SYMONS'S
MONTHLY
METEOROLOGICAL MAGAZINE.

CCCLXXVI.] MAY, 1897. [PRICE FOURPENCE, or 5s. per ann. post free.

Louis Pascal Casella.

1809—1897.

IT is but a few years since Mr. Casella retired, and few of those who saw him during the closing years of his business life would have thought that he was then well beyond the "fourscore years."

It is only since his death that we have heard that his second name was not Philip, but Pascal, and that it was supposed to be a family name. There seems little chance of now verifying the tradition, but it is a curious coincidence that the deceased, whose name will not soon be forgotton by meteorologists, should have borne also the honoured name of Pascal. Moreover, it is strange that Mr. Casella's Italian parent should have given his son the French name. Although Mr. Casella's father was by birth and parentage an Italian, he had resided in Edinburgh during the latter part of the 18th century, and he and his son removed to London only about 1835. Shortly afterwards the son joined the late Mr. Tagliabue as an instrument maker; he married his daughter, and half a century ago succeeded to the business, which at that time was extensive rather than scientific. Long before that time Mr. Casella had become a member of the original Meteorological Society, and, whether as a cause or as a consequence we know not, but, as a fact, Mr. Casella has chiefly been known as a maker of high-class instruments for meteorologists and travellers. As the business is being continued by one of the sons we think it best to leave the father's work to stand upon its own merits; but there was one feature in Mr. Casella's character which, now that he has passed beyond human praise, ought to be mentioned: his kindliness of disposition was well-known, but far more noteworthy was his benevolence to those who were in need.

HAILSTORM IN SOUTH LONDON.

To the Editor of the Meteorological Magazine.

SIR,—The storm of the 27th ult. having apparently been peculiar to this locality, I venture to think that some notes upon it may be of interest to you. Commencing at 6.30 p.m., the hail fell so thickly that the ground was soon covered to a considerable depth, bearing a resemblance to a heavy snowfall. A great deal of damage accrued to fruit trees, the partly "set" fruit of the pear and plum being cut off completely, and early rose-trees stripped of leaves and buds. The hail was followed by heavy rain, which, being unable to escape down the gutters and drains through the mass of hailstones which choked them, flooded the houses. doing not a little damage. The hailstones were of a large size and divers shapes, one which I picked up measuring half-an-inch square, but being soft, they did little damage to glass. The storm lasted one hour, and on measuring the rain at its conclusion the amount in the gauge was found to be 1·18 inches. I am informed by an "old inhabitant" that it is necessary to go back to August, 1846, for a parallel hailstorm in this neighbourhood. You will probably receive many letters on the subject, and it will be interesting to note how far the storm extended; as, from what I can gather, the area affected by it was very small, and the rainfall very variable even within that limit.

I am, Sir, yours faithfully, D. W. HORNER.

Clapham Park, S. W., May 1st, 1897.

[Our correspondent is correct in referring to the great storm of August 1st, 1846; but that was far more serious than the one in 1897, giving the tremendous rainfall of 3·12 inches in 2 hours 17 mins. We do not think that any rain gauge recorded the full intensity of the recent storm; Mr. Horner's 1·18 in. is the highest, and that is by no means remarkable for a thunderstorm with hail—and at most stations in the neighbourhood, *i.e.*, in North Surrey, the fall was quite insignificant. The only returns of even half-an-inch which we have received are—

	in.		in.
Kingston	·60	Surbiton (Seething Wells)	·73
Brixton (Acre Lane)	·62	New Malden (Sewage Works)	1·02
Wimbledon (Sewage Works)	·68	Clapham Park (New Park Road).	1·18

and yet we know from the pierced leaves which Mr. Horner has sent us that the hail was serious, and from eye-witnesses that the following accounts are substantially correct]:—

HEAVY THUNDERSTORM IN SOUTH LONDON.

"A correspondent writes:—For many years I have lived in South London, but never have I experienced anything like the scene which was witnessed at the base of Brixton Hill during the prevalence of last night's thunderstorm. Taking it altogether, with rain and hail, there was not probably more than twenty or five-and-twenty minutes' downpour, but that sufficed to temporarily

transform the appearance of the locality. The hill itself is a steep declivity—neither so high nor so steep, it is true, as that of Highgate—but a steady, persevering rise, starting at, say, the White Horse in the Brixton Road, and terminating a mile or a mile-and-a-half further south at Streatham Place. It is a broad thoroughfare, flanked by open gardens and shaded in many places by trees of respectable size and antiquity. The pavements are high-pitched, and the gutters are, consequently, relatively speaking, deep. Under the centre of the roadway itself run the two continuous tunnels through which the miles of tram cables run that draw cars and bogies from Kennington to Streatham. After the first few peals of thunder the hail began to pour down as though through some vast overhead sieve, and in a few minutes gutters were choked and lawns were covered for a depth of an inch or more. This was succeeded by rain of a semi-tropical character, and was followed a little later by a second storm of blinding hail. The hill was speedily converted into something like a cataract, the water running between the high kerb stones inches deep. Horses driven from the side streets refused to face it, and more than one driver had to get down and lead his frightened charge. It will scarcely be credited, but I actually saw a plank of timber merrily floating down the roadway. The southern tram traffic was first impeded, and then temporarily suspended, the bogies with their broad noses making heavy way 'up stream,' and throwing up water on each side as though they were snow ploughs driving through a drift. One lady I saw cross the main road, just at the base of the hill, had the water above her boot ankles, and I myself had to wade through inches of water to make my way to a belated tramcar which managed to make slow progress through the miniature sea because it was going citywards."—*Daily News.*

"Another correspondent writes:—A very curious experience happened to me yesterday. I had been spending the morning at a South Coast watering-place. It was to all appearance a perfect summer day—warm and balmy, with just wind enough to temper the sun. I left about half-past five, and as I entered the train, I noticed that the carriage was flooded with the sunshine, and it was necessary to draw down the blinds on one side. Then I lit a cigar, plunged into the *St. James's Gazette*, and for an hour or so forgot all about the weather. Suddenly, some time after we had passed Croydon, I looked out of the window, and almost shouted in my astonishment. An amazing spectacle greeted me. I had passed from summer to winter. The fields, the roofs, the roads, the railway-track, were all white with what seemed snow. I learnt afterwards that it was only hail, but to all appearance it was snow lying thickly on the ground, and the whole landscape was quite winterly."

St. James's Gazette.

ON THE WORSHIP OF METEORITES.

By the late PROFESSOR NEWTON.

THE January number of the *American Journal of Science* opens with an article written some years since by Professor Newton, but not previously published.

"In it the author has brought together a large number of facts showing the superstitious regard attached to meteorites from the

very earliest times. The first case mentioned is that of the iron from an altar of an Indian mound in Ohio, which was preserved with other articles evidently regarded as of peculiar value. By some this iron is regarded as probably the same as that of which a number of masses were found about 1886 in Kiowa county, Kansas. Another case spoken of is that of the stone which fell at Ensisheim, in Alsace, 1492, which was preserved in a church at that place. A fall of stones some nineteen years later near Milan, in Italy, is also alluded to as having probably been the occurrence recorded by Raphael by the fireball in his picture of the Foligno Madonna now in the Vatican. The sacred stone of the Mohammedans preserved in the Kaaba of the mosque at Mecca is also mentioned as perhaps a case in which a meteorite has been selected for long continued worship. The author then goes on to discuss a number of instances recorded in classical literature, and, although it is impossible to say that in each case a meteorite was the object described, in many cases it seemed highly probable. The Palladium of Troy, the needle of Cybele, the original image of the Ephesian Artemis, are some of the cases which the author describes in detail with quotations from the original authorities.

"On a later page of the same number a description is given by Warren M. Foote, of a new meteoric iron from the Sacramento Mountains, in New Mexico. This is a typical siderite and weighed, as found, 237 kilograms (521 pounds). It shows the common octahedral structure with unusual distinctness. Two plates accompany the article, one showing the appearance of the iron itself, one-eighth the natural size, the other the Widmannstätten figures printed directly from an etched slab. As further bearing on the same subject is to be mentioned a catalogue of the meteorites in the Yale University collection, which forms an appendix to the number."—

Science.

THE FORMATION OF DEW.

By Dr. J. G. McPherson, F.R.S.E., Lecturer on Meteorology in the University of St. Andrews.

UNTIL very recently the exact constitution of the nature and formation of dew was unknown even to scientific men. The opinion was generally held that if you went through the glistening meadow on a summer evening, through the diamond drops sparkling in millions, you would get your trousers or your boots moistened with dew. It was also believed that dew fell from the air upon the ground. Now in both cases the opinion was wrong, for it was not dew at all which was encountered in the meadow, and dew does not fall from the air. If you look into the garden on a dewy night—for there is such a thing as dew for all that—you will find some plants moist. Glistening drops appear on the Brocoli, but the Peas are dry. Place a hand-lantern below one of the healthiest Brocoli leaves, and you will find that the moisture is collected in clear drops along the edge of the leaf and at the end of the veins of the leaf. The leaf

veins radiating from the centre line of the surface have carried the moisture of the healthy plant to the edges to keep up plant circulation; and the drops you see are not dew drops, but the watery juices carried out by the energy of the healthy plant. For place the lantern under an unhealthy leaf, and you will find no drops; there is no circulating vitality in it. Again, examine grass blades, and you will find large drops near the tips of the blades, the rest of the blades being quite dry. The large drops seen on plants at night are falsely called dew; they are produced from the plants themselves as tokens of their active and healthy growth.

This can be demonstrated in more than one way. Remove a branch of Poppy and connect it by means of an indiarubber tube with a head of water of about 40 inches. After placing a glass receiver over it to prevent evaporation, leave it for three hours. Then you will find that water has been freely excreted through the veins, resembling what were familiarly called "dew drops." If the water pressed into the leaf is coloured with aniline blue, the drops when they first appear are colourless, but before they grow to any size the blue appears, showing that little water was held in the veins. What, then, has been for centuries called dew is not dew at all, but the watery juices of the healthy plants.

But look over dead leaves on a dewy night, and you will see a fine pearly lustre—that is dew. Dead matter gets equally wet when equally exposed, and real dew is not so common as is generally supposed. On many nights on which grass gets wet no true dew is deposited on it, and on all nights, when growth is healthy, the exuded drops always appear before the true dew. The difference between the true and the false dew can easily be detected. The moisture exuded from the leaf veins of the grass—false dew—is always isolated at points situated near the tips of the blades, forming drops of some size; whereas true dew collects evenly all over the blades. A glance distinguishes the pearly lustre of the dewy film from the glistening diamond drops of the healthy plant's juices.

But whence comes the dew? It does not fall from the air. Whence comes it, then? We shall see. Ground a little below the surface is always warmer than the air over it. As long, then, as the surface of the ground is above the dew point, vapour must rise and pass from the land into the air. The moist air so formed will mingle with the air above it, and its moisture will be condensed, forming dew wherever it comes into contact with a surface cooled below the dew point. In fact, dew rises from the ground.

Place some metal trays over the grass, the soil, and the road on dewy nights. You will generally find more moisture on the grass inside the trays than outside; you will always observe a deposit of dew inside the trays, even when there is none outside at all. This shows that far more vapour rises out of the ground during the night than condenses as dew on the grass and other objects.

Pieces of iron lying on grass are soon surrounded with richer grass, on account of the moisture which the cold metal attracts from the rising water-vapour. Travellers in Australia and South Africa state that they often found the under side of their waterproof bedding placed on the ground to be wet after camping out at night. That shows that even in dry countries vapour rises from the ground at night, I remember, when walking in the vicinity of Hexham with an acute observer, trained to farming, that, on my remarking that the farmers might to their profit remove the extraordinary quantity of

small stones from the fields in order to give room for the growth of the grain, he shrewdly said, "These stones collect moisture from the ground; the soil is thin, with a gravelly subsoil, and unless the maximum amount of moisture be collected (which can only be done by allowing these stones to remain), there would be a very deficient crop. They must not therefore be removed."

Dew, then, rises from the ground. But how is the dew formed on bodies high up in the air? If the dew comes out of the ground, should it not be found on bodies only exposed to the earth? Now, dew does not rise in particles, as it was once considered to fall in particles like fine rain. It rises in vapour. Some is caught by what is on the surface of the earth, but the rest ascends in vapour form until it comes in contact with a much colder surface, to condense it into moisture. The vapour does not flow upwards in a uniform stream, but is mixed in the air by eddies and wind currents, and carried to bodies far from where it rose. In fact, dew may be deposited, even though the country for many miles all round be dry and incapable of yeilding any vapour. In such cases the supply of vapour to form that dew would depend on the evaporation of the dew, and on what was wafted over by the winds.

But the most practically convincing proof of the rising of dew from the ground is in the form of hoar frost or frozen dew. If it has been a bright, clear, sunny day in January, with no snow on the ground, look over the garden, grass, and walks on the morning after the intense cold of the night; big leaves may be found scattered over the place. You see little or no hoar frost on the upper surface of the leaves, but turn up the surface next the earth, or the road, or the grass, and what will you see? You have only to handle the leaf in this way to be highly astonished. A thick, white coating of hoar frost, as thick as a layer of snow, is on the under surface. Leaf after leaf will present the same appearance. If a number of leaves have been overlapping each other, then there will be no coating of hoar frost under the top leaves; but when you reach the lowest layer, next the bare ground, you will find the hoar frost on the under surface of the leaves. Now, that is positive proof that the hoar frost has not fallen from the air, but has risen from the earth. And hoar frost is, as we have said, frozen dew.

Dew, then, mostly rises from the ground, and what used to be thought dew is the active exudation of the healthy grass. These two facts are now established. Brilliant globules are produced by the vital action of the plant, showing life in one of the most charming forms in the phenomena of Nature. —*Wakefield Express.*

REVIEWS.

The Atmosphere in relation to Human Life and Health. By FRANCIS ALBERT ROLLO RUSSELL, V.P. Royal Meteorological Soc., Fellow San. Inst., &c. Smithsonian Institution, Washington, 1896. 8vo, pp. 148.

WHEN a paper has received Honourable Mention and a Silver Medal from the Hodgkins Fund, and has been accepted and printed by the Smithsonian Institution, an ordinary reviewer feels it rather presumptuous to add his little meed of praise, and decidedly dangerous even to hint that the author has not always said what the reviewer would have expected him to say.

The first noteworthy features of this work are the large and extremely varied amount of information compressed into it, and the hopelessness of recovering any lost statement owing to there being neither index, nor table of contents, nor even specific headline on the pages. This might easily have been avoided, because the Memoir itself was written somewhat methodically in Parts and Sections. The Parts are—

Perhaps these do not sound very definite, but the Sectional headings, of which there must be more than a hundred, are so. We will give a few, just as we turn over the leaves :—Ozone, Vapour of water, Living germs in the air, Organic emanations from the skin, Influenza, Mode of attack of Miasmatic diseases, Mechanical ventilation in schools, The zodiacal light, Malaria.

There is a mass of information in the paper, of which it is not easy to convey an idea; perhaps the simplest plan is to reproduce two paragraphs :—

TYPHOID FEVER.

"Typhoid, or enteric, fever is most common in the autumn, and much less prevalent in May and June. There is a sharp decline in its prevalence in London in December. In New York, and in large towns in Europe, the maximum is decidedly apparent in late summer or autumn. The variation of prevalence according to season seems to show a distinct connection between the development of the bacillus and the temperature of soil and water; and, considering the long incubation and duration of cases, the maximum of infection must take place at the very time when the temperature of the soil, at 1 ft. or 2 ft. deep, is about at its highest."

HEIGHT OF THE ATMOSPHERE.

"Meteors which have been calculated to pass with ignition through air at a height sometimes as great as 300 miles; auroræ, of which the height has been estimated by careful observation sometimes to exceed 281 miles; and the duration of twilight, with polarizing effects of the sky, giving a height of 198 to 212 miles, agree in showing a much greater altitude for the extension of our atmosphere than was formerly supposed. First 5, and then 45, miles was generally stated as the outside limit. And we have to remember that at this great altitude of about 300 miles, the atmosphere is dense enough to produce very palpable effects. It would be a bold proposition to assign a limit to the atmosphere within 1,000 miles."

On the last pages of the Memoir, Mr. Rollo Russell develops, apparently in all seriousness, the most extraordinary meteorological proposal of which we ever heard—namely, the modification of climate

by the erection of monster walls as wind barriers! That we may not be suspected of misrepresenting his views, we conclude by reprinting two sentences from page 147.

"Portsdown Hill, which runs east and west for nearly seven miles, and is over 400 ft. high, would be another highly favourable ridge for an experimental wall, say 400 ft. in height. The practicability of works of this kind can hardly be questioned when we hear of structures like the reservoir embankment at Bombay, a stone barrier 118 ft. thick, over 100 ft. high, and two miles long. A less amount of material would have gone toward a wind wall 30 ft. thick at the base, 300 ft. high, and three or four miles long.

"A wall 300 ft. or 400 ft. in height, and five or six miles in length, extending from near the Thames a few miles east of London, in a north-westerly direction, would probably have the effect of stopping a considerable amount of fog, which often moves from the Essex marshes toward the metropolis. It would somewhat increase the rainfall on its westerly side. A wall stretching from N.W. to S.E. across some of the heaths in the neighbourhood of Woking would reduce the rainfall of North-east Surrey and of London."

The Roman wall, and even the great wall of China, though of far greater length than any suggested by Mr. Rollo Russell, are trifles compared with the walls 300 ft. or 400 ft. high which the writer suggests. What landowners, and Parliament, would say to such proposals, has to be ascertained; and it might have facilitated discussion had the cost per mile, of a wall 400 ft. high and strong enough to resist any gale, been procured from some competent engineer There is another object which these gigantic walls might serve, they might assist the proposed communications with the inhabitants of Mars.

Effects of the Weather upon Vegetation. A Lecture given by JOHN CLAYTON to the Bradford Naturalists' Society, March 1st, 1897. Byles & Sons, Bradford, 1897. 8vo., with a photograph.

THIS is one of the most instructive and original lectures that we have seen for a long time. Mr. Clayton is evidently a keen, painstaking, and very original investigator; and instead of the lecture being a series of platitudes and quotations, as is generally the case, it is almost wholly the result of investigations carried out with great care and patience during many years. As is it published at a nominal price, we merely specify a few of the points treated—such as, the relation of tree girth to amount of foliage, relative growth of plants in sun and in shade, followed by considerations as to the sunshine recorded in different parts of England and its influence on crops, percolation gauges, why trees split in times of frost, and the relation between the elongation of twigs and their increase in girth. When a well-printed pamphlet gives information, almost wholly original, on all these points for sixpence,—we need not advise our botanical and agricultural readers what course to pursue.

Observations made at the Blue Hill Meteorological Observatory, Massachusetts, U.S.A., under the direction of A. LAWRENCE ROTCH, A.M. *Discussion of the Cloud Observations*, by H. HELM CLAYTON. [Excerpt Annals of the Astron. Obs. of Harvard College.] Cambridge, U.S.A., 1896. 4to, 228 pp. and 18 plates.

THIS work is much more important and interesting than its title suggests, for it is not merely a Discussion of the Blue Hill Cloud Observations. Chapter I., entitled "Historical Sketch of Cloud Nomenclature," is really much more than a "sketch"; it occupies more than 50 4to pages, and gives the best history of the subject that we remember. It may be convenient to enumerate in chronological order the authorities quoted by Mr. Clayton:—

1801	Lamarck
1803	Howard
1804	Lamarck
1815	Forster
1828	Clos
1831	Kaemtz
1841	Loomis
1846	Fritsch
1857	Jevons
1860	Schmid
1861	Herschel
1863	Fitzroy
,,	Poëy
1865	,,
1868	Loomis
1870	Poëy
1874	Muhry
1875	Blasius
1879	Ley
,,	Poëy
1880	Ley
,,	Hildebrandsson
1881	Möller
,,	Weilbach
1882	Vettin
,,	Klein
1883	Koppen
,,	Russell, Rollo
,,	Ley
,,	Mohn
1884	Tissandier
1885	Scott
,,	Sprung
1885	Ley, Hildebrandsson, Capello
,,	Barker, Wilson
,,	Möller
1886	Jesse
,,	Toynbee
1887	Abercromby
,,	Clayton
,,	Hildebrandsson, Abercromby
1888	Abercromby
1889	Maze
,,	von Helmholtz
,,	Clayton
1890	Hildebrandsson, Köppen, Neumayer
,,	van Bebber
1891	Abbe, C.
,,	Singer
,,	Vincent
1892	Kassner
,,	Möller
1893	Gaster
,,	Hildebrandsson
,,	von Bezold
1894	Ley
,,	Davis, W. M.
,,	Hildebrandsson, Riggenbach, Teisserenc de Bort

Although the above list is not—does not profess to be—complete, it sufficiently indicates the thought and care devoted to the preparation of the "sketch"—a sketch of great ability and usefulness. We are not prepared to controvert any of the writer's statements, but at the same time we regret that he has been led to prepare, for use at Blue Hill, so complex a nomenclature (29 varieties) as that given on p. 342.

It is impossible for us to deal exhaustively with this work. Cloud observations as to amount, form, motion and altitude, have long been a feature in Blue Hill work; and in this paper we have a masterly discussion of them in relation to cyclones and anticyclones, to wind motion, to rainfall, to temperature, and to weather forecasting. We have long had doubts respecting the ideal forms of cyclones, and the following paragraph from p. 449 supports our doubts.

> "Another point of interest shown by the preceding results is, that a cyclone cannot be looked upon as an eddy in the atmos-

phere like an eddy in a river, because the highest air currents have a resultant velocity of drift thirty times as fast as the lowest current, and the eddy would be rapidly destroyed. The cyclonic circulation must rather be considered as continuously renewing itself, and struggling against velocities of drift which vary with the altitude."

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday evening, April 21st, at the Institution of Civil Engineers, Great George Street, Westminster, Mr. E. Mawley, F.R.H.S., President, in the chair. The following papers were read:—

Mr. W. H. Dines on "*The relation between cold periods and anti-cyclonic conditions of weather in England during the winter.*" There seems to be a generally accepted belief that anti-cyclonic conditions during the winter are likely to be accompanied by exceptional cold, but (for England) the author's observation has led him to the opposite conclusion, and he always expects a frost to break up as soon as the barometer gets much above 30·00 inches. To test the truth of this theory, he tabulated the height of the barometer during all the cold periods during the three winter months of the fifty years 1841-90. Out of 74 frosts, he found that 16 only had a pressure exceeding 30·20 inches, and the majority of these were of very short duration. Thirty-three, or less than half, had a pressure exceeding 30·00 inches. Twenty-one had a pressure below 29·80 inches, and these included almost every frost in the period remarkable for its length or severity.

Mr. A. Lawrence Rotch on "*The use of kites to obtain meteorological records in the upper air, at the Blue Hill Observatory, Mass.*" Three kinds of kites have been used, viz.: 1, the Malay kite, which presents a convex surface to the wind; 2, the Hargrave cellular kite; and 3, a flat kite, with a fin or keel on the front, devised by Mr. Clayton. These kites are attached to a wire carrying self-recording meteorological instruments, and a steam winch automatically distributes the wire on the drum and records its pull. The instruments have been elevated more than one hundred times, and valuable meteorological data as to the changes of temperature, humidity, and wind, up to an extreme altitude of 8,740 feet above Blue Hill have been obtained.

The meteorographs recently employed are an anemo-thermograph, made by Fergusson of the Observatory, and a baro-thermo-hygrograph made by Richard of Paris. These instruments are constructed chiefly of aluminium, and each weighs less than 3 lbs. One of them is hung to the end of a steel pianoforte wire, having a tensile strength of 280 lbs., between two or more kites which are attached

to the wire by independent cords. According to the strength of the wind, other kites can be attached at intervals by a peculiar form of clamp, and serve to lift the wire.

The altitude may be determined by triangulation from two stations at the ends of a base-line, but more easily by one angular measurement at the winch, the length of kite line being known. When the Richard meteorograph is hidden by clouds, differential measures of altitude are obtained from its barometric records. Measurements of the height and thickness of the lower clouds are frequently made by this method.

Kites are greatly superior to captive balloons for meteorological observations, except during calms or very light winds, which, however, seldom extend aloft. Not only do kites cost very much less, but they can lift a light load, such as a meteorograph, much higher in ordinary winds. The Blue Hill Kites fly in all weathers, whenever the wind blows between twelve and fifty miles an hour, whereas captive balloons are driven down by strong winds along an arc whose radius is the lifted cable, and thus transmit violent shocks to the suspended instruments.

Mr. A. B. MacDowall on "*Suggestions of Sunspot influence on the weather of Western Europe.*" The author believes that there is a tendency to greater heat in the summer half-year, and to greater cold in the winter half-year near the phases of minimum sunspots than near the phases of maximum; the contrast between the cold and heat of the year being intensified about the time of minimum sunspots.

THE ICY SAINTS.

We think that it would be good if some investigator would study the subject of low temperatures in May. In France, May 11th to 14th, the fête days of St. Mamertius, St. Pancras, St. Servais and St. Pacôme, are known as the "jours de glace," and the proverb is given in another form in Inward's *Weather Lore*:

"Who shears his sheep before St. Servatius's day loves more his wool than his sheep."

The daily mean temperatures now adopted at Greenwich show a cooling of only about half a degree for the four days, but means do not tell us everything, and it is possible that the cold spell may vary in date, or in intensity. In our number for June, 1891, we reproduced a lovely frost scene of May 18th, and it will be remembered that on May 22nd, 1867, the Derby was run in a snowstorm. We do not suggest that either the 18th or the 22nd has much to do with the 11th–14th—but merely that the whole question is worth study. In 1895 the 11th–14th were hot, but the mean temperature at Greenwich fell to 42°·9 on 17th, and in 1897 the mean temperature in London on the 12th was 42°·6, and for the 11th–13th averaged 43°·6, or 8°·4 below the mean.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, NOVEMBER, 1896.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
England, London	50·3	12	25·4	30	46·0	34·9	36·1	85	80·1	19·1	1·17	10	6·2
Malta	83·0	1	49·4	23	69·2	58·8	55·2	79	124·7	44·4	5·12	14	7·1
Mauritius	83·4	13	65·0	11	81·1	68·9	63·1	70	136·1	55·5	·91	9	5·5
Calcutta	89·7	2	58·0	28	83·6	64·4	62·8	68	147·2	49·6	·05	...	2·1
Bombay	92·8	12	66·2	24	88·2	75·4	70·6	69	139·5	58·3	·53	3	2·8
Ceylon, Colombo	91·0	5	72·2	23	87·4	75·0	73·3	82	152·0	68·3	19·81	27	6·0
Melbourne	97·4	23	36·5	2	74·5	51·4	48·9	67	145·5	24·6	·71	6	5·1
Adelaide	103·4	25	46·5	2	84·2	58·1	47·5	44	162·1	33·5	·52	3	4·4
Sydney	88·0	13	48·6	1	71·7	59·3	58·6	75	147·2	43·8	5·23	22	6·5
Wellington	69·0	25	39·0	2	62·2	48·4	45·4	70	139·0	30·0	2·82	12	4·3
Auckland	72·0	29	46·5	2	64·9	52·1	52·3	82	138·0	43·0	1·63	17	5·3
Jamaica, Kingston	92·3	10	69·4	15	88·9	71·6	68·9	71	...	...	1·40	9	...
Trinidad	91·0	3, 19	69·0	13	88·3	71·2	74·1	86	177·0	68·0	9·81	22	...
Grenada	88·0	4	67·2	30	83·1	73·4	74·4	77	155·2	...	20·90	26	5·0
Toronto	63·8	18	17·5	30	47·2	31·9	34·8	78	73·0	12·5	2·95	20	7·6
New Brunswick, Fredericton	60·9	6	— 1·1	23	39·3	22·1	26·8	73	...	...	4·98	16	7·0
Manitoba, Winnipeg	36·5	2	—31·7	30	15·6	—1·7	...	...	...	...	1·31	19	6·5
British Columbia, Esquimalt	56·7	13	16·7	27	40·9	33·6	35·4	90	...	...	10·97	19	7·1

REMARKS.

MALTA.—Adopted mean temp. 62°·7, or 0°·6 above the average. Mean hourly velocity of wind 10·8 miles. Average temp. of sea 69°·8. Lightning on 10 days; thunderstorms on 3 days; hail on 2 days. The shade max., 83°·0, is the highest recorded for November. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·3, dew point 1°·0, and rainfall ·98in. below, their respective averages. Mean hourly velocity of wind 11·0 miles, or 0·1 above average; extremes, 25·0 on 4th and 2·3 on 3rd; prevailing direction, S.E. by E. to E. T. F. CLAXTON.

CEYLON, COLOMBO.—Thunderstorms occurred on 11 days. A. E. WACKRILL.

Adelaide.—A warm, dry month, the temp. being 4°·3 above, and the rainfall ·48 in. below, the average. C. TODD, F.R.S.

Sydney.—Rainfall 2·02 in. above, temp. 1°·1 below, and humidity 5°·4 above, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—Showery in the early part of the month, with fine intervals; wind chiefly S.; the latter part very fine, with moderate and variable winds. Slight thunder on 1st and 11th. Snow on near hills on 1st and 2nd. Hail on 1st and 2nd. Slight earthquake on 27th, at 3 p.m. Mean temp. 1°·2 below, and rainfall 1·35 in. below, their respective averages. R. B. GORE.

Auckland.—A dry month, with an unusual predominance of cold S.W. winds. Rainfall barely half the average of 29 years. Mean temp. 2° below the average. T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Mean hourly velocity of wind 2·7 miles. Rainfall about half the average. R. JOHNSTONE.

TRINIDAD.—Rainfall 2·95 in. above the 30 years' average. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL, APRIL, 1897.

[For the Counties, Latitudes, and Longitudes of most of these Stations, see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge (Harefield Pk.)	1·59	XI.	Rhayader, Nantgwillt ...	5·97
II.	Dorking, Abinger Hall .	1·62	,,	Lake Vyrnwy	5·13
,,	Birchington, Thor	1·78	,,	Corwen, Rhug	2·42
,,	Hailsham	1·87	,,	Criccieth, Talarvor	3·15
,,	Ryde, Thornbrough	2·62	,,	I. of Man, Douglas	2·97
,,	Emsworth, Redlands ...	2·26	XII.	Stoneykirk, Ardwell Ho.	2·37
,,	Alton, Ashdell	1·77	,,	New Galloway, Glenlee	2·75
III.	Oxford, Magdalen Col..	2·39	,,	Lilliesleaf, Riddell	1·47
,,	Banbury, Bloxham	1·42	XIII.	N. Esk Res. [Penicuick]	2·20
,,	Northampton, Sedgebrook	1·90	,,	Edinburgh, Blacket Pl..	1·04
,,	Duddington [Stamford].	1·66	XIV.	Glasgow, Queen's Park..	2·01
,,	Alconbury	1·49	XV.	Inverary, Newtown	3·97
,,	Wisbech, Bank House...	1·56	,,	Oban, The Corran	3·14
IV.	Southend	1·42	,,	Islay, Gruinart School...	1·27
,,	Harlow, Sheering..... ...	1·79	XVI.	Dollar.....	1·51
,,	Colchester, Lexden	1·66	,,	Balquhidder, Stronvar...	5·47
,,	Rendlesham Hall	1·49	,,	Ballinluig	2·59
,,	Rushall Vicarage	2·02	,,	Dalnaspidal H.R.S.....	3·92
,,	Swaffham	2·42	XVII.	Keith H.R.S.....	·77
V.	Salisbury, Alderbury ...	2·24	,,	Forres H.R.S.	·70
,,	Bishop's Cannings	2·25	XVIII.	Fearn, Lower Pitkerrie..	·82
,,	Blandford, Whatcombe .	3·79	,,	N. Uist, Loch Maddy ...	3·91
,,	Ashburton, Holne Vic...	6·01	,,	Invergarry.....	3·31
,,	Okehampton, Oaklands.	5·05	,,	Aviemore H.R.S.	1·44
,,	Hartland Abbey	3·77	,,	Loch Ness, Drumnadrochit	1·83
,,	Lynmouth, Glenthorne.	4·54	XIX.	Invershin	·63
,,	Probus, Lamellyn	5·03	,,	Scourie	1·94
,,	Wellington, The Avenue	2·79	,,	Watten H.R.S.....	·92
,,	Wincanton.....	3·30	XX.	Dunmanway, Coolkelure	8·55
VI.	Clifton, Pembroke Road	3·68	,,	Cork, Wellesley Terrace	6·00
,,	Ross, The Graig	2·13	,,	Killarney, Woodlawn ...	4·01
,,	Wem, Clive Vicarage ...	1·68	,,	Caher, Duneske	4·17
,,	Cheadle, The Heath Ho.	3·27	,,	Ballingarry, Hazelfort...	4·04
,,	Worcester, Diglis Lock	1·12	,,	Limerick, Kilcornan ...	5·21
,,	Coventry, Kingswood ..	2·18	,,	Broadford, Hurdlestown	3·85
VII.	Grantham, Stainby	1·71	,,	Miltown Malbay	6·85
,,	Horncastle, Bucknall ...	1·28	XXI.	Gorey, Courtown House	4·19
,,	Worksop, Hodsck Priory	1·31	,,	Athlone, Twyford	4·54
,,	Neston, Hinderton	2·03	,,	Mullingar, Belvedere ...	4·36
VIII.	Southport, Hesketh Park	2·73	,,	Longford, Currygrane...	4·26
,,	Broughton-in-Furness ...	3·73	XXII.	Woodlawn	4·39
IX.	Ripon, Mickley.....	1·61	,,	Crossmolina, Enniscoe ..	4·90
,,	Melmerby, Baldersby ...	1·35	,,	Collooney, Markree Obs.	3·40
,,	Scarborough, Observat'y	1·78	,,	Ballinamore, Lawderdale	...
,,	Middleton, Mickleton ...	1·73	XXIII.	Lough Sheelin, Arley...	...
X.	Haltwhistle, Unthank...	1·85	,,	Warrenpoint.....	3·64
,,	Bamburgh	1·14	,,	Seaforde.....	2·57
,,	Keswick, The Bank	2·82	,,	Belfast, Springfield	2·77
XI.	Llanfrechfa Grange	4·65	,,	Bushmills, Dundarave..	2·38
,,	Llandovery	3·75	,,	Stewartstown	2·86
,,	Castle Malgwyn	3·23	,,	Killybegs	4·22
,,	Builth, Abergwesyn Vic.	6·01	,,	Lough Swilly, Carrablagh	2·80

APRIL, 1897.

Div.		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours. Dpth	Date	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date	Min. Deg.	Date.	No. of Nights below 32°. In shade.	On grass.
			inches.	inches.	in.								
I.	ENGLAND.	London (Camden Square) ...	1·57	— ·17	·23	6	16	67·3	27	27·8	11	2	9
II.		Maidstone (Hunton Court)...	2·04	+ ·39	·80	28	10	...	...	...	...	...	...
,,		Strathfieldsaye	1·53	...	·44	15	16	...	...	...	...	...	...
III.		Hitchin	1·77	— ·02	·43	28	13	66·0	26*c*	26·0	10	5	...
,,		Winslow (Addington)	1·57	— ·35	·31	16	14	68·0	28	26·0	11	3	7
IV.		Bury St. Edmunds (Westley)	2·07	+ ·41	·45	16	15	64·0	29	30·0	6	..	...
,,		Norwich (Brundall)	1·81	...	·29	16*a*	17	67·8	27	27·0	9	6	12
V.		Weymouth(LangtonHerring)	2·92	+ 1·04	·49	11	16	64·0	28	32·0	5	1	...
,,		Torquay (Cary Green)	3·98	...	1·26	26	20	59·9	28	34·3	2	0	2
,,		Polapit Tamar [Launceston]..	3·32	+ 1·10	·44	16	24	65·8	27	29·4	11	1	4
VI.		Stroud (Upfield)	1·81	— ·34	·26	12	20	68·0	28	31·0	4	1	...
,,		ChurchStretton(Woolstaston)	2·21	— ·13	·37	16*b*	20	63·5	27	27·0	5	7	13
,,		Tenbury (Orleton)	...	...	...	...	...	...	...	...	...	...	...
VII.		Leicester (Barkby)	1·67	— ·43	·38	17	17	67·0	29	21·0	4	6	16
,,		Boston	1·29	— ·42	·31	16	15	69·0	29	27·0	11	5	...
,,		Hesley Hall [Tickhill].....	1·59	— ·12	·42	28	15	67·0	29	27·0	5,11	8	...
VIII.		Manchester(PlymouthGrove)	2·16	+ ·45	·50	16	17	64·0	26	27·0	4	4	4
IX.		Wetherby (Ribston Hall) ...	...	...	...	...	...	...	...	...	...	...	...
,,		Skipton (Arncliffe)	4·11	+ ·68	·82	17	16	...	...	...	...	...	...
,,		Hull (Pearson Park).	1·75	— ·17	·36	16	17	67·0	29	27·0	3,11	11	11
X.		Newcastle (Town Moor)	1·69	— ·14	·44	17	12	...	...	...	...	...	...
,,		Borrowdale (Seathwaite).....	7·27	+ ·13	1·80	13	14	...	...	...	...	...	...
XI.	WALES.	Cardiff (Ely).....	4·30	+ 1·89	·56	17	22	...	...	...	...	...	...
,,		Haverfordwest	4·08	+ 1·45	·71	5	23	62·9	28	30·2	11	1	8
,,		Aberystwith (Gogerddan) ...	4·04	+ 1·48	·73	6	17	64·0	26	21·0	1,7	8	...
,,		Llandudno.....	3·11	+ 1·30	·55	13	18	59·5	28	33·5	8	0	...
XII.	SCOTLAND.	Cargen [Dumfries]	3·46	+ 1·23	·92	13	12	60·8	26*a*	24·6	1	9	...
XIII.		Edinburgh (Blacket Place)...	1·04	...	·33	13	13	57·3	29	26·4	3	6	14
XIV.		Colmonell	3·12	...	·87	13	14	63·0	27	24·0	1	...	...
XV.		Lochgilphead (Kilmory).....	3·48	+ ·67	·79	13	13	...	...	21·0	1	10	...
,,		Mull (Quinish).....	3·74	+ ·76	·88	13	13	...	...	...	...	...	...
XVI.		Loch Leven Sluices	1·60	— ·62	·70	14	7	...	...	...	...	...	...
,,		Dundee (Eastern Necropolis)	1·50	— ·55	·55	13	15	59·0	28	27·7	2	8	...
XVII.		Braemar	2·51	+ ·09	1·17	13	14	53·2	22	13·4	3	15	27
,,		Aberdeen (Cranford)	2·51	...	·84	13	17	57·0	29	23·0	2	5	..
,,		Cawdor (Budgate)	·79	— ·73	·20	15	12	...	...	...	...	...	...
XVIII		Strathconan [Beauly]	2·92	+ ·11	·73	16	9	...	...	...	...	...	...
,,		Glencarron Lodge.....	4·14	...	·78	13	15	57·7	27	23·0	2	12	...
XIX.		Dunrobin	·68	— 1·05	·23	12	8	53·0	28	27·8	3	4	...
,,		S. Ronaldsay (Roeberry).....	1·42	— ·19	·56	13	17	54·0	17	27·0	1, 2	4	...
XX.	IRELAND.	Darrynane Abbey.....	5·69	...	·80	12	23	...	...	...	...	...	...
,,		Waterford (Brook Lodge) ...	5·05	+ 2·58	·86	12	23	61·0	28	31·0	2	1	...
,,		O'Briensbridge (Ross)	5·19	...	·54	3	20	...	...	...	...	...	...
XXI.		Carlow (Browne's Hill)	3·63	+ 1·35	·47	5	22	...	...	...	...	...	...
,,		Dublin (FitzWilliam Square)	2·49	+ ·37	·42	20	22	59·7	28	29·9	2	1	4
XXII.		Ballinasloe	4·78	+ 2·44	·58	16	23	58·0	26	30·0	1, 2	5	...
,,		Clifden (Kylemore)	7·38	...	1·14	5	19	...	...	...	...	..	...
XXIII		Waringstown	3·24	+ ·82	·75	15	19	63·0	29	26·0	2	7	15
,,		Londonderry (Creggan Res.).	2·24	·00	·33	29	20	...	...	...	...	...	...
,,		Omagh (Edenfel)	2·92	+ ·69	·40	20	19	60·0	26	26·0	1	6	16

+Shows that the fall was above the average ; —that it was below it.

a—and 28. *b*—and 17. *c*—and 27.

METEOROLOGICAL NOTES ON APRIL, 1897.

ABBREVIATIONS.—Bar. for Barometer; Ther. for Thermometer; Max. for Maximum; Min. for Minimum; T for Thunder; L for Lightning; T S for Thunderstorm; R for Rain; H for Hail; S for Snow.

ENGLAND.

ADDINGTON.—Cold, ungenial weather until the 26th, when there was a considerable rise in the max. temp. On the afternoon of the 16th a sharp TS occurred, and another on the evening of the 28th. Mean temp. just one degree higher than the mean of March. The cuckoo rather early, heard on the 15th. Swallows seen on same date. Nightingale later, not heard until 24th. S on 1st and 7th. H on 30th.

BURY ST. EDMUNDS, WESTLEY.—The month was cold, with the exception of the 13th till the 26th, then warm till the end. A violent TS occurred on the 28th, with unusual darkness about midday, very heavy in Mid-Suffolk. The migratory birds came at their usual times. Distant T on 7th and 17th.

NORWICH, BRUNDALL.—Rainfall ·14 in. above the average; mean temp. slightly below. Prevailing winds from N.E., S.E., and S.W. The early part of the month was very ungenial, with S on 1st, 2nd and 5th. Windy weather and cool for the season till the fourth week, when some warm days alternating with heavy rains forced on vegetation.

WEYMOUTH, LANGTON HERRING.—Rainfall for the first four months of the year, 58 per cent. above the average. Average temp. at 9 a.m., 47°·1, or 0°·4 below the average of 25 years. Solar halos on 11th and 20th. Fogs on 9th, 27th and 28th. TS on 26th.

TORQUAY, CARY GREEN.—Rainfall 1·64 in. above the average. Total rainfall of the first four months 4·81 in. above the average. Mean temp. 47°·5, or 0°·7 below the average. Duration of sunshine 139 hours 35 minutes, being 43 hours 55 minutes below the average. Total sunshine of the first four months 86 hours 40 minutes below the average. The R of the 26th, 1·26 in., all fell in five hours, between 5 p.m. and 10 p.m.

POLAPIT TAMAR [LAUNCESTON].—Unusually wet for April, also a cold month generally. For the fortnight from the 11th to the 24th strong winds to half gales were prevalent. H storms on 6th and 7th. Distant L on 26th.

STROUD, UPFIELD.—Sleet on 1st. Gales from S.E. on 3rd, and from S.W. on 14th and 17th. T on 28th.

WOOLSTASTON.—A backward month. The first week very cold, with S storms on 1st and 6th. First swallow on 11th; cuckoo on 21st. T and L on 28th. Mean temp. 44°·1.

LEICESTER, BARKBY.—A rather cloudy and windy month. Mean temp. 45°·4. T on 16th and 28th. S on 6th and 7th. Cuckoo heard on 13th; swallow seen on 17th.

HULL, PEARSON PARK.—H on 2nd and 4th. TS at noon on 16th.

WALES.

HAVERFORDWEST.—The first four months of this year have produced 16·74 in. of rain, the general characteristics being constant wet and mildness. In 1867 the rainfall for the first four months was 26·55 in., character constant wet and severity, S forming a large portion of the fall. In 1872 constant R and mildness characterized the first four months, the fall being 23·34 in. So during the last 48 years there have been two notably wetter springs than the present. April this year has been remarkable for constant R, but never any very heavy fall.

S on the 1st. Lunar halos on 10th and 15th. Aurora on 11th. Vegetation very forward; ash and oak both out, ash the earlier. Prevailing winds from S.E. 19 days, S.W. 9 days.

ABERYSTWITH, GOGERDDAN.—A cold and stormy month, with very little sunshine.

SCOTLAND.

CARGEN [DUMFRIES].—A cold, rainy, sunless month, resembling in almost every particular the exceptionally unpleasant April of 1877. The mean Bar. pressure has only been less in six, the mean temp. lower in five, the rainfall greater in six, and the sunshine less in two, out of the 38 years over which observations extend. The mean temp. is only 1°·7 higher than that of February, while the mean min., 34°·7, is actually lower than that of either February or March. Easterly winds prevailed on 21 days. Heavy S showers occurred on 15th. The total R for the first four months of the year, 14·24 in., is only ·71 in. above the average for that period. Vegetation is unusually backward, fully three weeks later than last year.

COLMONELL.—Rainfall ·81 in. above, and mean temp. 0°·4 below the average of 21 years. Heavy S shower on 1st; S on 14th; T on 14th and 15th.

MULL, QUINISH.—The week from 11th to 18th was exceptionally wet and stormy. Tremendous H showers, with T and L, from S.W. on 14th, 15th and 16th.

BRAEMAR.—A very cold and backward month.

ABERDEEN, CRANFORD.—This month has been cold, with little sunshine.

S. RONALDSAY, ROEBERRY.—A very cold month. Mean temp. 41°·6, being 2°·6 below the average of seven years.

IRELAND.

DARRYNANE ABBEY.—Another very wet month, and cold, except the last few days.

WATERFORD, BROOK LODGE.—Showers of S on 1st; heavy H showers on 6th; H and S on 14th. Swallows seen on 24th; cuckoo heard on 26th.

O'BRIENSBRIDGE, ROSS.—The wettest April for 30 years, but exceeded in 1867, when 6·43 in. of R fell. Temp. very low during the month, and gales frequent and heavy. Everything late.

DUBLIN.—A cold, changeable, rainy month. The amount of cloud was 12 per cent. in excess of that of April, 1896. Mean temp. 45°·9, or 1°·8 below the average. Fog on 21st. High winds on 16 days, reaching the force of a gale on 3rd and 10th. H fell on five days. Solar halos were seen on the 8th and 16th. Lunar halos on the 10th and 15th. S or sleet fell on the 1st and 14th.

WARINGSTOWN.—A very backward season.

OMAGH, EDENFEL.—Until the 21st the weather of April was a continuance of the extremely wet and unsettled weather of March, with the addition of a decreased instead of an increased mean temp.; as a result, vegetation, even of trees, absolutely stood still, as might also be said of all kinds of farm labour. The fourth week, however, was fine and generally dry and clear, and much agricultural work was overtaken; but the month ended in a return to the rainy and unsettled condition prevailing now for so many months.