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HYGROSCOPES.

By John Aitken, LL.D., F.R.S.

In recent numbers of your Magazine you have described and illustrated some hygroscopes. The one described in your number for February last is an ingenious method of using our old friend the

awn of the sterile oat, the twisting and untwisting of which is made to alter the position of the wings of an artificial butterfly. This awn was long ago used for making some of the hygroscopes which were fitted into the lower part of old-fashioned wheel barometers, where, of course, they were utterly useless, owing to being closely confined in the hollow in the frame cut out for them and covered with glass, and therefore cut off from all communication with the outer air. Besides this awn there are many other organic substances capable of indicating a change in the humidity of the atmosphere. One of these, which I have never seen referred to anywhere, and which I have used for many years and found very sensitive—much more so than the awn of the sterile oat—it is made of a petal of one of the so-called everlasting flowers. Though the petals of any of these flowers can be used, yet I think those of *Acroclinium roseum*, or *album*, will be found to be the most suitable.

In the lower part of the illustration is shown an instrument which has been used for many years. At the top left-hand corner is shown a flower of *Acroclinium*, and at the top right corner are three petals taken from another flower; two of these are shown edge-on, the third broadside. The petal to the left is fairly dry, while the middle one is not so dry, and if it had been in saturated air there would have been no break in the curvature; the upper and lower parts of the petal would have formed a continuous curve, the upper part coming to nearly a horizontal position. The curious point in this mechanism is that the sensitive area is extremely short, and forms practically an elbow joint, the upper part of the petal hinging on the lower part, which is fixed in the top of the flower stalk. By this mechanism the flower is enabled to open and close its petals with every change in the humidity of the atmosphere.

In the instrument shown in the lower part of the illustration a short pillar is screwed into the base-plate near the centre, and to this is attached a spring clip as shown. A petal having been selected from a flower, most of it is cut away above the sensitive part and a stiff hair cemented in its place to act as a pointer, and what was the base of the petal is inserted into the clip. The instrument is then put under a glass cover, which has been wetted inside to saturate the air. After the pointer ceases to move the centre pillar is turned so as to bring the pointer to zero on the scale.

This instrument is just about as sensitive as a hair hygroscope, and has advantages over it. It is much more compact, has no mechanism to get out of order or to cause friction, and is much cheaper. The instrument should be fitted in an open metal-work case, or the cover must be opened when in use if not fully ventilated. Nothing but metal should be used in the construction of the case. For the scale, paper should be avoided, owing to its power of absorbing and giving out moisture, which retards the movements of the hygroscope.

THE RAINFALL OF OCTOBER, 1907.

A WET October is no new thing, for in the British Isles that month has on the average the heaviest general rainfall of the twelve; but, probably in contrast with the remarkable dryness of September, the wetness of October, 1907, has acquired a certain notoriety which will, we think, be short-lived. Our correspondence pages bear witness to the very heavy falls of rain which occurred in various parts of the country on the 16th, accompanying the passage of a deep depression from south to north, and but for that day and the 28th the rainfall of October would hardly have exceeded the average in most parts of the country.

The tables at the end of this number give details of the actual rainfall at a large number of stations, and the returns from four times as many are utilized in producing the accompanying map of the October rainfall. It will be observed that the north of Scotland is remarkably dry, indeed the whole country north of the Great Glen had less than the average, and in some parts less than half the average. There was a relatively dry belt stretching southward and eastward from Lancashire, where the rainfall was below the average at some points; and in London and its immediate neighbourhood, to the north-east, the rainfall also failed to reach the average.

On the other hand the south and east of Scotland, the greater part of England, and the south and east of Ireland, had an excess of more than fifty per cent. of rain, and there were two extensive areas—in the south of Scotland and in the south of England respectively—where more than twice the average rainfall for the month was precipitated. In those areas the fall was, in some instances, unprecedentedly great in records extending over more than thirty years.

The map now reproduced may be compared with that of the extraordinarily wet October of 1903 (Vol. **38**, p. 170), which was probably the wettest on record for the country as a whole, and although a few stations had more rain in October, 1907, than in October, 1903, the country as a whole had greatly less. Last month only a few patches with more than 10 inches of rain occurred as compared with large areas in 1903, and the areas over 8 and over 6 inches were also restricted, though the latter were sufficiently extensive to be remarkable in the South of England and over the Pennine Chain. In the South of Scotland the October rainfall approaches more nearly to that of 1903 than in any other part of the country. Unfortunately several of the records available four years ago have come to an end, but we can compare a certain number.

It is apparent from the table that while in the west of Scotland the rainfall of October, 1903, was several inches greater than that of 1907, the relation is reversed in the Lothians, where the rainfall of last month exceeded that of October, 1903, by between one and two inches, and is, we believe, the greatest that has been recorded in the Edinburgh district since observations began.

RAINFALL OF OCTOBER, 1907.

		Rainfall of October, 1903.	1907.	Oct., 1903, Wetter by	Oct., 1907, Wetter by
		in.	in.	in.	in.
XII.	Cargen [Dumfries].....	10·40	8·59	1·81	
,,	Dalry, Old Garroch	12·34	10·08	2·26	
,,	Langholm	11·85	7·34	4·51	
,,	Moniaive, Maxwelton House	11·59	9·14	2·49	
XIII.	Selkirk, The Hangingshaw...	10·12	6·42	3·70	
,,	Edinburgh, Roy. Observatory	5·72	7·90	...	2·18
,,	West Linton, Rutherford Ho.	8·11	8·97	...	·86
,,	N. Esk Reservoir [Penicuick]	7·90	9·00	...	1·10
,,	Whittinghame Gardens	7·09	9·08	...	1·99
,,	Boghead	8·54	9·81	...	1·27
XIV.	Colmonell	9·01	6·91	2·10	
,,	Glasgow, Queen's Park	7·47	6·66	·81	
XV.	Tighnabruaich	10·61	7·31	3·30	
XVI.	Loch Leven Sluice.....	7·55	6·77	·78	
,,	Dundee, Eastern Necropolis..	5.30	5·20	·10	
,,	Balquhidder, Stronvar..	15·58	5.67	9·91	

The effect of the heavy rain on the harvest in Scotland has been disastrous, the splendid crops, which at the end of September were almost ready for cutting, having been totally lost in many parts of the country.

The dull cold summer, with many rain days, followed by this wet October, have created a general impression that 1907 has so far proved a very wet year. The data before us are not complete, but we think that there is good ground for the statement, based on the records published in our pages, that although the rainfall for the ten months in Scotland exceeds the average by about 7 per cent., in Ireland it just reaches the average, and in England and Wales it falls short of the average by something like 4 per cent. It thus depends on the rain of November and December whether the year will have to be recorded as wet or dry.

ON A REPRESENTATION OF THE TEMPERATURE CYCLE OF THE SEASONS.

By L. C. W. Bonacina, F.R.Met.Soc.

The following investigation may serve to elucidate the nature and peculiarities of that cycle of atmospheric temperature changes which differentiate the seasons. There need to be considered only two agencies which control the temperature of the Earth's atmosphere as a whole: (*a*) the reservoir of heat or furnace, (*b*) the receiver of heat or refrigerator. The reservoir of heat for the atmosphere is, of course, the sun; the refrigerator of the atmosphere is properly the land and water surface of the globe, for although it is this surface which communicates to the lower layers of the atmosphere most of the heat which the latter derives from the sun, it is likewise this very surface which is always ready to act as a source of cold by radiating back into space the energy received from the reservoir.

These two agencies, then, are in constant antagonism, and operate through the transmission in opposite directions of radiant energy. How they produce the characteristic effects in the four seasons will now be shown. Let only one hemisphere, say the northern, be considered. During the winter season, which for the present investigation is best defined as lying between the winter solstice about December 22nd and the vernal equinox about March 20th, the reservoir is transmitting only a small quantity, relatively speaking, of heat, so that so far as the northern hemisphere is concerned the temperature of the reservoir may be regarded as low, although constantly increasing throughout the period.

At the same time the refrigerator is at a lower temperature than in any other season, and inasmuch as the amounts of heat gained and lost by it during this epoch are approximately equal, the atmosphere may be regarded in this relation as being in a state of low temperature equilibrium, the months of January and February being the coldest of the year. From March 20th to June 21st—that is to say, during the spring season—the reservoir furnishes as much heat as it does during the following summer season, and its temperature may therefore be regarded as high and as increasing till the end of the period at the summer solstice when it reaches its maximum. The refrigerator is at a low temperature at the commencement of the period (March 20th), and gradually gaining more heat than it loses, has, by the advent of the summer solstice acquired a relatively high temperature. Further, the temperature conditions of the lower atmosphere in spring, being the product of the action of strong solar radiation upon a cold land or water surface, are markedly unstable.

In the period from about June 21st to September 23rd, which constitutes the summer season, the reservoir is at a high but constantly declining temperature; the refrigerator is likewise, as compared with winter, at a high temperature, and since it loses approximately as much heat as it gains, the lower atmosphere is now at a high temperature equilibrium, July and August being the warmest months of the year.

In autumn, which lasts from about September 23rd to about December 22nd, the reservoir is still diminishing the output of heat, its temperature reaching a minimum at the winter solstice, whilst a steady leakage of heat takes place from the refrigerator, which begins warm and ends cold. The cooling of the refrigerator must, of course, be communicated to the lower atmosphere, but the latter does not in autumn, for a reason to be shortly indicated, exhibit the temperature instability so conspicuous in spring.

The following tabulation affords an insight into the reason of two interesting peculiarities by which the normal temperature cycle of the seasons is characterised. These are: (1) the large daily range of atmospheric temperature in summer as compared with winter; (2) the different manner in which the atmosphere becomes heated and cooled in spring and autumn respectively.

	Reservoir of Heat (furnace), *i.e.*, the Sun.	Receiver of Heat (refrigerator), *i.e.*, the land and water surface of the globe.	Atmosphere of the Earth.
WINTER (Dec. 22–Mar. 20)	Amount of heat transmitted small; increasing	Loss and gain of heat equal	Low temperature equilibrium
SPRING (Mar. 20–June 21)	,, ,, ,, large; increasing	Gain greater than loss	Temp. rises irregularly
SUMMER (June 21–Sep. 23)	,, ,, ,, large; decreasing	Loss and gain equal	High temperature equilibrium
AUTUMN (Sep. 23–Dec. 22)	,, ,, ,, small; decreasing	Loss greater than gain	Temp. falls more regularly than it rises in spring

As to (1), the greater difference shown by meteorological records between the mean temperatures of day and night in summer than in winter follows on the principle of Newton's *law of cooling*, as a little reflection will suggest. The case of (2) deserves more consideration as it is less easily accounted for. Soon after the vernal equinox solar radiation becomes powerful and of long daily duration, and soon after the autumnal equinox it becomes feeble and of short daily duration; but the receiving surface of the northern hemisphere—*i.e.*, the refrigerator of the lower atmosphere—is cold at the former date and warm at the latter, having the summer surplus of heat to get rid of in the form of dark radiant energy. There is, consequently, a much greater difference in April and May than in October and November between the amounts of heat already possessed by the refrigerator and the amounts in the form of solar radiant energy to which it is exposed.

The period from March to June, proverbially treacherous in its meteorological character, is normally marked in most temperate countries by a series of sudden spurts of high temperature frequently followed by a speedy relapse into the cold of winter. In other words, this irregular and capricious mode of arrival of summer warmth is due to the difficulty experienced by the powerful solar radiation of April and May in defeating the tendency of the refrigerator to retain in the atmosphere the low-level temperature of winter. In October and November, on the contrary, when the sun's rays are feeble, and the office of the refrigerator is to cool the atmosphere by parting with its own summer store of heat, the onslaught of the cold of winter is, except in so far as it may be interfered with by general meteorological causes or particular types of weather, much more regular and gradual, and a steady leakage of heat marks the recession of the vertical sun into the southern hemisphere. This exposition is a general representation of the temperature cycle of the seasons for the globe as a whole, without reference to the distinctive characteristics or anomalies of the cycle over any particular region.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

THE COLD SNAP IN SCOTLAND ON OCTOBER 8th.

THE sudden access of low temperature over Scotland on October 8th, 1907, was a highly instructive phenomenon from the meteorological point of view. The Weather Chart of the Deutsche Seewarte showed that on that morning there was no frost in any other part of Europe, not even in the most northerly regions, including Iceland, Lapland, and northern Russia. At Wick, a temperature of —2·26° C. (27° F.)* was recorded, at Stornoway —0·6° C. (31° F.), whilst at Aberdeen the temperature was +1·1° C. (33° F.). Along the whole east of England, even though the wind was westerly, the recorded temperatures were less than 3° C. (38° F.), and this at a time of year when the warming influence of the sea is still fully operative. The surrounding water was warm enough to influence the temperature of the air over the coasts affected by sea winds, as is shown by observations of 6·7° C. (44° F.) at Thorshavn, 7·8° C. (45° F.) at Valencia, 8·5° C. at Westervig, on the west of Denmark, and 8·2° C. at Oxö in the south of Norway.

Whence then came the cold snap in Scotland? The weather chart shows three areas of low pressure, as indicated by the isobar of 750 mm. (= 29·54 in.); one over Ireland, one over the North Sea, and one over the Norwegian Sea, which were drawing in the air from all sides. Scotland, however, lay under a little anticyclone, which might, perhaps, be represented by the isobar of 752·5 mm. (= 29·63 in.). In this way the air from the west of Scotland was being drawn over towards Ireland; that in the east of Scotland was being drawn south-eastward to the North Sea; and that over Orkney and Shetland north-eastward towards the Norwegian Sea. In order to take the place of this outdraught on all sides, it was necessary for the air in the little Scottish anticyclone to be replenished from above, and in Autumn the upper air is cold enough to produce a frost on the surface, in spite of the dynamical heating which it undergoes in its descent, the clear sky and dry upper air favouring nocturnal radiation.

Similar phenomena have occurred over the Cimbrian peninsula when cyclones lay simultaneously over the North Sea and the western Baltic, and air from above has descended to replace that drawn away to opposite sides; but I have never seen so striking an instance as that of October 8th in Scotland.

The Weather Chart of the Deutsche Seewarte for October 24th, at 8 a.m., supplies an *experimentum crucis* as to my theory of the frost of October 8th. This time there are two barometrical depressions,

* The temperatures in brackets are those recorded in the *Daily Weather Report* for October 8th, not the exact equivalents of the Centigrade temperatures.

one in the North Sea, the other in the Bristol Channel, and between them a region with a relatively strong descending current of cold air, from which comes a record of 32° F. and fog at Skegness.

The University, Kiel, October 25th, 1907. O. KRÜMMEL.

[The *Daily Weather Report* of our Meteorological Office does not show the low-pressure area over the North Sea on October 8th, though the low-pressures over Ireland and the Norwegian Sea are clearly brought out. It shows an area with less than 30° F. in the north-east of Scotland, while the isotherm of 40° includes the centre of Great Britain from north to south, and reappears in no other part of Europe except the middle of Ireland and Iceland. The *Daily Weather Report* of October 25th shows a low-pressure area over Ireland and another in the Norwegian Sea, but none in the North Sea; temperatures under 40° are indicated both in the east of Scotland and the east of England, elsewhere only in Iceland and northern Scandinavia. It must be remembered that the isobars on these charts are drawn from a very small number of points, and it often happens that when drawn for different units, *e.g.*, one set for intervals of 5 mm. another for intervals of 0·1 in., the same data may not give exactly the same outlines. Professor Krümmel's theory is in our opinion supported as well by the British chart as by the German chart which suggested it.—ED. *S.M.M.*]

HEAVY RAIN OF OCTOBER 16th—17th.

IN case you should be investigating the rainfall of October 16th–17th, I send you my figures.

Rain began about 7 p.m. on October 16th, and ended about noon on the 17th; very little fell before 9 p.m. or after 11 a.m., the heaviest was probably between 5 and 6 a.m.

	7 p.m. to 9 a.m.	9 a.m. to noon.	
Harewood Lodge	2·15	0·50	=2·65 in.
Royd Edge	2·13	0·69	=2·82 in.

The fall of 2·65 in. in 17 hours (most of it in 14 hours) has, I think, only been exceeded once in my register, *viz.*, in 1901, 3·06 in. in 16 hours, from November 11th, 8.30 p.m., to November 12th, 12.30 p.m.

Other heavy falls, not of thunderstorm type, are:—1883, January 28th, 10.30 a.m., to 29th, 10.30 a.m., 2·35 inches, which owing to the then position of the gauge is too small and requires an addition of from 10 to 15 per cent.; 1890, November 22nd–23rd, 36 hours, 2·43 in.; 1892, October 14th, 4 a.m., to 15th, 10 p.m., continuous rain 42 hours, 4·00 inches, of which 2·31 in. in 24 hours ending 15th at 9 a.m.; 1907, October 16th, 7 p.m., to 17th, 12 noon, 2·65 inches in 17 hours.

CHARLES L. BROOK.

Harewood Lodge, Meltham, Yorks, Oct. 19th, 1907.

THE rainfall for the 24 hours ending at 9.30 this morning was 3·67 in., which is nearly four times as much as the previous heaviest fall this year, *viz.*, ·93 in. on 20th April. My position is about 356 feet above sea level.

CHARLES F. SELBY.

Ravensbourne, Stoke Fleming, Nr. Dartmouth, 17th Oct., 1907.

THE rainfall registered here about 8.30 a.m. yesterday, the 17th October, was 3·41 inches. In my return to you at the end of the year this will appear as on the 16th October. My previous highest record was 1·65 inches on the 16th October, 1898.

A gale is now blowing with heavy rain, 11 a.m.

LEWIS KARSLAKE.

Redlap House, Nr. Dartmouth, 18th Oct., 1907.

I AM told that the rainfall in this neighbourhood in the 24 hours between 9 a.m. on Wednesday, October 16th, and 9 a.m. on Thursday, October 17th, was very unusual, and that we ought to report it to you. At "Fallapit" (Lord Ashcombe's place), East Allington, the rain gauge registered **4·63** during that 24 hours, and at Kingsbridge, 4½ miles off, where Mr. Latham, solicitor and architect, keeps a register also, it was **4·86**. At Salcombe it was only 2·30, and the same at Torquay.

A. D. MALLOCK.

East Allington Rectory, S.O., S. Devon, Nov. 2nd.

It MAY interest you to know that the rainfall here during the last 24 hours is **4·86** inches, at an elevation of 100 feet above sea level. I believe that the greatest amount previously recorded here during the last 40 years was 2·10 in. in any 24 hours.

T. W. LATHAM.

Westcombe, Kingsbridge, S. Devon, Oct. 17th, 1907.

THE GREENWICH SUMMER OF 1907.

A FEW notes on this may be acceptable. It might be described as decidedly cool and moderately dry. All the three months were cool; and on 69 of the 92 days (25 in June, 26 in July and 18 in August) the thermometer never got above the seventies; though it did once in May, and once in September. Few years have had so few of those hot days: we find 2 (each) in '41 and '53, one in '62 and '79, none in '60.

Some months ago I noted (in a contemporary) that where, as this year, the first three months were dry, the summer was generally dry (10 cases out of 12). The recent summer conforms to this.

The combination—a cool and dry summer—is rather rare, but less rare than that other, a warm and wet summer. On analysis of the records, 1841–1906, I find this:

1. Warm and dry summers 28
2. Cool and wet summers 21
3. Cool and dry summers 11
4. Warm and wet summers 5

(this leaves one case of average temperature). The third kind are thus one in 6; the fourth about one in 13.

Those cool and dry summers were: 1844, '54, '62, '63, '64, '69, '82, '83, '85, '86, '89 (thus, mostly in the sixties and eighties).

The warm and wet summers were: '52, '65, '73, '78, 1905. Curiously, these were all of the same type, *viz.*, June and August wet, July dry.

ALEX. B. MACDOWALL.

THE BROCKEN GHOST.

THE Brocken Ghost may often be seen on damp evenings such as November brings. When the night air is laden with mist anyone who will stand at the open window, having placed a candle behind him, will see a huge dim shadow thrown out upon the mist—and very weird the effect often is. A. F.

HAILSTONES.

ON October 11th, between 2 p.m. and 2.30 p.m., a sharp thunderstorm passed over this neighbourhood from S.W. to N.E., being accompanied by a heavy fall of hail lasting five minutes, from 2.5 p.m. to 2.10 p.m. The hailstones, although not of exceptional size, were of distinct formations. In the less common form the stone was composed of dull ice except at one side, where a small portion was clear. One base was markedly larger than the other.

In the other form there was a hard nucleus of dull ice surrounded by a radiated structure. This, again, was enclosed by rings of clear ice with a thin division between them, the edge was sharp and pointed although somewhat brittle. Some idea of the durability of the hailstones is brought out by the fact that five hours after the storm they were still to be found in sheltered spots, despite the fact that there was no material depression of temperature.

Fork-lightning of a deep blue hue was prevalent during the storm. From a number of observations I have obtained of thunderstorms accompanied by hail, it is a somewhat remarkable feature that the phenomena when occurring together are in almost every case accompanied by lightning of which the predominent colour is blue.

SPENCER C. RUSSELL.

Parkside, Ashley Road, Epsom, October 31st, 1907.

THE STUDY OF WEATHER PHENOMENA.*

By Rev. D. C. Bates, F.R.G.S., F.R.Met.Soc.

(*Continued from p. 177.*)

The *Temperature* of the air is the first subject we must deal with, and this in its most elementary form is as the senses perceive it. Heat is hard enough to define and explain, but even the most heedless youngster—the boy who on a wintry day neglects his overcoat, or the girl who forgets to put on her warm woollen undergarments —can usually tell you with some degree of definiteness the state of the air with regard to temperature and associate changes with times and events. In making a brief record first on the board, which one or more of the pupils may copy into a book, the teacher will draw out all sorts of information bearing on the subject. Every child will brighten up with associations and contradictions which the teacher will have to explain, guide or rule out of order. But to get them to understand, observe, remember and classify temperatures is the primary object in view.

Wind Directions and Velocities must have next attention. Fix the points of the compass roughly by the sun at sunrise, noon or sunset, and, from the usual point of observation, fix upon distant objects or the direction of a road for the points of reference on days when the sun is behind the clouds. Then the winds may be tabulated according to the four cardinal points and the four others half-way between, thus :—N , N.E., E., S.E., S., S.W., W., N.W., are all we need. For *velocity*, take the definitions used in our daily Weather Reports,† or use figures 0 for calm and 1 to 7 for the strength of the wind.

L.	1.	Light, just moving leaves on the trees.
B.	2.	Breeze moving branches.
FB.	3.	Fresh breeze, swaying branches, blowing up dust.
MG.	4.	Moderate gale, blowing up twigs from ground, swaying whole trees.
G.	5.	Gale, breaking small branches, loosening bricks or chimneys.
W.	6.	Gale of exceptional force, doing tremendous damage.

Cloudiness may be studied in three ways :—(1) For amount of the sky covered at a definite time, which is usually 9 a.m., in tenths. 0 is a clear day, and 1 with a little cloud, 2 more, 5 half covered, and so on to 10, quite overcast. (2) A simpler notation dependent on the scale of tenths for the estimation of the cloudiness or weather is the use of four letters to describe it at a certain time, or even for a whole day, as :—

* A paper read to a gathering of teachers at the Training College, Wellington, N.Z., August 1st, 1907.

† The Weather Reports of New Zealand are referred to. In the British Isles every alternate value of the Beaufort scale might conveniently be used.—Ed. *S.M.M.*

B. For blue, less than $^3/_{10}$ cloudy.
F. For fair, from $^3/_{10}$ to $^7/_{10}$ cloudy.
C. For cloudy, over $^7/_{10}$ cloudy; and
R. For rain, when the sky is usually overcast.

(3) By a description of the clouds according to their main divisions :— The stratus, or level low-lying clouds; the cumulus, or heaped or humpy clouds; and the cirrus, or lofty, feathery clouds, built up of delicate threads of particles of ice. Changes from one type to another are most instructive, and each has its own story to tell. The cirrus often heralds wind and storm; the stratus of winter thickens for rain, and the cumulus gathers up after the storm or before the thunderstorm or southerly that clears the air.

These are infant studies; but we may proceed to further division and classification as the studies advance. The international classification may be used as in all observatories, or we may exercise a little freedom and make our own independent studies in the form, colour, height, changes, direction of movement, and difference of direction between upper and lower clouds. At all times associate your observations with the weather that has passed here but is probably still prevailing at a distance, and with the weather which the clouds tell you to expect in the near future. Science is organised with accurate knowledge; therefore, work in the main upon the same lines as others, by using, as far as possible, the same terms. Tabulation, association and speculation will then show you that similar results follow similar causes. From these we form for ourselves empirical rules concerning the relationships between the clouds and the weather. The best local forecasters, especially of rain and wind, often go by nothing else than the clouds and their movements. Fishermen, shepherds and others who only use the tables of their memories, often attain, by steps and methods they cannot even trace, wonderful accuracy in the forecast of weather. Scientific methods are surer and safer, and those who will take the trouble carefully to observe, note down, tabulate and associate the various changes will obtain valuable results, but patience and perseverence are needed.

Hyther is a brand new word coined by Mr. W. F. Tyler, who lives at Shanghai where the heat and moisture at times makes life most uncomfortable. He invented it to express the degree of comfort, or rather discomfort, caused by weather. A bare record of temperature does not give the fullest idea of climatic effects. Dry heat, as in Australia, is tolerable; dry cold is enjoyable, as in the Canadian winter; cold moisture gives raw weather, hot moisture gives muggy weather, and this combination of the two is the hardest to bear. Mr. Tyler takes 0 as a perfect day, and 10 as almost unbearable, and by the numbers between he estimates varying degrees of discomfort. Professor Dexter, of America, in his book on "Weather Influences," treated of the effect especially upon school children, endeavouring to

show the times when school children were careless, unruly, etc., in relation to weather. Now take temperature, humidity, cloudiness (that makes us sad), *sunshine* that makes the butterflies come out and the youngster play truant; wind (that makes our horses frisky and unruly), and lump these phases together and estimate our days 1, 2, 3, 4, 5, 6, let us hope none of you ever get beyond that as an estimate of the sum total of the collective of bad sensations, as the effect of the weather on the body and mind. I think it would make an interesting addition to our registers especially as we shall see later we can somewhat check the records by instrumental tests with the hygrometer.

A full juvenile or first grade record would include :—

Date.	Temp.	Wind.		Cloud.				Remarks.	Hyther.
		Dir.	Velocity.	Amount 0—10	Kind.	Movement. Lower.	Movement. Upper.		

The teacher could draw out the record and write it upon the board and then one of the pupils, the honorary clerk of the weather, make a record in a book using both sides of the note book, or, better still, let all the pupils copy it out and on Monday morning summarise the last week and write the story of the weather as briefly, accurately and comprehensively as possible. At the end of the month the whole could be summarised and shown statistically, graphically by diagram, or even by picture. Such work gives a simple grip of most valuable methods and is extremely valuable as a school exercise. But, though it is hardly necessary to say so, it must not all be attempted at once or weather observations would be very burdensome.

Every place has a different climate owing to many complex influences of different soils, aspects for sunshine, neighbouring woods or hills, exposure to prevailing winds, etc. The climate depends a great deal upon the conformation of the country, and great mistakes are often made for want of a little weather knowledge some people would call common sense. I know of costly hospitals, asylums, mansions, etc., in different countries built in places naturally disagreeable both to plant and animal life. Primitive people understood weather signs. The Maori of old times usually built his *whare* on the sunny side of a hill, in a situation both airy and dry, and it was sheltered from the cold blasts by the palisading of the *pa*. In ignorance our settlers have often ruthlessly destroyed trees that would have given much comfort around their homesteads, sometimes they never realise their loss of comfort, but, if they do, how long a time they have to wait for natural shelter to grow again.

Correlation of the different elements of weather bring most useful but neglected facts home to the mind. For example we may take wind and temperature and record them in this form :—

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Percentage
Very hot Hot										
Warm ...										
Cold ..... Very cold										

Or we may correlate wind and sky weather thus :—

	N.	N.E.	E.	S.E.	S.	S.W.	W.	N.W.	Total.	Percentage
B.										
F.										
O.										
R.										
Total										
%										

The teacher will then be in a position to explain how the winds take their characteristics from the regions they come from. Cold from the south, hot from the north.*

Squared paper and cross lined exercise books can be used for diagrams to show varying forces of wind, cloudiness, direction of wind, Hyther, etc.

There are many other directions in which the study of weather phenomena without instruments might profitably be pursued, but we must hasten to speak of meteorological instruments which should only aid, though they sometimes seem to supersede real thought. People are apt to be satisfied with mere statistics which may be quite misleading, and it is to be regretted that English meteorologists the world over have had to pursue such drudgery in producing figures that their brains have but little chance of occupation in drawing out the meanings by a proper use of statistics. Brain work for research and not machine work for the printer is most needed. Bearing this in mind we may regard meteorological instrumental results as an *aid* but never as the supreme end in meteorological work. They are simply invaluable—essential indeed to the advance of the science, but meteorological research must be much more than a mere compilation of statistics. Do not let your work stop at that dead level, but rather study and observe until you feel an earnest desire to take up some special line of study in weather phenomena.

My present object is not to deliver a popular lecture upon the

* Again we remind our readers that the author addresses teachers in the southern hemisphere.—ED. *S.M.M.*

science, or to give instruction in meteorology itself, but to direct you to methods of independent study and for the teaching of the subject in two grades—(1.) Preliminary, without the aid of instruments; and (2.) Elementary Studies, with the aid of instruments. Advanced meteorology with its most interesting relationships to other sciences and dependence upon them for solution of its fascinating problems hardly comes within our scope, but I trust some of you will in time pursue it.

The best method of teaching meteorology to the little ones is the old one of catechetical enquiry, leading them by degrees to independent recognition of definite facts, and the discovery of relationships which exist between weather phenomena and definite causes. This can never be done all in one lesson, one season, or one year. You must hasten slowly, and carefully lay the foundations, not too much of the same thing, lest the pupils become weary, and not so much variety that the way is lost. By varying the observations interest may be awakened and sustained through a course of simple studies up to a more complete and advanced knowledge,—in a word the lessons must have a living interest, and be progressively instructive.

METEOROLOGICAL NEWS AND NOTES.

THE SYMONS GOLD MEDAL for 1908 was awarded by the council of the Royal Meteorological Society, at their meeting on October 16th, to Monsieur L. Teisserenc de Bort, of Paris, in recognition of the services which he has rendered to the science of meteorology. The medal was established in memory of the late George James Symons, F.R.S., the founder of the British Rainfall Organization, and is awarded biennially. The presentation will take place at the annual general meeting of the society on January 15th.

AT THE METEOROLOGICAL OFFICE the Director resumed on October 28th the series of meetings commenced in 1905 for the informal discussion of important contributions to Meteorological Literature, particularly those by Colonial or Foreign Meteorologists. The days provisionally arranged for the meetings are the following Mondays (at 5 p.m.):—November 25th, December 9th, 1907; January 20th, February 3rd and 17th, March 2nd, 16th, and 30th, 1908. The Director will be glad if contributors of observations to the Office, and others interested in Meteorology, will favour him with their presence at 63, Victoria Street, S.W., and take part in the discussions.

DR. W. N. SHAW, F.R.S., Reader in Meteorology in the University of London, commenced a series of twelve lectures on Meteorological Organization and Methods of dealing with meteorological observations, on Monday, October 21st, and these are being con-

tinued on alternate Mondays, at the University of London, South Kensington. The lectures are designed for advanced students at the University and others interested in Meteorology. There is no fee for the course.

THE INTERNATIONAL METEOROLOGICAL COMMITTEE met at Paris on September 10th, ten out of the seventeen members being present. Dr. Shaw was appointed President in succession to M. Mascart, and Prof. Hellmann was appointed Secretary, in succession to Prof. Hildebrandsson. From a very brief report in *Nature* we learn that the principal subjects discussed were the scheme of organisation of international meetings for meteorological purposes; marine charts and weather signals; a number of items of the international daily weather service, including reports by wireless telegraphy; and various propositions concerning the meteorology of the globe, in which were included one on the necessity for observing stations in the regions of centres of action of the atmosphere, another on the necessity for new charts of isotherms for the globe, and a third on the desirability of daily observations from selected stations, in order to trace the course of meteorological changes over the globe.

DR. W. DOBERCK, the late Director of the Observatory at Hong Kong has been succeeded in that position by Mr. F. G. Figg, who has been connected with the Observatory for many years.

WEATHER WHIMS A HUNDRED YEARS AGO.

AMONGST the interesting extracts from *The Times* of a century ago, we note the following quaint paragraph from the issue of Friday, October 30th, 1807 :—

"A man at *Thorn* has announced a discovery made by him, of a *certain* method, by which he can procure a constancy of 'settled *pleasant, healthy*, and *fruitful weather*;' and he adds, that he hopes 'the *Great Nation* will attend to it.' This undoubtedly deserves attention. Such an experiment is certainly beyond that of Dr. Franklin and others, who made *lightning* by poking at the clouds; or those of a late writer, who proposes enormous *mills* and *machines* in this Country, 'only to *abate* the rigour of the seasons,' by the effect of their friction on the atmosphere; or that of Jacques Bernardin St. Pierre, who suggests the erection of *pyramids*, losing themselves in the skies, in countries where there are no mountains, to attract vapour, create clouds, and make showers of rain descend upon the plains beneath. It is suggested that we might as well buy up the secret, as let France get it, for we want it, both *at home* and in our *colonies*. 'Tis, however, rather an awkward circumstance for this sagacious Citizen, that he did not discover his *secret* while Napoleon was struggling, *in his neighbourhood*, with all the *rigours* of a *winter* climate, in his campaign against the Russians."

TEMPERATURE FOR OCTOBER, 1907.

STATION.	COUNTY.	Lat. N.	Long. W. [*E.]	Height above Sea. ft.	TEMPERATURE. Max.		TEMPERATURE. Min.		No. of Nights at or below 32°	
									Shade.	Grass.
		° ′	° ′		°	Date.	°	Date.		
Camden Square	*London*	51 32	0 8	111	68·2	1	37·1	24.26	0	0
Tenterden	*Kent*	51 4	*0 41	190	66·0	1	31·0	25	1	3
West Dean	*Hampshire*	51 3	1 38	137	63·0	1, 6	30·0	27	5	14
Hartley Wintney	,,	51 18	0 53	222	65·0	1, 2, 3	30·0	25	2	6
Hitchin	*Hertfordshire*	51 57	0 17	238	65·0	1	30·0	24	3	...
Winslow (Addington)	*Buckinghamshr.*	51 58	0 53	309	65·0	1	32·0	16, 24	2	4
Bury St. Edmunds (Westley)	*Suffolk*	52 15	*0 40	226	66·0	1	31·0	24	1	...
Brundall	*Norfolk*	52 37	*1 26	66	65·4	1	33·6	25	0	5
Winterbourne Steepleton	*Dorset*	50 42	2 31	316	62·0	1	30·2	25	1	6
Torquay (Cary Green)	*Devon*	50 28	3 32	12	65·9	4	38·8	27	0	0
Polapit Tamar [Launceston]	,,	50 40	4 22	315	61·5	4	31·8	16	1	5
Bath	*Somerset*	51 23	2 21	67	64·5	1	32·0	25	1	...
Stroud (Upfield)	*Gloucestershire*	51 44	2 13	226	65·0	1	38·0	24, 31	0	...
Church Stretton (Wolstaston)	*Shropshire*	52 35	2 48	800	64·0	7	...	...	...	...
Coventry (Kingswood)	*Warwickshire*	52 24	1 30	340	60·0	1	34·0	16	0	...
Boston	*Lincolnshire*	52 58	0 1	25	65·0	1	32·0	24	1	...
Worksop (Hodsock Priory)	*Nottinghamshire*	53 22	1 5	56	66·1	6	29·2	8	4	12
Derby (Midland Railway)	*Derbyshire*	52 55	1 28	156	66·0	1	31·0	15	4	...
Bolton (Queen's Park)	*Lancashire*	53 35	2 28	390	63·8	1	33·3	16	0	7
Wetherby (Ribston Hall)	*Yorkshire, W.R.*	53 59	1 24	130	...	...	...	...	...	...
Arncliffe Vicarage	,, ,,	54 8	2 6	732	...	...	...	...	...	...
Hull (Pearson Park)	,, *E.R.*	53 45	0 20	6	67·0	6	32·0	8	1	4
Newcastle (Town Moor)	*Northumberland*	54 59	1 38	201	...	...	...	...	...	...
Borrowdale (Seathwaite)	*Cumberland*	54 30	3 10	423	61·6	6	33·8	29	0	...
Cardiff (Ely)	*Glamorgan*	51 29	3 13	53	...	...	...	...	...	...
Haverfordwest (High Street)	*Pembroke*	51 48	4 58	95	60·2	6	33·0	24	0	2
Aberystwyth (Gogerddan)	*Cardigan*	52 26	4 1	83	70·0	1	27·0	15	...	...
Llandudno	*Carnarvon*	53 20	3 50	72	68·0	2	37·0	14	0	...
Cargen [Dumfries]	*Kirkcudbright*	55 2	3 37	80	62·0	4	31·0	27	1	...
Lilliesleaf (Riddell House)	*Roxburgh*	55 31	2 46	550	...	...	...	...	...	...
Edinburgh (Royal Observy.)	*Midlothian*	55 55	3 11	442	61·2	5	34·8	16	0	2
Girvan (Pinmore)	*Ayr*	55 10	4 49	207	61·0	9	27·0	27	3	...
Glasgow (Queen's Park)	*Renfrew*	55 53	4 18	144	60·0	1	32·0	26	1	13
Tighnabruaich	*Argyll*	55 55	5 14	50	56·0	1, 2	32·0	16, 26	2	2
Mull (Quinish)	,,	56 36	6 13	35	61·0	5	...	...	...	...
Dundee (Eastern Necropolis)	*Forfar*	56 28	2 57	199	59·2	6	31·2	8	1	...
Braemar	*Aberdeen*	57 0	3 24	1114	...	...	...	...	...	...
Aberdeen (Cranford)	,,	57 8	2 7	120	64·0	9	30·0	24	2	...
Cawdor	*Nairn*	57 31	3 57	250	...	...	...	...	...	...
Invergarry	*E. Inverness*	57 4	4 47	130?	...	...	...	...	...	...
Loch Torridon (Bendamph)	*W. Ross*	57 32	5 32	20	...	...	...	...	...	...
Dunrobin Castle	*Sutherland*	57 59	3 56	14	58·0	2	32·0	8	1	...
Castletown	*Caithness*	58 35	3 23	100	62·0	5	26·0	7	4	4
Killarney (District Asylum)	*Kerry*	52 4	9 31	178	65·0	2	31·0	16	...	...
Waterford (Brook Lodge)	*Waterford*	52 15	7 7	104	62·0	4	28·0	16	3	...
Broadford (Hurdlestown)	*Clare*	52 48	8 38	167	60·0	5, 6†	30·0	15, 23	2	...
Abbey Leix (Blandsfort)	*Queen's County*	52 56	7 17	532	62·0	5, 6	...	...	...	...
Dublin (Fitz William Square)	*Dublin*	53 21	6 14	54	65·1	5	32·8	24	0	2
Ballinasloe	*Galway*	53 20	8 15	160	66·0	20	29·0	27	5	...
Clifden (Kylemore House)	,,	53 32	9 52	105	...	...	...	...	...	...
Crossmolina (Enniscoe)	*Mayo*	54 4	9 18	74	...	...	...	...	...	...
Seaforde	*Down*	54 19	5 50	180	64·0	5	30·0	15	2	4
Londonderry (Creggan Res.)	*Londonderry*	54 59	7 19	320	...	...	...	...	...	...
Omagh (Edenfel)	*Tyrone*	54 36	7 18	280	...	...	...	...	...	...

† and 20.

RAINFALL FOR OCTOBER, 1907.

RAINFALL OF MONTH.							RAINFALL FROM JAN. 1.					
Aver. 1870-99.	1907.	Diff. from Av.	% of Av.	Max. in 24 hours.		No. of Days	Aver. 1870-99.	1907.	Diff. from Aver.	% of Av.	Mean Annual 1870-1899.	STATION.
in.	in.	in.		in.	Date.		in.	in.	in.		in.	
2·85	2·52	— ·33	88	·34	5	22	20·59	17·08	— 3·51	83	25·16	Camden Square
3·60	5·73	+2·13	159	·79	3	25	22·40	19·44	— 2·96	87	28·36	Tenterden
3·53	7·76	+4·23	215	1·13	10	25	23·94	22·21	— 1·73	93	29·93	West Dean
3·08	5·35	+2·27	174	·95	14	24	21·52	21·55	+ ·03	100	27·10	HartleyWintney
2·72	3·70	+ ·98	136	1·38	14	19	20·05	18·98	— 1·07	95	24·66	Hitchin
2·89	3·94	+1·05	127	·76	16	20	21·85	19·68	— 2·17	90	26·75	Addington
2·66	2·58	— ·08	97	·42	14	16	20·78	19·34	— 1·44	93	25·39	Westley
2·98	3·90	+ ·92	131	·86	9	24	20·56	20·33	— ·23	99	25·40	Brundall
4·33	10·12	+5·79	259	1·39	16	26	30·05	29·02	— 1·03	97	39·00	Winterbourne Stpltn
4·09	7·92	+3·83	193	1·91	16	27	27·83	24·76	— 3·07	89	35·00	Torquay
4·97	7·96	+2·99	160	1·26	16	28	30·17	28·16	— 2·01	93	38·85	Polapit Tamar
3·22	5·67	+2·45	176	·75	10	26	24·93	25·30	+ ·37	101	30·75	Bath
3·10	5·94	+2·84	191	1·15	16	24	24·38	24·45	+ ·07	100	29·85	Stroud
3·99	7·07	+3·08	177	1·68	16	24	26·94	29·05	+ 2·11	108	33·04	Wolstaston
3·18	5·03	+1·85	158	1·31	16	21	23·97	23·46	— ·51	98	29·21	Coventry
2·62	4·09	+1·47	156	1·04	6	21	19·37	17·83	— 1·54	92	23·30	Boston
2·77	5·35	+2·58	193	2·05	16	21	20·58	19·38	— 1·20	94	24·70	Hodsock Priory
2·77	3·79	+1·02	137	·96	16	24	21·62	23·70	+ 2·08	109	26·18	Derby
4·72	4·03	— ·69	85	·55	12	23	34·33	37·40	+ 3·07	109	42·43	Bolton
3·18	6·09	+2·91	191	1·01	16	23	22·54	23·48	+ ·94	104	26·96	Ribston Hall
6·55	7·02	+ ·47	107	1·09	16	22	48·55	49·67	+ 1·12	103	60·96	Arncliffe Vic.
3·26	3·96	+ ·70	121	·87	16	22	22·21	19·98	— 2·23	90	27·02	Hull
2·94	5·86	+2·92	199	·86	25	26	22·70	22·50	— ·20	99	27·99	Newcastle
3·35	15·11	+1·76	113	2·73	12	26	104·07	98·25	— 5·82	94	132·68	Seathwaite
4·81	7·33	+2·52	153	·88	8	30	34·12	31·49	— 2·63	92	42·81	Cardiff
5·63	8·80	+3·17	156	·89	30	31	37·25	35·68	— 1·57	96	47·88	Haverfordwest
5·58	6·56	+ ·98	118	1·13	21	24	36·24	38·06	+ 1·82	105	45·41	Gogerddan
4·08	5·28	+1·20	130	·59	30	25	24·65	21·71	— 2·94	88	30·98	Llandudno
4·39	8·59	+4·20	196	1·04	14	20	34·25	39·95	+ 5·70	117	43·43	Cargen
3·24	...	...	...	...	...	...	26·57	...	...	...	33·04	Riddell House
...	7·90	...	...	3·13	15	25	...	25·36	...	...	...	Edinburgh
5·42	8·49	+3·07	157	2·10	15	25	38·32	...	...	...	48·87	Girvan
3·36	6·66	+3·30	200	2·27	15	26	28·79	34·34	+ 5·55	119	35·80	Glasgow
5·72	7·31	+1·59	128	1·90	15	22	45·36	51·10	+ 5·74	113	57·90	Tighnabruaich
6·09	3·80	—2·29	62	·50	9	19	44·62	41·34	— 3 28	92	57·53	Quinish
2·71	5·20	+2·49	191	1·55	15	21	23·46	26·45	+ 2·99	113	28·95	Dundee
4·05	4·06	+ ·01	100	...	...	...	28·98	25·82	— 3·16	89	36·07	Braemar
3·18	6·01	+2·83	189	1·47	17	21	26·15	26·61	+ ·46	102	33·01	Aberdeen
2·85	5·04	+2·19	177	1·46	15	12	24·19	27·13	+ 2·94	112	29·37	Cawdor
5·54	3·21	—2·33	58	·85	16	14	43·35	46·34	+ 2·99	107	56·00	Invergarry
9·98	3·46	—6·52	35	·49	14	18	67·67	72·44	+ 4·77	109	86·50	Bendamph
3·32	2·01	—1·31	60	·35	9	14	24·95	26·86	+ 1·91	108	31·60	Dunrobin Castle
...	2·98	...	...	·87	15	25	...	26·09	...	...	...	Castletown
6·05	7·04	+ ·99	116	·71	1	30	45·62	34·45	—11·17	75	58·11	Killarney
4·00	6·12	+2·12	153	·85	27	27	31·08	29·13	— 1·95	94	39·30	Waterford
3·12	4·87	+1·75	156	·79	2	27	26·91	28·71	+ 1·80	107	33·47	Hurdlestown
3·45	5·89	+2·44	171	1·00	8	29	28·50	30·13	+ 1·63	106	35·19	Abbey Leix
3·08	5·12	+2·04	166	·71	8	29	22·76	22·25	— ·51	98	27·75	Dublin
3·45	4·31	+ ·86	125	·80	9	25	29·81	29·41	— ·40	99	37·04	Ballinasloe
7·93	11·26	+3·33	142	1·90	1	27	62·99	58·03	— 4·96	92	80·23	KylemoreHouse
5·04	6·60	+1·56	131	·85	18	29	39·06	40·74	+ 1·68	104	50·50	Enniscoe
3·82	5·55	+1·73	141	·63	20	23	31·03	33·17	+ 2·14	107	38·61	Seaforde
4·45	3.64	— ·81	82	·82	6	24	32·70	39·58	+ 6·88	121	41·20	Londonderry
3·72	...	...	...	...	...	...	30·55	...	...	...	37·85	Omagh

SUPPLEMENTARY RAINFALL, OCTOBER, 1907.

Div.	STATION.	Rain inches	Div.	STATION.	Rain. inches
II.	Abinger Hall	7·08	XI.	Rhayader, Tyrmynydd	5·80
,,	Ramsgate	4·69	,,	Lake Vyrnwy	8·30
,,	Hailsham	6·49	,,	Llangyhanfal, Plâs Draw	8·15
,,	Crowborough, Uckfield Lodge	6·36	,,	Criccieth, Talarvor	5·17
,,	Totland Bay, Aston House	7·07	,,	Llanberis, Pen-y-pass	16·82
,,	Emsworth, Redlands	6·82	,,	Lligwy	7·45
,,	Alton, Ashdell	6·72	,,	Douglas, Woodville	7·10
,,	Newbury, Welford Park	7·53	XII.	Stoneykirk, Ardwell House	6·54
III.	Harrow Weald, Hill House.	4·66	,,	Dalry, The Old Garroch	10·08
,,	Oxford, Magdalen College	5·18	,,	Langholm, Drove Road	7·34
,,	Bloxham Grove	5·39	,,	Moniaive, Maxwelton House	9·14
,,	Pitsford, Sedgebrook	4·66	XIII.	N. Esk Reservoir [Penicuick]	9·00
,,	Huntingdon, Brampton	3·43	XIV.	Maybole, Knockdon Farm	7·30
,,	Wisbech, Bank House	2·73	XV.	Campbeltown, Witchburn	6·21
IV.	Southend Water Works	3·05	,,	Inveraray, Newtown	4·15
,,	Colchester, Lexden	2·46	,,	Ballachulish House	4·63
,,	Newport, The Vicarage	2·48	,,	Islay, Eallabus	5·00
,,	Rendlesham	3·00	XVI.	Dollar Academy	7·10
,,	Swaffham	3·07	,,	Loch Leven Sluice	6·77
,,	Blakeney	4·10	,,	Balquhidder, Stronvar	5·67
V.	Bishops Cannings	5·81	,,	Perth, Pitcullen House	4·79
,,	Ashburton, Druid House	8·53	,,	Coupar Angus Station	4·80
,,	Okehampton, Oaklands	7·81	,,	Blair Atholl	2·75
,,	Hartland Abbey	5·71	,,	Montrose, Sunnyside Asylum	4·99
,,	Lynmouth, Rock House	5·92	XVII.	Alford, Lynturk Manse	5·58
,,	Probus, Lamellyn	8·02	,,	Keith Station	5·78
,,	Wellington, The Avenue	...	XVIII.	N. Uist, Lochmaddy	2·21
,,	North Cadbury Rectory	5·81	,,	Alvey Manse	3·52
VI.	Clifton, Pembroke Road	5·33	,,	Loch Ness, Drumnadrochit.	3·67
,,	Ross, The Graig	8·51	,,	Glencarron Lodge	3·85
,,	Shifnal, Hatton Grange	4·99	,,	Fearn, Lower Pitkerrie	2·23
,,	Cheadle, The Heath House.	...	XIX.	Invershin	1·97
,,	Blockley, Upton Wold	8·40	,,	Altnaharra	1·62
,,	Worcester, Boughton Park.	6·84	,,	Bettyhill	2·09
VII.	Market Overton	5·60	XX.	Dunmanway, The Rectory	6·43
,,	Market Rasen	4·47	,,	Cork	5·07
,,	Bawtry, Hesley Hall	4·55	,,	Darrynane Abbey	6·74
VIII.	Neston, Hinderton Lodge	3·90	,,	Glenam [Clonmel]	6·99
,,	Southport, Hesketh Park	3·80	,,	Ballingarry, Gurteen	4·87
,,	Chatburn, Middlewood	4·49	,,	Miltown Malbay	6·20
,,	Cartmel, Flookburgh	7·13	XXI.	Gorey, Courtown House	6·24
IX.	Langsett Moor, Up. Midhope	7·73	,,	Moynalty, Westland	5·74
,,	Scarborough, Scalby	4·02	,,	Athlone, Twyford	3·62
,,	Ingleby Greenhow	4·87	,,	Mullingar, Belvedere	4·86
,,	Mickleton	4·90	XXII.	Woodlawn	5·10
X.	Bardon Mill, Beltingham	6·52	,,	Westport, Murrisk Abbey	...
,,	Ewesley, Fallowlees	5·84	,,	Collooney, Markree Obsy.	5·08
,,	Ilderton, Lilburn Cottage	7·46	,,	Mohill	4·24
,,	Keswick, York Bank	8·06	XXIII.	Enniskillen, Portora	4·07
XI.	Llanfrechfa Grange	6·93	,,	Warrenpoint, Summer Hill.	4·71
,,	Treherbert, Tyn-y-waun	10·98	,,	Banbridge, Milltown	4·09
,,	Carmarthen, The Friary	9·40	,,	Belfast, Springfield	4·28
,,	Castle Malgwyn [Llechryd].	10·62	,,	Bushmills, Dundarave	4·26
,,	Plynlimon	11·40	,,	Stewartstown, The Square	3·87
,,	Crickhowell, Ffordlas	10·10	,,	Killybegs	6·49
,,	New Radnor, Ednol	9·83	,,	Horn Head	5·24

METEOROLOGICAL NOTES ON OCTOBER, 1907.

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.

CAMDEN SQUARE.—Frequent though seldom heavy R, together with a preponderance of cloud and gloom, and absence of sunshine. The mean temp. was 51°·7, or 1°·9 above the average, chiefly owing to the absence of low minima. Duration of sunshine 73·9 hours, and of R 52·8 hours.

CROWBOROUGH.—R 2·08 in. above the average of 36 years, the deficiency since January 1st being reduced to ·17 in. R fell on every day, establishing a record. There was a considerable deficiency of sunshine. Mean temp. 49°·8, or 0°·2 above the average. Sharp TS on 20th.

NORTH CADBURY RECTORY.—Persistently and continuously wet, but with absence of really large falls. The temp., wind and cloud were all about normal, with a marked absence of extremes.

ROSS.—The wettest October since 1818, forming a great contrast to September. The Wye was in flood on 31st.

BOLTON.—Mean temp. 48°·4, or 1°·5 above the average. Sunshine occurred on 20 days, the total being 34·6 hours, or 21·7 below the average. Fog, generally slight, occurred on many days. Short TS, with heavy R, on 22nd.

SOUTHPORT.—Low but steady bar., with exceptional prevalence of light easterly winds, and many rain days, the total fall, however, being ·07 in. less than the average. Mean temp. 49°·9 or 1°·0 above the average. Duration of sunshine 88 hours, or one hour below the average, and of R 74·0 hours. Mean amount of ozone less than half the average.

LILBURN.—Remarkable for excessive R. Harvest was very late, and operations were entirely stopped after 5th. Thousands of acres of corn were still standing at the close of the month.

HAVERFORDWEST.—Very wet and mild, with a heavy gale on 19th. Crops were damaged by the R, and much corn was still out at the end. Duration of sunshine 77·4 hours.

DOUGLAS.—Wet and stormy throughout. The R was exceeded in 1893 only during the last 34 years.

INVERARAY.—Beautiful weather through the greater part of the month.

MULL.—Fine on the whole and very mild, with wind from E. throughout. An abundant harvest was secured in good order early in the month.

STRONVAR.—With the exception of the last six days it was a most depressing and unfavourable month for agriculture generally.

COUPAR ANGUS.—The R was 74 per cent. above the average, and coming at the close of a late season, was the most disastrous on record, though the month closed with promise of better weather. The mean temp. was 47°·1, or 2°·3 above the average.

ABERDEEN.—Wet, with light southerly and westerly winds, and heavy, cloudy skies. Much of the crops was still lying out in the fields at the end.

DRUMNADROCHIT.—R ·03 in. above, and rain days one below, the average of 21 years. The weather was unusually destructive to crops.

DUNMANWAY.—Wet on the whole, but the R was chiefly at night, and many of the days were fine and bright. Heavy frosts on 14th, 15th and 16th.

CORK.—R 1·77 in. above the average, and mean temp. 3°·8 above the average.

DARRYNANE.—R 24 per cent. above the average: it was generally mild, but with a few cold days about the middle. Strong gale and extremely high tide on 18th.

BALLINGARRY.—Persistently wet. "Black rain" fell during the night of 8th as at Birr and elsewhere. The first destructive frost occurred on 16th.

DUBLIN.—One of the wettest months on record, having 29 rain days. The R was, however, persistent rather than heavy. Mean temp. 49°·9, or 0°·4 above the average. TS lasting three hours on 9th.

BANBRIDGE.—Very wet, the R being 1·09 in. above the average of 45 years. The harvest was good, but much will be lost as it could not be got in.

Climatological Table for the British Empire, May, 1907.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	82·3	12	35·9	20	63·5	45·6	45·8	74	124·2	29·8	1·74	17	...
Malta	80·6	14	51·0	2	70·9	59·9	56·6	75	139·6	...	·00	0	3·9
Lagos	92·0	16	70·0	28	87·2	75·4	74·7	76	159·0	67·0	14·86	19	7·3
Cape Town	76·8	4	41·0	28	62·9	50·3	50·9	83	...	...	6·29	19	6·2
Durban, Natal ...	87·3	25	41·1	28	75·4	58·3	...	...	138·3	...	·73	12	3·6
Johannesburg	69·0	14	25·3	28	62·4	44·2	41·1	72	134·1	24·1	·19	3	2·0
Mauritius	81·8	8	55·0	19	77·6	65·4	64·0	77	145·9	46·5	4·71	13	5·9
Calcutta...	102·1	9	68·1	24	95·8	76·7	73·1	69	156·6	67·2	5·48	7	3·7
Bombay...	93·2	31	76·9	11	91·2	79·9	74·3	71	136·2	71·0	·00	0	1·6
Madras	109·0	21	76·3	1	102·1	80·8	72·7	64	146·3	72·6	·00	0	2·8
Kodaikanal	74·3	26	50·2	16	70·2	54·4	49·1	66	140·9	42·4	5·37	18	4·1
Colombo, Ceylon ...	90·4	3, 4	73·5	5	88·1	78·3	75·7	80	156·0	70·8	5·47	22	6·1
Hongkong	86·8	17	67·4	3	80·6	73·0	70·4	82	147·5	...	11·28	14	7·7
Melbourne	73·8	18	39·8	30	63·9	46·8	47·2	76	124·0	30·7	1·66	6	5·8
Adelaide	80·7	16	41·3	1	67·7	49·2	48·6	72	136·6	35·9	2·40	11	4·7
Coolgardie	86·5	4	36·0	21	68·5	46·2	40·4	56	146·0	30·2	1·28	8	2·6
Sydney	73·1	7	45·9	1	65·4	51·8	50·5	84	104·8	35·3	1·70	19	4·3
Wellington	62·5	24	38·9	15	55·6	46·7	44·8	79	102·0	30·0	6·39	20	5·1
Auckland	69·0	8	41·0	21	61·2	49·9	47·7	76	122·0	37·0	3·97	16	5·0
Jamaica, Negril Point.	88·1	2	67·6	9	86·0	71·4	72·3	77	...	...	5·38	19	...
Trinidad	94·0	24	68·0	sevrl	87·6	70·8	73·1	82	160·0	62·0	4·58	14	...
Grenada	87·4	2	70·8	19	84·2	74·3	69·1	73	146·0	...	4·44	15	5·5
Toronto	76·3	18	26·0	12	..	...	...	...	...	...	1·93	9	5·0
Fredericton	..	...	...	...	...	...	...	...	...	...	...	...	...
St. John's, N.B. ...	63·0	17	31·8	3	...	...	...	...	...	...	2·96	10	7·0
Victoria, B.C.	76·7	30	38·0	1	...	...	...	...	...	...	·35	3	5·0
Dawson	80·0	23	23·0	11	...	...	...	...	...	...	1·06	9	5·0

MALTA.—Adopted mean temp. of air 64°·8. Mean hourly velocity of wind 7·6 miles. Mean sunshine 10·8 hours per day.

LAGOS.—R on the 13th 6·62 in.

Johannesburg.—Bright sunshine 287·4 hours.

Mauritius.—Mean temp. of air 0°·5, dew point 1°·3, and relative humidity 2·1 per cent., below averages, and R ·75 in. above average.

MADRAS.—R 4·07 in. below average. TSS on one day.

KODAIKANAL.—Bright sunshine 229 hours.

COLOMBO.—Mean temp. of air 82°·5 or 0°·1 above, of dew point 0°·4 above, and R 6·30 in. below, averages. Mean hourly velocity of wind 8·6 miles. TSS on 3 days.

HONGKONG.—Mean temp. of air 76°·2. Bright sunshine 164·0 hours. Mean hourly velocity of wind 13·9 miles.

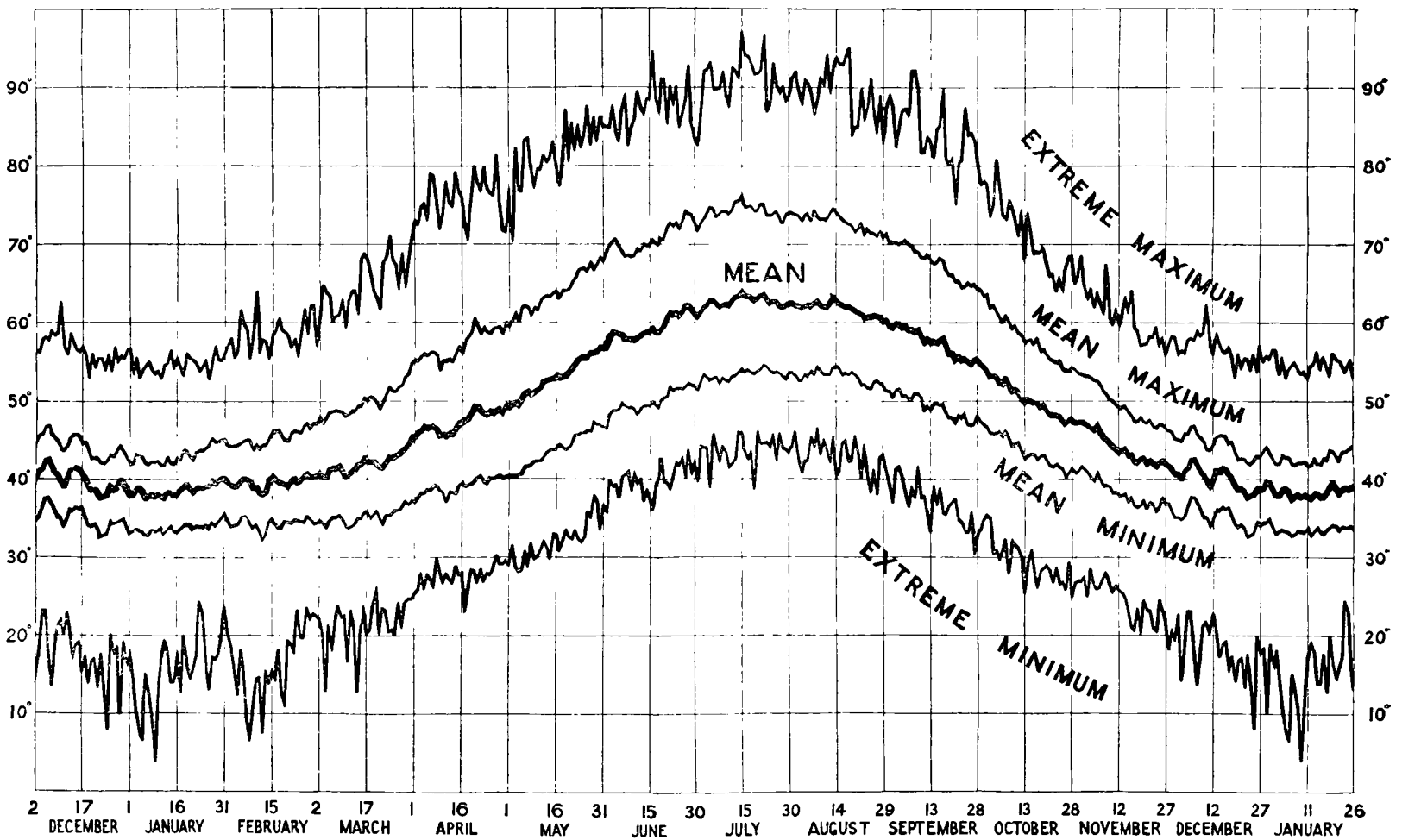
Adelaide.—Mean temp. of air 0°·7 above, and R ·35 in. below, averages.

Sydney.—Mean temp. of air 0°·2 above, and R 3·48 in. below, averages.

Wellington.—Mean temp. of air 1°·7 below, and R 1·73 in. above, averages. Bright sunshine 93·5 hours.

Auckland.—Mean temp. of air and R both slightly below averages of 40 years.

TRINIDAD.—Rainfall ·88 in. above 43 years' average.


TEMPERATURE — ROYAL OBSERVATORY GREENWICH, 65 YEARS 1841 – 1905.
90°
80°
70°
60°
50°
40°
30°
20°
10°
EXTREME MAXIMUM
MEAN
MEAN MAXIMUM
MEAN MINIMUM
EXTREME MINIMUM
2 17 1 16 31 15 2 17 1 16 1 16 31 15 30 15 30 14 29 13 28 13 28 12 27 12 27 11 26
DECEMBER JANUARY FEBRUARY MARCH APRIL MAY JUNE JULY AUGUST SEPTEMBER OCTOBER NOVEMBER DECEMBER JANUARY