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THE BRITISH ASSOCIATION AT IPSWICH.

Although there were not many meteorologists at the Ipswich Meeting, meteorology came more to the front than usual. The President (Sir Douglas Galton, K.C.B.) devoted to it the following portion of his address :—

METEOROLOGY.

At the first meeting, in 1831, Professor James D. Forbes was requested to draw up a report on the state of meteorological science, on the ground that this science is more in want than any other of that systematic direction which it is one great object of the Association to give. Professor Forbes made his first report in 1832, and a subsequent report in 1840. The systematic records now kept in various parts of the world of barometric pressure, of solar heat, of the temperature and physical conditions of the atmosphere at various altitudes, of the heat of the ground at various depths, of the rainfall, of the prevalence of winds, and the gradual elucidation not only of the laws which regulate the movements of cyclones and storms, but of the influences which are exercised by the sun and by electricity and magnetism, not only upon atmospheric conditions, but upon health and vitality, are gradually approximating meteorology to the position of an exact science. England took the lead in rainfall observations. Mr. G. J. Symons organised the British Rainfall System in 1860 with 178 observers, a system which until 1876 received the help of the British Association. Now Mr. Symons himself conducts it, assisted by more than 3,000 observers, and these volunteers not only make the observations, but defray the expenses of their reduction and publication. In foreign countries this work is done by Government officers at the public cost. At the present time a very large number of rain gauges are in daily use throughout the world. The British Islands have more than 3,000, and India and the United States have each nearly as many; France and Germany are not far behind; Australia probably has more—indeed, one colony alone, New South Wales, has more than 1,100. The storm warnings now issued under the excellent systematic organisation of the Meteorological Committee may be said to have had their origin in the terrible storm which broke over the Black Sea during the Crimean War on November 27th, 1855. Le Verrier traced the progress of that storm, and, seeing how its path could have been reported in advance by the electric telegraph, he proposed to establish observing stations which should report to the coasts the probability of the occurrence of a storm. Le Verrier communicated with Airy, and the Government authorised Admiral FitzRoy to make tentative

arrangements in this country. The idea was also adopted on the Continent, and now there are few civilised countries north or south of the equator without a system of storm warning. (It has often been supposed that Le Verrier was also the first to issue a daily weather map, but that was not the case, for in the Great Exhibition of 1851 the Electric Telegraph Company sold daily weather maps, copies of which are still in existence, and the data for them were, it is believed, obtained by Mr. James Glaisher, F.R.S., at that time Superintendent of the Meteorological Department at Greenwich).

The subject of Meteorology was also mentioned in Mr. Vernon Harcourt's Presidential Address to Section G. (Mechanics).

Meteorology in Relation to Engineering.—The maximum pressure that may be exerted by the wind has to be allowed for in calculating the strains which roofs, bridges, and other structures are liable to have to bear in exposed situations; and continuous records of anemometers for long periods are required for determining this pressure. The force of the wind also, and the direction, duration, and period of occurrence of severe gales, are important to the maritime engineer for estimating the effects of the waves in any special locality, for determining the quarter from which shelter is needed, and for ascertaining the seasons most suitable for the execution of harbour works, the repair of damages, and the carrying out of foundations of lighthouses and beacons on exposed rocks. The harbour engineer must, indeed, of necessity be somewhat of a meteorologist, for the changes in the wind and weather, the oscillations of the barometer, and the signs of an approaching storm are indications to him of approaching danger to his works, which he has to guard against; for the sea is an insidious enemy which soon discovers any weak spot, and may in a few hours destroy the work of months.

Continuous records of rainfall, as collected regularly by Mr. Symons from numerous stations in the United Kingdom, are extremely valuable to engineers for calculating the probable average yield of water from a given catchment area, the greatest and least discharges of a river or stream, the size of drainage channel needed to secure a low-lying area from floods, and the amount of water available for storage or irrigation in a hot, arid district. The loss of water by evaporation at different periods of the year, and under different conditions of soil and climate, the effect of percolation in reducing evaporation, and the influence of forests and vegetation in increasing the available rainfall, while equalising the flow of streams, are subjects of equal interest to hydraulic engineers and to meteorologists.

Countries periodically visited by hurricanes, cyclones, or earthquakes, necessitate special precautions, and special designs for structures; and every additional information as to the force and extent of these visitations of nature is of value in enabling engineers to provide more effectually against their ravages.

A considerable portion of the address of the Chairman of the Conference of Delegates (Mr. G. J. Symons) dealt with matters of a similar nature:—

1. *Meteorological Observations in general.*—Do not encourage the keeping of records from any but good instruments, properly placed. A hard frost occurs, and forthwith there is a crop of wonderful records, some from thermometers badly placed, some from thermometers which never were good, some from good

thermometers allowed to go wrong. An incorrect statement is much worse than none at all; see to it, then, that such records as you publish are worthy of your Society. I say no more on this head because the Royal Meteorological Society has published almost at cost price (1s.) an amply illustrated pamphlet, "Hints to Observers," which will show anyone what, and when, and how, observations ought to be made. It is by no means necessary to start with an elaborate and costly set of instruments; but see to it that the instruments which you do have are good, and that no records except from good and tested instruments, properly placed, ever appear in your volumes.

2. *Sea and river temperature.*—I have interpolated the words "and river" because I ought to have put them in the syllabus originally, and because my attention has been drawn to the subject by an excellent summary of Dr. Adolf Forster's work upon the temperatures of European rivers, by Mr. H. N. Dickson, given in the September number of *The Geographical Journal*. You will remember that for a few years there was a Committee of the British Association studying river temperature; and I am sure that if your societies took up the investigation, a fresh committee could be appointed, so that we should not need to go to a German book to learn the details of the temperature of the Thames. The work is easy, healthy, and inexpensive. Easy, because it merely involves a walk to a bridge, a jetty, or a pier head, the lowering of the thermometer into the water, entering the reading, and carrying it home again; healthy, from the regularity of the walk; and inexpensive, because the verified K. O. thermometer and its copper case, cord and everything could be sent to any part of the country complete for a sovereign.

3. *Earth temperature at shallow and at great depths.*—The second half of this subject has often been brought before you, because the Underground Temperature Committee is the oldest one of the British Association. It, as you know, deals chiefly with the temperature in mines and in deep shafts and wells. Anyone who can obtain good records at depths of, or exceeding, 1,000 feet can do useful work, but I am doubtful whether much more can be learned in this country by observations at depths between 10 feet and 1,000 feet than we already know. I insert the words "in this country," because I do not think that the law of decrease for tropical and for arctic localities is known. Unfortunately we have no representatives of such localities here, or we might sow a productive seed. Observations at shallow depths—say 3 inches to 10 feet—are becoming less rare than they were, and the time is not distant when the law of temperature variation for shallow depths will be known with sufficient accuracy. That much has yet to be ascertained, many persons learned by burst water pipes last winter. I mention this as an illustration of the application of scientific records to the welfare of mankind, not as an indication that I consider the mischief to have been wholly produced by soil temperature; but I must not digress.

4. *Phenological work.*—I am afraid that this word, phenological, has not proved very acceptable. I once heard an inquiry what meteorology had to do with prisons—and it turned out that the querist had overlooked the "h," and reading it as "penological," thought that it must have something to do with punishment. However, I need not tell you that it means the laws of the life history of plants and animals; in fact, an endeavour to record the progress of the seasons, not by thermometers or by rain gauges, but by plants, trees, insects and birds, and the study of the relations between the indications of the natural history

phenomena and those of the instruments, and efforts to separate cause and effect. It has always seemed to me a class of work peculiarly adapted for the Local Scientific Societies, for their Botanical and Entomological Sections. The Royal Meteorological Society has spent a considerable sum in promoting this work, and in the hands of Mr. E. Mawley it is progressing. Personally, I am not competent to pronounce any criticism upon the work beyond this, that Mr. Mawley has devoted himself to it, and has produced tables and diagrams of great interest. But I do say this, that I think that the naturalists should either co-operate heartily with the meteorologists, or else should show that the meteorologists are attempting the impossible or the undesirable.

5. *Early meteorological records.*—It is a prevalent idea (especially with executors) that old manuscript books of observations are useless. I have every reason to believe that a long deceased relative of my own assisted in burning part of the oldest record of the rainfall in this country—that begun at Townley in Lancashire in 1677; and what she did, at the beginning of this century, has been done by scores of others, and will be until mankind are much more thoughtful and much better informed than they yet are. But I am not addressing you in the capacity of executors, but as representatives of large local bodies, many of them with museums and libraries; and I invite you to see to it, that any such records that you have are properly cared for.

Another suggestion—The practice is fortunately rapidly spreading of publishing the early parochial registers. If each society represented here would make it a rule to go through all such publications as have been issued within its area, and print in chronological order all the notes on earthquakes, storms, frosts, floods, &c., which can be collected, much good would be done. Of course, this can be done for unpublished as well as for published records.

6. *Records of river and well levels.*—The second half of this subject has so often been brought before you by Mr. de Rance, the Secretary of the British Association Committee on Underground Water, that I need merely mention it. The first part refers to a subject involved in my next and last heading, and to which, therefore, I will at once proceed.

7. *Records of floods and the placing of flood-marks.*—It is very strange that Englishmen (Britons I had better say, for our Irish and Scotch friends are equally bad) are so nearly the worst nation in Europe for looking after their rivers. I do not refer to fouling by sewage and by manufacturing refuse, or to defective engineering—I do not know where we stand in those respects—but I refer to records of river levels, to automatic recorders of their rise and fall, to arrangements for warning the owners of low-lying property when floods are probable, to scale marks on the bridges, and to the classification, levelling, and publication in full, of particulars as to the old flood-level marks, and the due marking of new ones when floods occur. I do not suggest that your Societies should themselves do all this, but that they should bring it before their Parish and County Councils, and couple their request with the offer of any assistance in their power. Of course the suggestion will be received politely, the great cost will be urged, and in many cases nothing will be done. Forgive my detaining you to hear a little true story. Years ago I suggested such arrangements to an influential man in York—nothing was done. In 1892 York had a flood, not so bad as some on record, but one which cost

the Corporation a very large sum ; they paid it, and, that steed having been stolen, they have figuratively locked the stable door, by adopting every one of the arrangements suggested above. If the Councils do not take your advice, they must remember that your attendance will be on their Minutes, to be referred to when their town or district suffers as York did.

REPORT ON UNDERGROUND TEMPERATURE.

Professor J. D. Everett read this report, which contains a description of temperature observations made in a bore-hole at Cremorne, near Port Jackson, New South Wales. The hole is 2,929 ft. deep, and showed a temperature gradient of 1° F. in 80 ft. This being smaller than the average, it might be thought that the proximity of Sydney Harbour was affecting the distribution of temperature. Observations on the water of the harbour showed, however, that the gradient was less than in the bore-hole. This was the first observation in the Southern Hemisphere.

Lord Kelvin suggested that the African mines might furnish a new field for future observations of underground temperature.

REPORT ON SOLAR RADIATION.

The Committee which was appointed some time ago to consider the best methods of recording the direct intensity of solar radiation, reported that for various reasons no experiments had been made with the Balfour Stewart actinometer since the last meeting of the Association. As Mr. W. E. Wilson had undertaken to continue the experiments, the Committee asked for re-appointment, and the unexpended balance of the previous grant.

REPORT ON EARTH TREMORS.

Mr. G. J. Symons read this report. During the year two bifilar pendulums have been purchased from the Cambridge Instrument Company, similar to those with which experiments were made in 1893 and described in the report for that year. Several modifications have, however, been made, such as were mentioned in last year's report. Each pendulum has a photographic recording apparatus. The committee hope to compare the records of the two instruments during the coming year. An appendix to the report, by the secretary (Mr. C. Davison) gives the history and bibliography of the horizontal and bifilar pendulums. These he groups into three classes—(1) those in which the rod or mirror is suspended by two wires, the centre of gravity of the rod or mirror lying either (a) between the points of attachment of the suspending wires or (b) outside them ; (2) those in which the rod is supported by one wire and one steel point ; (3) the pendulum of Rebeur-Paschwitz, which is supported on two steel points. Mr. Symons said the instruments could detect a tilt of the earth through an angle equal to that between two straight lines diverging from each other by only one inch in 1,000 miles. They are quite unaffected by short-period movements such as are produced by ordinary street traffic. The object was not merely to record distant earthquakes or tremors, but also to record any tilting in the earth's surface, with the ultimate view of determining whether this tilting was caused by tidal waves, large changes and disturbances of atmospheric pressure, or other agencies.

REPORT ON THE APPLICATION OF PHOTOGRAPHY TO METEOROLOGY.

Mr. G. J. Symons presented the report from this Committee, and gave an interesting account of what Mr. Clayden, the secretary, had done in the direction of cloud photography, and explained that, although it would be some time before they could hope to get any considerable number of photographs, the cameras for this purpose had been purchased and electrically connected, and little more was now required beyond the necessary time and attention. Mr. Symons handed round a photograph of a rainbow—the first of the kind that he had seen—which had been sent to him with the following letter :—

“ Steeple Croft, Coventry.

“ Dear Sir,—At the meeting of British Association a couple of years ago, I promised to obtain for you, if possible, some photographs of lightning; but circumstances have not been favourable. I send you, however, a couple of prints from negatives of a rainbow recently taken. It was, I think, the finest bow I have ever seen. One marked peculiarity was the brighter or lighter colour of the cloud inside the bow, and this is clearly shown in the photograph. Another peculiarity was that the green and violet seemed to be duplicated or triplicated inside the bow, and the albumenised print shows some traces of this. The outer bow is also visible in the prints. The lens I used was a symmetrical doublet, four inches focal length, exposure three seconds.—Yours, &c.,

“ WILLIAM ANDREWS, F.G.S.”

Professor Schuster said it was a most interesting and beautiful photograph, showing how the inside of the rainbow was much brighter than the outside. It was also an instructive photograph, as a means of showing students what we had been teaching them without being able to prove to them.

REPORT ON METEOROLOGICAL OBSERVATIONS ON BEN NEVIS.

Extracts from this report were read by the Secretary. The hourly eye observations by night as well as by day have been made without interruption during the year on Ben Nevis, and continuous records have been made at Fort William low-level observatory. Rainband observations are inserted in the report for the first time, as are also the records of mean hourly velocity of the wind at the top of the mountain. At Fort William the mean temperature of the year was $0^{\circ} \cdot 8$ higher than the mean of previous years, while the top of the mountain was $0^{\circ} \cdot 9$ higher than the mean. The lowest mean monthly temperatures were in January, $39^{\circ} \cdot 3$ at Fort William and $21^{\circ} \cdot 7$ on the summit. The former is $0^{\circ} \cdot 7$ above, the latter $2^{\circ} \cdot 1$ below, the average; so that during the month there existed a large difference of temperature between the two places, attributable to absence of anticyclonic weather and a great want of sunshine, the total sunshine registered on the top of the mountain being only three hours for the whole month. In September and October, on the other hand, maxima of sunshine were recorded. The highest mean temperatures were reached in July at both observatories. November showed the greatest excess of temperature above the average of past years, amounting to $4^{\circ} \cdot 1$ at the bottom and $3^{\circ} \cdot 2$ at the top of the mountain. The cause is to be found in the south-westerly

winds which predominated to a greater extent than for the past 40 years. The coldest day was January 6th, the lowest temperature recorded being $0^{\circ}\cdot7$ at the top and $20^{\circ}\cdot8$ at Fort William. Details of the observations and weather of this day are given in the report. Much work has been done in re-copying the observations at the two observatories in order to examine the bearings of the differences of readings on the meteorology of North-Western Europe. This work is being carried on by Dr. Buchan and Mr. Omond; among the chief phenomena considered are cyclones and anticyclones, differences of temperature and wind between the two stations, especially occasions when the temperature was higher on the top than at the sea-level, and days when the difference of temperature greatly exceeded the normal amount. An inquiry into the connexion of these occurrences with coming storms and with each other will, it is hoped, lead to valuable results; it already points to the necessity for most important modifications in the present theory of cyclones held by meteorologists. Four tables are added to the report, showing the mean hourly variations of pressure at Magdeburg and San José on fine and cloudy days respectively. These two stations are chosen because Magdeburg has a dry climate contrasting with the wet one of Ben Nevis, and San José, at about the same height above the sea as the top of the Ben, is only 10 deg. from the equator. The characteristically low morning maximum and the very high evening maximum during cloudy days at Ben Nevis and Magdeburg, in all seasons, do not occur at San José in similar weather. The two daily minima do, however, occur there, the morning one being larger on cloudy than on sunny days, and the afternoon one less.

REPORT ON EARTHQUAKES IN JAPAN.

Prof. John Milne gave an account of the long report of the Committee on Seismological Phenomena in Japan. This commences by a reference to the great loss caused by the recent fire at Prof. Milne's house and observatory, after which follows a description of the records of the Gray-Milne seismograph. Attached to the report is a catalogue of 8,331 earthquake shocks recorded in Japan between 1885 and 1892, giving full particulars of the centre and area of disturbance. It enables the approximate *weight* of each to be found, and permits the division of Japan into fifteen distinct seismic districts. The next section of the report deals with the rate of propagation of earthquake disturbances from Japan to Europe. The small tremors which occur in the ten seconds or so before an earthquake shock are transmitted to Europe, but they are spread over half an hour; it appears, therefore, that the preliminary tremors either travel more quickly, or reach Europe by a shorter route than the main shock. The latter is known to travel along the surface at about 3,000 metres per second. Do the tremors travel at 8,000 to 11,000 metres per second, or do they pass through the earth, not round it? If the latter, we may hope for some further knowledge concerning the interior of the globe. Prof. Milne has set up horizontal pendulums in nearly a score of places, and finds great differences in their behaviour. They all exhibit a general displacement, *i.e.*, tilt, in the same direction, and similar long-period movements. Examined from hour to hour, however, some of them show the existence of a diurnal wave. After a long and very laborious search, graphically described to the Section by Prof. Milne, he succeeded in tracing this diurnal effect to the local removal of load from the

alluvium by greater evaporation from exposed areas. At night the movement is slight, and is probably accounted for by the condensation, at the cold surface, of aqueous vapour after rising through the warm earth. Some observations have been made on the disturbance of the pendulums by earth tremors. Their cause has not been ascertained, but they always occur with greatest intensity between 5 and 9 a.m. They are most marked with a steep barometer gradient and consequent wind, local or distant.

Lord Kelvin said it was possible to determine mathematically the time of arrival of the first earthquake shock reaching any point from any other point. Such calculations would, however, tell us nothing about the rigidity of the interior of the earth.

Prof. Gray referred to the enormous loss sustained by Prof. Milne in the burning of his books and instruments. He hoped the Association would make a grant enabling Prof. Milne to continue his work.

As Prof. Milne has now returned from Japan, and the earthquake catalogue is completed, the Committees on Earth Tremors and Seismological Phenomena have united under the latter name. The new Committee is a large one, and with Prof. Milne and Mr. Davison as joint secretaries, it ought to do good work.

REPORT OF THE COMMITTEE ON UNDERGROUND WATERS.

This was read by Mr. C. E. De Rance, the Secretary, who has practically done all the work for many years. We have not a full note of the report, but understand that it was the final one, and that arrangements are proceeding with a view to the publication of a volume giving a synopsis of the large mass of data as to wells and their yield in all parts of the country.

REPORT ON COSMIC DUST.

Dr. John Murray said that at the bottom of the Pacific Ocean, 1,000 miles from any coast, the red clay deposits contain three classes of magnetic particles. These are (1) crystalline fragments of magnetic or titaniferous iron; (2) dark, shiny spherules; and (3) brownish spherules, known as chondres. The dark spherules contain iron particles which, when the spherule is ground down, become coated with copper if treated with a solution of copper sulphate. They are probably volcanic, and of terrestrial origin. The brown spherules are extra-terrestrial. They occur in the various layers of manganese nodules, along with the black spherules, but they are not found except at the place mentioned in the Pacific Ocean. They have been looked for in many places, but without success. Most probably they are hidden by the presence of other matter, as their amount is very small, say, about 20 lb per square mile per century. He wanted advice as to the best means of procedure, in order to collect this dust in other parts of the globe.

In reply to Lord Kelvin and Professor Fitzgerald, Dr. Murray said that the dust from Ben Nevis and the Greenland glaciers contained no cosmic matter.

The following were the ordinary papers which dealt with meteorological subjects:—

E. S. BRUCE—*On Probable Projective Lightning Flashes.*

The object of this paper was to suggest the possibility of projective lightning flashes, whose existence would increase the difficulties of classification. Ordi-

nary sheet lightning is the reflection of a lightning flash by a cloud, images from different points being superposed. If, however, a cloud intervenes between the flash and the reflecting cloud, containing one or more openings, the light from the flash will be faintly reflected from a few points only of the reflecting cloud, and we shall have as many inverted images of the flash as there are openings. If the reflecting cloud is of irregular shape the images will be distorted, and a straight flash may appear to possess angles. This was illustrated by lantern slides and experiments, a drawing of an actual thundercloud with four apertures being exhibited. He doubted whether such reflected flashes would be intense enough to affect a photographic plate.

Mr. G. J. Symons thought there should be a patch of brighter light at the angle of a reflected flash, if formed in the manner suggested by Mr. Bruce, and he failed to see the parallelism between the experimental conditions and those of nature.

Mr. Bruce, who was thanked for the manner in which he had brought so interesting a subject before the meeting, contended that he had conclusively proved the possibility of a projection lightning flash.

(To be concluded in our next.)

SALT HAIL.

IN the *Met. Mag.*, vol. xxiv. (1889), p. 105, occurred the following lines :—

“Mr. W. Rogers, of Ensfield Farm, Tunbridge, was walking over his farm, accompanied by his dog. The dog, seeing the large hail-stones hopping about as they fell, ran after them, and began to eat some. This led Mr. Rogers to taste them, and he found that they all tasted of salt.” The statement was (in subsequent numbers) ridiculed by Mr. R. J. Lecky, and discredited by the Rev. J. Slatter, but supported by Dr. Muirhead and by Dr. Burder, who, having exposed a slip of glass to catch Krakatoa dust, found, where a hail-stone had melted, chloride of sodium.

We have just noticed, in the *Jamaica Weather Review* for June, 1895, the following report :—

“VALE ROYAL. (*H. F. Kilburn*).—On the afternoon of June 6th, “between 3 and 4 p.m., there was a remarkably heavy fall of hail at “Vale Royal. It lasted fully half an hour. The stones were the “largest I had ever seen, being about $\frac{3}{4}$ inch diameter. On tasting “a couple, I found that they were quite salt. Nobody on the “Estate can tell me of hail ever having fallen here before.”

RAINFALL IN PALESTINE IN THE SECOND CENTURY.

DR. HERMANN VOGELSTEIN took, for the subject of his Diplôme Dissertation, "Agriculture in Palestine in the time of the Mishnah. Part I. The Cultivation of Corn." (Published at Breslau, 1894).

In the *Zeitschrift* for April, 1895, Dr. Hann gives an account of that portion of Dr. Vogelstein's dissertation which refers to rainfall. It is of such interest that we believe that a free translation will be generally acceptable.

Dr. Vogelstein gives an account of agriculture in Palestine in the first two centuries of the Christian era, based upon the records of the Mishnah, Tosefta, &c.

The Mishnah distinguishes two seasons, the time of the rains and the time of drought. In average years the early rains fell soon after the autumnal equinox. The great importance of these rains, as governing the fertility of the land, is repeatedly indicated both in the Bible and in the Mishnah. During the normal season for rain, daily prayers were offered for it. When rain did not fall at the usual dates, fast-days and prayer days were appointed, which of course indicate periods of drought. The recognition of the importance of rain to agriculture had (even in the time of the Mishnah) led to fairly accurate measurements and observations. The depth of rain was measured in a vessel. There should, in the first, second, and third period of the early rains, fall respectively 1, 2, and 3 Tefahs = about $3\frac{1}{2}$, 7, and $10\frac{1}{2}$ inches. In the second period there should be seven consecutive days of rain.

The early rains were important for the sowing, the later rains, in Nisan (March and April) for the harvest. The change from the rainy period, in which also hailstorms destructive to the springing crops were not rare, to the dry season was gradual. The rains diminished, and finally ceased. In the dry season, rain or a thunderstorm was extremely rare, but the dew was excessive, so that in the morning the ground was as wet as if rain had fallen; this was the only refreshment for the thirsty earth, and therefore of the greatest importance to the growing crops.

So far, Dr. Vogelstein and the Mishnah. The rainfall was therefore regularly measured in Palestine in the first century after Christ, and the average for the early rains was estimated at about 6 Tefahs, or 21 inches, which agrees fairly well with modern records—for instance, with that at Jerusalem. Perhaps Dr. Vogelstein may yet find a record of the total yearly fall of rain in Palestine in the first century of the Christian era.

Since the above was in type we have been favoured by Dr. Hann with a copy of Dr. Vogelstein's Dissertation (82 pp., German, but with a mass of Hebrew, Syriac, Arabic, Greek and Latin notes). We have also received some important papers from Dr. Chaplin, who took daily observations in Jerusalem from 1860 to 1882. We therefore hope to return to the subject at an early date.

BELGIAN RAINFALL.

To the Editor of the Meteorological Magazine.

SIR,—It was by an inexplicable error, the origin of which I cannot trace, that I wrote “*Deux pluviomètres conjugués ont constamment servi aux observations.*” The fact is that the gauges represented on p. 102 of the *Met. Mag.* were used from 1833 to 1854, and not from 1833 to 1866, as you supposed. The gauges by which in 1855 they were supplanted were observed uninterruptedly at Brussels until 1890, and others of the same pattern are in use at Uccle.

Comparisons of the two systems were made by Quetelet during 22 months (*Annales* xi., p. 273). The original gauges were of tin, and they were abandoned because the rust on their surface caused (towards the end of their existence) greater loss than usual from retarded flow of the water into the receivers.

The mean by the old gauges (1833-54) was 724 mm. (28.50 in.); the mean of the subsequent 22 years (1855-76) by the new ones was 695 mm. (27.36 in.)

These contradict your argument on p. 103, in which you did not call attention to the dryness of the period, 1857-65, over the whole of Western Europe, which sufficiently explains the difference between the periods 1833-66 and 1867-90.

I am sure that the observations from 1833 to the present time are *strictly comparable*, and that the differences are due to secular variation alone.

The details as to the pattern, &c., of gauges are intentionally reserved for a later part of the work.

Observations made in the same town are usually placed in one series, unless two or more records were kept simultaneously, then necessarily they are separated. By exception, the early records for Brussels are separated from the Observatory observations, in order that the full value of the latter should in no way be impaired.

I was entirely unaware that Prof. Raulin had adopted the method of typographically indicating the length of series of observations. We have, therefore, independently arrived at the same plan.

Yours truly,

A. LANCASTER.

Uccle, October 2nd, 1895.

[Considering the opening sentence of the above, it would not be courteous for us to pursue the subject, but we really cannot pass the words which we have put in italics. Uccle is nearly 4 miles from the old Observatory, and more than 100 feet higher. The mean for 5 years (1886-90) was at Uccle 711 mm. (27.99 in.), and for the same years at the old Observatory, 760 mm. (29.92 in.), an excess of nearly seven per cent. How can these be regarded as strictly comparable?

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, MARCH, 1895.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.		Aver.
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		
England, London	63·7	22	23·7	3	51·0	35·6	37·6	84	102·6	22·4	1·42	14	6·9
Malta.....	81·6	30	41·8	20	63·9	49·4	47·3	76	132·5	36·3	·80	9	4·5
Mauritius.....	85·0	6,7	70·1	19	81·9	74·1	71·3	81	134·1	66·3	24·11	26	7·4
Calcutta.....	97·5	29	59·2	21	91·3	68·7	65·2	65	153·9	53·0	·18	1	2·0
Bombay.....	89·3	6	71·0	26	86·1	73·9	70·5	73	138·5	61·2	·00	0	1·3
Ceylon, Colombo ...	91·0	...	71·8	...	89·0	75·4	71·7	74	147·5	63·0	1·84	13	2·8
Melbourne.....	95·0	13	46·0	21	73·4	54·8	52·9	70	142·6	36·1	1·80	8	5·5
Adelaide.....	100·5	12	50·7	30	80·5	58·8	51·9	53	155·3	43·0	1·79	9	3·9
Sydney.....	83·2	17	55·3	20	74·6	63·2	61·0	75	145·9	44·6	1·46	13	4·1
Wellington.....	71·0	19	43·0	23	66·2	53·6	50·2	70	132·0	27·0	2·40	10	4·6
Auckland.....	75·0	18	52·0	28	70·6	58·0	54·6	71	140·0	48·0	1·91	14	4·8
Jamaica, Kingston.....	90·2	29	64·0	4	85·4	67·9	66·8	78	...	...	·43	6	3·5
Trinidad.....	91·0	20	64·0	19a	86·9	67·3	68·0	76	170·0	62·0	2·27	14	...
Toronto.....	49·9	24	—1·6	14	32·5	15·7	19·2	75	...	—3·0	·93	18	5·0
New Brunswick, Fredericton.....	47·3	25	—8·7	12	33·8	11·9	18·6	69	...	...	2·16	12	4·6
Manitoba, Winnipeg ...	49·0	31	—32·5	13	26·6	1·30	...	...	...	...	·55	11	4·9
British Columbia, Esquimalt.....	58·6	27	25·7	14	50·1	35·9	28·6	86	...	...	1·38	19	6·1

a—and 31.

REMARKS.

MALTA.—Adopted mean temp. (55°·0), 0°·9 below the average. Mean hourly velocity of wind 11·8 miles. Average sea temp. 59°·0. Thunderstorm on 27th. Lightning on 6th and 20th. Hail on 6th and 7th. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·1 above, of dew point 1°·4 above, and rainfall 15·38 in. above their respective averages. Mean hourly velocity of wind 11·7 miles, or 1·7 mile above average; extremes, 25·5 miles on 18th and 2·1 on 5th; prevailing direction, E.S.E. to E.N.E. Thunder and Lightning on 5 days. An unusually wet month, the rainfall in different parts of the island being from 21 to 50 inches.

CEYLON, COLOMBO.—Thunderstorms occurred on 6 days, and lightning was seen on 8 other days. C. MELDRUM, F.R.S.
D. G. MANTELL.

Adelaide.—Mean temp. 0°·9 below the average of 38 years. Rainfall 75 in. above the average. C. TODD, F.R.S.

Sydney.—Mean temp. 0°·3 below, humidity 1°·3 and rainfall 4·04 in. below their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—Showery at the beginning of the month; dry, but generally unpleasant from the 4th to the 20th, with strong N.W. winds; from 21st to the end showery, with intervals of fine weather. Thunder on 23rd. Mean temp. 2°·2 and rainfall 1·14 in. below the average. K. B. GORE.

AUCKLAND.—A dry month with little of importance to report. Mean temp. and rainfall both below the average of 28 years. T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Hourly velocity of wind 4·2 miles. Kingston rainfall one-third, and island rainfall two-thirds, of the average. R. JOHNSTONE.

TRINIDAD.—Rainfall 40 in. above the average of 30 years.

J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL,
SEPTEMBER, 1895.

[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.
II.	Dorking, Abinger Hall .	·63	XI.	Lake Vyrnwy	3·22
„	Birchington, Thor	·79	„	Corwen, Rhug	·48
„	Hailsham	·76	„	Carnarvon, Cocksidia ...	1·50
„	Ryde, Thornbrough	·46	„	I. of Man, Douglas	·86
„	Emsworth, Redlands ...	·84	XII.	Stoneykirk, Ardwell Ho.	·63
„	Alton, Ashdell	·98	„	New Galloway, Glenlee	1·21
III.	Oxford, Magdalen Col.	·64	„	Melrose, Abbey Gate ...	...
„	Banbury, Bloxham	·94	XIII.	N. Esk Res. [Penicuik]	1·35
„	Northampton, Sedgebrook	·64	„	Edinburgh, Blacket Pl.	·63
„	Alconbury	·47	XIV.	Glasgow, Queen's Park..	1·40
„	Wisbech, Bank House...	·57	XV.	Inverary, Newtown	4·43
IV.	Southend	·89	„	Islay, Gruinart Schools..	1·99
„	Harlow, Sheering.....	·86	XVI.	Dollar	2·53
„	Colchester, Lexden	1·26	„	Balquhiddie, Stronvar...	2·94
„	Rendlesham Hall	·93	„	Ballinluig	1·34
„	Diss	·56	„	Dalnaspidal H.R.S.	2·57
„	Swaffham	·61	XVII.	Keith H.R.S.	1·98
V.	Salisbury, Alderbury ...	1·41	„	Forres H.R.S.	1·59
„	Bishop's Cannings	1·30	XVIII.	Fearn, Lower Pitkerrie..	1·36
„	Blandford, Whatcombe .	·39	„	Loch Shiel, Glenaladale	...
„	Ashburton, Holne Vic...	·61	„	N. Uist, Loch Maddy ...	3·66
„	Okehampton, Oaklands.	1·53	„	Invergarry	4·48
„	Hartland Abbey	·66	„	Aviemore H.R.S.	2·25
„	Lynmouth, Glenthorne.	1·16	„	Loch Ness, Drumadrochit	2·27
„	Probus, Lamellyn	·29	XIX.	Invershin	1·42
„	Wellington, Sunnyside..	...	„	Scourie	2·39
„	Wincanton, Stowell Rec.	·67	„	Watten H.R.S.	1·62
VI.	Clifton, Pembroke Road	1·22	XX.	Dunmanway, Coolkelur...	2·25
„	Ross, The Graig	1·01	„	Fermoy Gas Works .....	...
„	Wem, Clive Vicarage ...	·93	„	Killarney, Woodlawn ...	1·09
„	Cheadle, The Heath Ho.	·74	„	Caher, Duneske	1·19
„	Worcester, Diglis Lock	·29	„	Ballingarry, Hazelfort...	·54
„	Coventry, Coundon	1·00	„	Limerick, Kilcornan ...	1·33
VII.	Ketton Hall [Stamford]	·72	„	Ennis .....	...
„	Grantham, Stainby	·70	„	Miltown Malbay	1·07
„	Horncastle, Bucknall ...	·27	XXI.	Gorey, Courtown House	1·48
„	Worksop, Hodsck Priory	·97	„	Athlone, Twyford	·55
VIII.	Neston, Hinderton	1·05	„	Mullingar, Belvedere ...	·20
„	Preston, Haighton	1·70	„	Longford, Currygrane...	·38
„	Broughton-in-Furness ...	1·77	XXII.	Woodlawn	1·30
IX.	Ripon, Mickley	1·41	„	Crossmolina, Enniscoe ...	1·88
„	Melmerly, Baldersby ...	1·08	„	Collooney, Markree Obs.	1·16
„	Scarborough, South Cliff	...	„	Ballinamore, Lawderdale	...
„	Middleton, Mickleton ...	·73	XXIII.	Lough Sheelin, Arley...	·37
X.	Haltwhistle, Unthank...	·99	„	Warrenpoint	·48
„	Bamburgh	·30	„	Seaforde	·38
„	Keswick, The Beeches...	...	„	Belfast, Springfield	·60
XI.	Llanfrechfa Grange	1·53	„	Bushmills, Dundarave..	·88
„	Llandovery	1·17	„	Stewartstown	·55
„	Castle Malgwyn	·61	„	Buncrana	1·14
„	Builth, Abergwessin Vic.	1·51	„	LougeSwilly, Carrablagh.	1·86
„	Rhayader, Nantgwillt ...	1·05			

SEPTEMBER, 1895.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.						TEMPERATURE.						No. of Nights below 32°.	
		Total Fall.	Difference from average 1880-9.	Greatest Fall in 24 hours		Days on which -01 or more fell.	Max.		Min.						
				Dpth	Date		Deg.	Date	Deg.	Date.					
											inches.	inches.	in.		
I.	London (Camden Square) ...	1·28	— 1·23	1·24	6	2	82·8	24	42·6	22	0	0			
II.	Maidstone (Hunton Court)...	·35	— 2·24	·25	10	2	...	...	...	...	...	...
III.	Strathfield Turgiss	2·15	— ·30	1·78	6	6	87·0	25a	38·4	14	0	0			
IV.	Hitchin	·92	— 1·58	·84	6	5	82·0	24a	34·0	21	0	...			
V.	Winslow (Addington)	·69	— 1·98	·61	6	5	85·0	24	33·0	20b	0	4			
VI.	Bury St. Edmunds (Westley)	·58	— 2·12	·53	6	3	74·0	2, 26	42·0	22	0	...			
VII.	Norwich (Brundall)	·46	...	·41	6	3	81·0	2	38·2	21	0	4			
VIII.	Weymouth (Langton Herring)	·54	— 1·88	·27	6	4	75·0	26	46·0	21	0	...			
IX.	Torquay (Cary Green) ...	·28	...	·27	30	2	73·9	28	45·4	18	0	0			
X.	Polapit Tamar [Launceston]..	·66	— 3·05	·29	10	10	81·8	9	34·7	22	0	1			
XI.	Stroud (Upfield)	·98	— 1·93	·50	6	10	79·0	9	44·0	20c	0	...			
XII.	Church Stretton (Woolstaston)	1·08	— 1·42	·27	5	10	80·0	24a	41·0	22	0	...			
XIII.	Tenbury (Orleton)	·70	— 1·91	·29	24	7	82·1	24	33·0	22	0	3			
XIV.	Leicester (Barkby)	·44	— 2·20	·22	6	6	82·0	24a	30·0	21d	3	5			
XV.	Boston	·48	— 2·29	·37	6	3	84·0	26	40·0	23	0	...			
XVI.	Hesley Hall [Tickhill].....	·78	— 1·38	·45	6	6	84·0	2	33·0	22e	0	...			
XVII.	Manchester (Plymouth Grove)	1·44	— 2·03	·80	6	6	84·0	28	43·0	20	0	...			
XVIII.	Wetherby (Ribston Hall) ...	·97	— 1·49	·34	7	5	...	...	...	...	...	...
XIX.	Skipton (Arncliffe)	3·00	— 1·76	1·21	11	10	...	...	...	...	...	...
XX.	Hull (Pearson Park) ...	1·08	— 1·36	·47	6	7	78·0	2, 9	35·0	23	0	...			
XXI.	Newcastle (Town Moor)	·44	— 2·34	·21	3	5	...	...	...	...	...	...
XXII.	Borrowdale (Seathwaite).....	5·35	— 6·38	1·61	11	14	...	...	...	...	...	...
XXIII.	Cardiff (Ely)	1·29	— 2·45	·49	6	9	...	...	...	...	...	...
XXIV.	Haverfordwest	·98	— 3·42	·42	4	10	77·4	28	37·2	22	0	3			
XXV.	Aberystwith (Gogerddan) ...	1·70	— 2·57	·44	4	7	85·0	28	30·0	21	1	...			
XXVI.	Llandudno	1·24	— ·98	·84	4	7	84·0	9	47·0	20	0	...			
XXVII.	Cargen [Dumfries]	·22	— 3·34	·14	2	3	79·0	28	36·6	21	0	0			
XXVIII.	Jedburgh (Sunnyside).....	·29	— 2·40	·10	17	6	84·0	9, 13	37·0	23	0	...			
XXIX.	Colmonell	·60	...	·17	17	7	81·0	27	36·0	19	0	...			
XXX.	Lochgilphead (Kilmory).....	3·04	— 2·09	1·10	10	11	...	...	39·0	19	0	...	
XXXI.	Mull (Quinish)	5·42	+ ·39	1·26	16	20	...	...	...	...	...	...
XXXII.	Loch Leven Sluices	1·10	— 1·69	·40	17	6	...	...	...	...	...	...
XXXIII.	Dundee (Eastern Necropolis)	·80	— 1·71	·45	16	10	74·1	25	38·8	21	0	...			
XXXIV.	Braemar	1·89	— ·97	·61	16	12	73·2	29	34·0	6	0	3			
XXXV.	Aberdeen (Cranford) ...	1·44	...	·45	16	14	74·0	25a	36·0	22	0	...			
XXXVI.	Strathconan [Beaul]	3·25	— ·43	·70	12f	10	...	...	...	...	...	...
XXXVII.	Glencarron Lodge	6·41	...	1·07	17	19	77·1	9	39·0	6	0	...			
XXXVIII.	Cawdor [Nairn]	1·76	— ·99	·80	17	11	...	...	...	...	...	...
XXXIX.	Dunrobin .....	...	...	...	...	...	...	...	...	...	...	...
XL.	S. Ronaldsay (Roeberry).....	2·23	— ·43	·37	17	17	67·0	27	45·0	12	0	...			
XLI.	Darrynane Abbey	·88	...	·32	4	10	...	...	...	...	...	...
XLII.	Waterford (Brook Lodge) ...	2·08	— ·84	·82	4	9	75·0	28	40·0	13g	0	...			
XLIII.	O'Briensbridge (Ross)	1·49	...	·41	10	7	...	...	...	...	...	...
XLIV.	Carlow (Browne's Hill)	1·10	— 1·72	·38	4	8	...	...	...	...	...	...
XLV.	Dublin (Fitz William Square)	·54	— 1·43	·18	2, 4	7	72·0	2	43·0	22	0	0			
XLVI.	Ballinasloe	·57	— 2·22	·34	10	7	84·0	26	35·0	23	0	...			
XLVII.	Clifden (Kylemore)	2·31	...	1·00	10	9	...	...	...	...	...	...
XLVIII.	Waringstown	·29	— 2·87	·14	11	5	81·0	27	38·0	...	0	...			
XLIX.	Londonderry (Creggan Res.)..	1·53	— 2·25	·52	2	11	...	...	...	...	...	...
L.	Omagh (Edenfel)	·76	— 2·62	·24	10	7	75·0	29	36·0	22	0	...			

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

a—and 27. b—and 21, 22. c—and 21. d—and 22. e—and 23. f—and 18. g—and 20.

METEOROLOGICAL NOTES ON SEPTEMBER, 1895.

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

ENGLAND.

STRATHFIELD TURKISS. — Very fine and dry until the night of the 6th, when a very heavy TS passed over, after which hot weather returned and continued until the end of the month, with a slight TS on the 24th. During the last fortnight the max. temp. was the highest in September since the record began in 1875.

ADDINGTON. — This September has given us the least rainfall and the highest temp. of any September recorded here. The max. temp. was 70° and upwards on 17 days, 80° and upwards on 6 days, the last 8 days having an average max. of 80°. The night temp. was with a few exceptions high, and on three nights a minimum of 60° was recorded. Violent TS at 3 a.m. on 7th.

BURY ST. EDMUNDS, WESTLEY. — The driest September since 1865, when the fall was 11 in. The drought was accompanied by great heat and much sunshine, many days being without a cloud. TS on 6th, distant T on 3rd and 10th.

NORWICH, BRUNDALL. — Probably the finest, warmest and driest September since 1865. The last week was abnormally warm. A similar week at the end of September seems, according to old MSS. in my possession, to have occurred in East Anglia in 1832. Distant TS on 3rd; TS 5.45 to 6.45 a.m. on 7th.

LANGTON HERRING. — The driest September in the last 24 years. A warm month with many cloudless days. The average min. (54°·4) is 3°·2, and the average max. (67°·9) 4° above the average of 23 years. The temp. throughout was equal to that of the preceeding July and higher than that of August. The last week of the month was the hottest in the year, with an average temp. of 66°·2. On ten days the temp. rose to 70° or above. T and L on the 3rd, 4th, 7th, 24th, 26th and 30th. Fogs on the 6th and 25th.

TORQUAY, CARY GREEN. — Rainfall 2·06 in. below the average. Mean temp. 60°·9, or 3°·1 above the average. Duration of sunshine 213 hours 45 minutes, or 49 hours 20 minutes above the average; one sunless day.

POLAPIT TAMAR. — A most memorable month; remarkable for absence of strong breezes, for excessive heat, and for the exceptionally small quantity of R, the smallest in September since 1880. The rainfall for the first 9 months of 1895 is only 18·19 in., or less than half the annual average (37·36 in.) The average max. shade temp. was very high, 71°·5. Heavy TS at midnight on 6th.

STROUD, UPFIELD. — TSS to the E. on 3rd, E. and S.E. on 6th, and to the W. on 24th; L on 23rd. Max. temp. above 70° from 23rd to 30th inclusive.

WOOLSTANTON. — A very hot and dry month, the heat during the last fortnight especially being most intense. Fruit-bearing trees of all kinds produced enormous crops, but the want of water was greatly felt. Mean temp. 60°·1.

TENBURY, ORLETON. — The hottest and, with the single exception of September, 1888, the driest September since 1865. The mean temp. of the month was 60°·0, or 3°·2 above the average of 34 years, and was nearly 2° lower than that of 1865; but the mean max. was nearly 1° higher than in that year, and the thermometer reached 70° on 22 days, as against 21 in that year. The hottest weather too was in the last week of the month, whereas in 1865 the last week was cold. Brilliant sunshine prevailed through the whole month. T on the 3rd and 24th. L on 3rd, 23rd and 24th. Fog on 12 days.

LEICESTER, BARKBY. — Remarkable for great heat and drought. The mean max. temp. is the highest for the year. Streams, wells and pits are dry all round the district, and the scarcity of water is great and serious. Mean max. temp. 73°·8. Mean min. 44°·8. Mean 59°·3. Fortunately the Borough of Leicester has an additional water supply this year. L, T and H on 3rd. L on 24th.

HULL, PEARSON PARK. — TS on 3rd. Fog on 14th and 16th, and daily from 22nd to 30th, excepting the 24th.

WALES.

HAVERFORDWEST.—The first 9 days were more or less wet, after which a fine, hot, almost cloudless condition set in, much haze rendering the distant landscape invisible for nearly a fortnight. The temp. was above 70° on eight days, seven of which occurred in the last week. The fine weather enabled the harvest to be gathered in in fine condition, and such a superabundance of grass has seldom been seen at this season of the year. One of the driest Septembers on record, and the warmest.

SCOTLAND.

CARGEN.—This month still further adds to the remarkable meteorological phenomena of 1895. Although the mean temp. has been twice exceeded during 36 years, the average temp. of the last seven days ($63^{\circ}\cdot5$) is unprecedented in September. On ten days the max. exceeded 70° . The max. temp. of the month (79° on the 28th) has only once been exceeded ($80^{\circ}\cdot4$ on September 4th, 1880), and once equalled. The high mean pressure is also noticeable, while the number of hours of sunshine exceeds the average by 54. Wind force slight and southerly winds prevalent. The rainfall has only once been less in September, and only on three occasions in any month. Unusually heavy dews made up for the absence of R, and pastures were never more luxuriant at this season. The effects of the warm weather are seen in the enlargement of the buds of bush fruit and flowering trees, and several species of rhododendron blossomed a second time.

JEDBURGH.—The temperature was higher than in any September for 30 years. The grain crops have been secured in good condition, and potatoes are a full crop and free from disease. Tree fruit abundant and excellent. The temp. on 12 days was above 70° . A good deal of fog before 9 a.m. Rainfall the smallest in any month since March, 1865, when $\cdot17$ in. fell.

COLMONELL.—Rainfall $3\cdot56$ in. below the average of 19 years. T and L on 9th.

ABERDEEN, CRANFORD.—A very warm month, with winds from S.W. and W., and very light. Crops all cut about Aberdeen.

ROEBERRY.—The first part wet, the latter warm and foggy. Mean temp. $55^{\circ}\cdot3$.

IRELAND.

DARRYNANE.—A very fine and warm month.

O'BRIENSBRIDGE, ROSS.—Fine average harvest weather for the first three weeks. On the night of the 23rd a violent storm of T and L set in at 8 p.m., and continued for three hours, followed next day by an extraordinary rise in temperature, and for 6 days the heat far exceeded that of midsummer.

DUBLIN.—As in both 1893 and 1894, September proved a favourable month. The heat was tempered by a sea breeze but the sunshine was above the average, and the mean amount of cloud was only $4\cdot2$. Towards the close of the month heavy dews and dense night fogs became very prevalent. Mean temp. $59^{\circ}\cdot1$, or $3^{\circ}\cdot3$ above the average. High winds occurred on 7 days, and attained the force of a gale on the 10th and 11th. L on the 23rd.

WARINGSTOWN.—A remarkable September, the warmest since 1865. Max. in 1865, 82° ; in 1895, 81° . Mean, 1865, $59^{\circ}\cdot7$; 1895, $58^{\circ}\cdot5$. Mean for the 14 years, 1861 to 1874, $54^{\circ}\cdot3$. A magnificent harvest was secured in prime condition.

EDENFEL, OMAGH.—Another remarkable September, with the smallest rainfall except 1894, and much the highest temp. for at least 31 years; indeed, during that period a max. temp. of 70° has been only twice reached in the latter half of September, viz., 71° on 19th September, 1881, and 70° on 17th September, 1883, while during the last week of the past month the max. ranged from 75° to 70° on five days, and on the night of the 25th the minimum was the highest of the year, 61° . Coming after the wet August, vegetation has been phenomenal. The autumn tints have hardly touched the trees, and it was only on October 4th that the extraordinary change ushered in by October seemed to have re-awakened the migratory instincts of the swallows from their "midsummer night's dream."