R ·96 in., above, averages. Mean hourly velocity of wind 7·5 miles, or 3·3 below average.

KODAIKANAL.—Bright sunshine 235 hours. Hoar frost on 12 days.

COLOMBO.—Mean temp. of air 77°·7, or 1°·4 below, of dew point equal to, and R 4·29 in. below, average. Mean hourly velocity of wind 11·0 miles.

HONGKONG.—Mean temp. of air 63°·3. Bright sunshine 101·7 hours, or 77 hours below average. Mean hourly velocity of wind 10·5 miles.

Melbourne.—Mean temp. of air 3°·8 above, and R 1·64 in. below, averages.

Sydney.—Mean temp. of air 2°·1 above, and R ·88 in. below, averages.

Wellington.—Bright sunshine 237 hours. R ·53 in. below the average.

TRINIDAD.—R 3·95 in. above the 43 years' average.

RAINFALL OF THAMES VALLEY. - JUNE, 1909.



ALTITUDE SCALE

Below 250 feet	250 to 500 feet	500 to 1000 feet	Above 1000 feet
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SCALE OF MILES

0 5 10 15 20