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IS THE ROYAL CHARTER GALE PERIODIC?

The sharp squall, which surprised many persons on the morning of Oct. 24th, 1882, reminded us of an old article in this Magazine, and we now submit a continuation of it for the fifteen years which have elapsed since we wrote it.

In Vol. II. of this Magazine, *i.e.*, in the number for November, 1867, we inserted under the above heading a short list of storms, &c., from 1820 to 1867, which might possibly have some bearing on the question. We introduced the subject with all reserve, commencing with the following words :—

"We anticipate an immediate negative reply to the above query, but that will not deter us from examining the facts, at least, such as are within our reach."

For the convenience of those who have not a perfect set of this Magazine, we may add that in subsequent numbers the theory of periodicity was maintained by T. Beesley, E. J. Lowe, P. H. Newnham, J. Murray, G. V. Vernon, and others.

SOME STORMS IN OCTOBER 1868-1882.

1868.—Gale on 24th; trees down at Selborne and Banbury. At Huddersfield the velocity was 52 miles an hour.

1869.—Oct. 18th, severe gale on Lincolnshire coast. Many trees uprooted.

1870.—October 19. A storm of small extent but great intensity passed from Cornwall to Cambridge at an average velocity of about 50 miles an hour. Much structural damage.

1871.—A destructive storm at Guildford on the 1st, but after that date the month remarkably calm.

1872.—No very general and violent gale, or perhaps the continuous and excessive rains occupied all the thoughts of the observers. "Very high winds," or "gales," are, however, reported from Northumberland for October 11th; Llandudno, 23rd and 24th; and the North of Scotland, 30th and 31st.

1873.—Considerable fall of the barometer and heavy gale at Bridport and other places on 22nd and 23rd.
1874.—Gale on 6th and 7th. A storm, high wind, or very heavy gale reported from nearly all stations on 21st.
1875.—No remarkably high winds.
1876.—Some sharp local squalls on 11th, but no general gale during the month.
1877.—Very heavy gale on 14th–15th, doing great damage.
1878.—Gale on 9th. Destructive whirlwind passed over Walmer on 24th, and sharp local squalls on 28th.
1879.—Generally very calm in England; gale in Scotland on 19th.
1880.—Gale on 27th.
1881.—Violent gale October 13th–14th.
1882.—October 24th. Sharp storm in early part of day.

THE BRITISH ASSOCIATION AT SOUTHAMPTON.

(*Continued from page* 138.)

On the Origin of Hail. By PROF. THÉODORE SCHWEDOFF, *of Odessa.*

As is well-known, hail is most often granular in appearance. This is the best recognised fact amongst authors of hail-theories, because it seems to tell in favour of the hypothesis that hailstones must be disorderly conglomerates formed in the atmosphere by the mutual adhesion of ice-grains hurried about and agitated by atmospheric whirlwinds.

We have only to take a glance at figures 1 and 2 to conceive doubts as to this manner of regarding them. These figures represent the polar and equatorial surfaces of numerous hailstones observed by Abich in the Caucasus, on the 8th of June, 1869 (27th of May, Russian calendar). "The regularity of the hailstones," says M. Abich*, and the originality of their structure, which I had never observed until then, gave to these bodies a peculiar interest. A third of all the hailstones that fell were perfect spheroids, which in form and magnitude resembled mandarins (mandarin oranges). This type, common to all these bodies, revealed the existence of a general law of their formation, and presented, in certain examples, varieties allied with one another by intermediate forms, recalling the varieties of type in the organic world. . . . ."

At first sight the mass of the hailstone seemed to be composed of grains agglomerated concentrically and successively around a nucleus, and separated one from another by layers of snow. But a closer examination persuaded the observer that the mass, of which each of the hailstones had been formed, was of pure transparant ice, traversed by an innumerable quantity of little fissures and capillary canals, whose relative abundance in certain layers impressed on these a milky opaque appearance. These canals and fissures were always directed along radii of the hailstone, their pointed extremities being toward the central region. It is the regular distribution of these fissures, according to certain surfaces which give to the hailstone a granular appearance; and it is the

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* *Annales de la Société Russe de Géographie. Section du Caucase*, T.X., part 3, 1879, p. 21, 22 (in Russian).

general convergence of these same fissures toward the central region, which impressed on the latter the character of a nucleus. That which might be taken for a nucleus was in reality intimately related to the exterior form of the hailstone. "In the hailstones that were not much flattened the nucleus had an undefined spherical form. . . . . But in the hailstones that were much flattened this nucleus was almost cylindrical, and one saw the bases (of the cylinder) at the poles of the hailstone, which were most often slightly concave. In this last case a sheaf of layers of transparent ice extended from the nucleus in the form of radii (Fig. 3), and constituted planes which, crossing one another, separated the whole volume of the hailstone, longitudinally, into separate compartments. At their equatorial surface the hailstones presented a network of joints. . . . ." (as in Fig. 2).

The regularity of form and structure observed by M. Abich is not an isolated case; it is found in greater or less perfection in other hailstones. The unknown laws which that savant suspected to intervene in the formation of hail really exist. They are as follow:—

1. The exterior surface of a spheroidal hailstone is a surface of equilibrium (or level-surface) of a fluid mass endowed with rotation about its axis.

2. The surfaces of the heterogeneous layers which divide the hailstone into separate compartments are normal or orthogonal to the surfaces of equilibrium in that hailstone.

It follows from the first law that four types of surface are possible in a spheroidal hailstone.

(*a*) A perfect sphere, or rather a slightly oblate ellipsoid. This is the case of the hailstones occurring most commonly.

(*b*) A very oblate ellipsoid. Hailstones of this form are also not rare; observers ordinarily compare them to biconvex lenses. If the flattening of form is very considerable, the hailstone may become a disk. The Utrecht hailstone that was 65 centimetres (26 in.) in circumference was of this form.

(*c*) A toroidal surface, or a quasi-spheroidal surface excessively oblate and concave at the two poles. The hailstones observed by Abich on the 8th of June, 1869, were exactly of this form. Another case of this kind has been reported to me by M. Lagounowitche, who had found amongst some hailstones fallen on the 14th (June 2nd, Russian calendar) of June, 1880, in the province of Minsk (Russia), little spheroids of ice, much flattened, and furnished with "two little fossettes" at the extremities of the axis.

(*d*) An annular surface. I only know of a single case of such hailstones, which has also been reported to me by M. Lagounowitche. According to this observer, certain hailstones that fell on the 14th of June were pierced from side to side by a hole or canal, the axis of which occupied the centre of the hailstone.

The second law indicates to us that for a spherical figure the only possible system of the surfaces of the segmental parts will be represented by conical or pyramidal surfaces, the apices of which are at the centre C of the spheroid (Fig 4), the bases of these conical surfaces being delineated by the curves *a b c d*, *a b e f*, &c., traced arbitrarily upon the surface of the hailstone. It is the intersection of these conical segmental structures with the surface of the hailstone which determines the distribution of the superficial joints; and it is the general convergence of these same surfaces towards the centre which gives to that part the appearance of a central nucleus. Hailstones in the form of cones and pyramids, which are often found in hail, are only fragments of the spherical or spheroidal stones broken in their fall.

As to the cases (*b*) (*c*) (*d*), they comprise, according to the second law, two systems of surfaces of layers. The first corresponds to meridional planes passing through the axis of rotation, and the second is engendered by the rotation of the curves orthogonal to the surfaces of equilibrium. The intersection of the two systems of segmentation with the external surface of the hailstone forms two systems of joints of which one set $a\ a'\ a''\ a'''$ . . ., $b\ b'\ b''\ b'''$ . . ., (Fig. 5), converge towards the poles p and p'; while the others, $a\ b\ c\ d$ . . ., $a'\ b'\ c'\ d'$ . . ., are concentric with the axis of rotation. The axial part of the spheroid limited by the layer $a\ b\ c\ d$ . . . ., corresponds to the nucleus which, in this case, has the appearance of a cylindrical body. All these conclusions are confirmed by the observations that I have just cited.

We can see from this that the opinion widely spread amongst savants that hailstones are disorderly conglomerations of grains accumulated concentrically about a central nucleus, is based upon a misunderstanding. Hailstones show a regularity of structure so precise that we cannot put down whirlwinds in the atmosphere as the cause of them. But there remain other facts less easy still to reconcile with the hypothesis of atmospheric origin of these bodies.

Hailstones often show highly developed crystalline forms. Such have been the cases observed by Adamson, in 1769 at Paris; by Delcros, in 1819, in the south of France; by Neuchel (Fig. 6), in 1863, at Tiflis; by Abich in 1869, at Bely-Klutch, in the Caucasus; and by Secchi, in 1876, in Italy (Fig. 7). According to M. Abich, hailstones that fell on the 21st (9th Rus. Cal.) of June, 1869 (Figs. 8 and 9), consisted of a very oblate central spheroid, and a group of crystals planted all around it. The spheroid offered a remarkable regularity of structure. The fissures and capillary tubes which rendered this mass slightly opaque, had their pointed ends converging towards the central region to which they gave the appearance of a nucleus. Six rays, or rather six meridianal planes, distant 60° one from another, set out from the nucleus in the manner of the rays of a wheel. These rays could only be distinguished from the central mass by the branching of the fissures, which were microscopic and very much compressed in the radial planes, though they were wider apart and visible to the naked eye in the remainder of the spheroid. As to the crystals they were formed of perfectly-transparent ice, were distributed, for the most part, over the equator of the spheroid, and rose, either solitary or in groups, to a height of from 15 to 30 millimetres (0·6 to 1·2 in.) above the surface of the spheroid. It is a fact worthy of being noted here that ten years later, on the 29th (17th Rus. Cal.) of June, 1879, at the same hour of the day, the same original forms reappeared at Bâle. The hailstones that fell at Bâle "offered not only a resemblance but quite a concordance with those which Abich had observed in 1869." But more remarkable still is the fact that in the two cases cited the atmospheric conditions were diametrically opposite. At Bâle the thermometer indicated 30° (86° F.), the air was oppressive, it was a perfect calm, and the hailstones fell almost vertically; whilst at Bely-Klutch, the temperature did not exceed 12°·5 (54°·5 F.), atmosphere was furiously agitated, and the hailstones dashed from all quarters of the horizon.

II.

Experience teaches us that to form a regular crystal of even small dimensions, the liquid has need of perfect and prolonged repose. In the case of water, it is in vain to take all possible precautions to preserve it against internal currents and sudden variations of temperature during freezing: for one only obtains crystals of insignificant dimensions, most often microscopical, and having the form of hexagonal prisms — never that of pyramids. It follows — at least unless you wish to make out no case for physics — that the formation of a pyramidal crystal of ice from 15 to 20 millimetres (0·6 to 0·8 in.) in thickness in the space of a few minutes, or, at most, a few hours, and in the midst of the fury of a tempest, must be considered at least as a miraculous fact. Now, as a miracle is not within the domain of reason, we are obliged to seek for the origin of hail outside our atmosphere, outside our planet, in the inter-planetary space.

However bizarre this idea may appear at the first glance, it is not on that account less conformable to the truths established by modern science. If chemical analysis of meteorites has revealed to us the existence in inter-planetary space of iron, silicon, nickel, oxygen, hydrogen, &c., there should be no plausible reason for denying the possibility of the existence of meteorites composed of oxygen and hydrogen alone. Now in consequence of the low temperature of celestial space, such meteorites could be nothing but icicles or hailstones. Considered from this point of view, hail emerges from the rank of astonishing and marvellous phenomena, and takes its place in the class of facts that have been well known for some time past—in the class of meteoric showers.

A detailed comparison between the phenomena which accompany hail, and those proper to the fall of meteorites, plainly confirms this way of looking at the matter.

Hail comes from very characteristic clouds, sometimes dark, almost black, at other times very bright, but always dense, with clear-cut and agitated outlines; we recognise them amongst storm-clouds. The same character of clouds is repeated in the falls of meteorites. The famous meteorites of the 26th of April, 1803, were precipitated from a little cloud of rectangular form, from from which vapours rushed as if at an explosion. The meteorites of the 13th of June, 1819, descended from a greyish-white cloud, which afterwards was dissipated in smoke. The meteorite of the 14th of May, 1864, left on its track a sort of long white cloud, which lasted more than a quarter of an hour. The meteorite of Poultousk was accompanied by a pale train. The hail of stones in 1868 in Piedmont was discharged from a cloud of irregular form enveloped in an atmosphere of smoke, &c.

A short time before the hail falls there is often heard a peculiar sound, resembling neither the sound of a tempest nor that of peals of thunder. Certain observers compare this noise to that of a jar of walnuts that is shaken. Peltier cites a hailstorm preceded by a noise so intense that at first he thought it the arrival of a squadron of cavalry. According to M. Abich, the hailstorm of the 8th of June, 1869, was preceded by a noise similar to the roaring of an impetuous torrent, and that of the 27th of June by a sort of crackling. The hail at the Orkneys in 1818 was preceded by a noise like the cannonade of several pieces of artillery. The same thing is to be found in falls of meteorites. The fall of meteorites at Aigle was preceded by a sort of discharge which resembled a fusillade, after which one heard a frightful beating as of drums. The hail of stones on the 13th of June, 1819, was preceded by a long rolling with crashing and a sound as of musketry. The bolide which fell on the 13th of May, 1831, was accompanied by three violent detonations as loud as the explosion of a piece of artillery, followed by a noise like the rolling of a heavy carriage over an uneven pavement, &c. It has been sought to explain this noise, in the case of hail, by the mutual clashing of the hailstones ; but this cause would not be at all proportional to the effect which it would have to produce. Moreover, on this hypothesis, the noise ought to increase on the approach of the hailstones, and to last all the while that it is hailing. Now, it is heard a little before it hails. The thing becomes very simple to explain, however, from the point of view of the cosmical origin of the hailstones. Meteorites detonate at the moment of their entrance into our atmosphere, in consequence of the sudden condensation of the air, and they fall to the ground without noise, having lost their planetary velocity in consequence of the resistance of our atmosphere. The same thing happens to aqueous meteorites, that is to say, to hailstones.

The spherical form predominates in hailstones, and this is precisely the case of meteorites in general. "The globular structure," says M. Daubrée, "is so frequent in the common type of meteorites, that it has procured for this group the denomination of chondrite. Of ten falls, nine at least belong to it."

Hailstones are often surrounded by a friable pellicle, apparently of the nature of snow. This pellicle, which some persons have made out to be a layer of snow, formed by the precipitation of atmospheric vapours, is repeated in meteorites, which are, however, anything rather than an atmospheric sediment. "One observes," says M. Daubrée, "that each grain (of a meteorite) is enveloped in a metallic pellicle more or less thin, the structure of which is much more confused than that of the rest of the mass."

The crystals of ice that are formed in the depths of our atmosphere are always very small, and can in no way be compared with the enormous crystals which sometimes accompany hail. The same difference is found in meteorites. "If," observes the same savant, "one traces out the orientation of the octahedra (in meteoric iron) one recognizes that in many masses of meteoric iron they present a parallelism, from which it results that they constitute, taken as a whole a single crystal. The dimensions of these crystals are so considerable as to contrast with the structure, which is observed in artificial iron, even when the state of the latter is as pronounced as possible ; for even then, the cleavage planes are oriented in all directions, as one sees in a host of minerals and of terrestrial rocks."

The crystals of ice which accompany hail present, moreover, this peculiarity, that their form is often pyramidal, whilst the crystals of ice of atmospheric origin are prisms. Now the same difference of crystalline form is repeated in meteorites. According to M. Daubrée, the crystals of meteoric iron are octahedra, and the crystals of artificial iron are always cubes.

But that which agrees best with the cosmic origin of hailstones is that they are sometimes accompanied by true meteoric masses. "More than once," says M. Baumhauer, "showers of hail have been observed in which the hailstones had a metallic nucleus, and I presume that this fact would present itself frequently, if the trouble were often taken to examine hailstones. It was thus, for example, that Eversmann found in hailstones that fell at Sterlitamansk, in the province of Orenburg, in Russia, obtuse-angled octahedra of sulphide of iron, in which Hermann found by analysis 90 per cent. of iron. Similarly there fell on the 21st of June, 1821, in the province of Majo in Spain, hailstones with metallic nuclei, in which Pictet proved the presence of iron . .

But the case which, above all, merits our attention, is that of the shower at Padua, on the 26th of August 1834, of hailstones with nuclei of a dark grey colour. These nuclei, examined by Cozari, consisted of grains of different sizes, the largest of which could be attracted by the magnet, and were found to be composed of iron and nickel. The identity of this matter with that of ærolites can scarcely be open to doubt." An analogous observation has been made at Stockholm by Nordenskiöld, who proved the presence of little dark grains of metallic iron in some hailstones. I think it appropriate to note here a fact relating to the colour of hailstones. According to M. Lagounowitche, many of the hailstones that fell on the 14th (2nd O. S.) of June 1880, in the province of Minsk, were visibly coloured, some rose, others clear blue, recalling the colours of solutions of salts of nickel and cobalt, bodies very frequent amongst meteoric masses.

It has been sought to explain the presence of stony masses in hailstones, by the supposition that hurricanes raised the stony matters from the serface of the soil, and carried them up into the clouds; and it is this way of regarding them that has caused so general an indifference with respect to the stones that accompany hail. In 1815 the Academy of Sciences of St. Petersburg received a case containing specimens of stones that fell during a hailstorm at Wilna, of which some hundreds weighed as much as a pound. It is not known what subsequently became of these stones, at least no traces of them are to be found in the museums of the Academy. Nor is better information to be obtained about the stony masses which accompanied showers of hail at Permj in 1809, at Fatesch in 1844, and at Nachraschinsk in 1833 (Russia). Later, when the cosmic origin of such masses had become evident, it has been sought to explain their presence in hailstones by supposing that atmospheric vapours congeal around stony masses of cosmic origin floating in the air.

All these suppositions become unnecessary from the moment that one adopts a cosmic origin for hailstones themselves. That which appears astonishing, improbable and doubtful in hailstones of terrestrial origin, becomes natural, logical, and necessary in hail of cosmic origin. Hailstones sometimes have enormous dimensions, for there are no limits to the size of celestial bodies. The quantity of them is often extraordinary, for celestial space has no bounds. The form of them is most often spheroidal, for that form is the typical one for celestial bodies. Certain hailstones offer a development of ice-crystals, unknown on the surface of our globe, for the crystallisation of these masses is effected during thousands of years, and under conditions of repose unknown on the surface of the earth. The temperature of hail is very low, because the temperature of celestial space is so also. Lastly, hailstones are sometimes accompanied by meteorites, because these two kinds of bodies belong to the same family, and travel together through the depths of the sky.

Considered from this point of view, each hailstone has its history, its periods of formation. In the first period it is collecting itself together in consequence of the mutual attraction of particles dispersed throughout cosmic space; in the second it accommodates itself to the conditions of equilibrium determined by its volume and its velocity of rotation, and is constituting itself a more or less oblate spheroid; lastly, in the third period the mass obeys internal molecular forces, and crystallizes.

I do not conceal from myself that the ideas that I am putting forward may raise a crowd of objections. It may be asked, how can the ice of hailstones take the form of a spheroid whilst remaining solid. How does the same ice crystallize while still remaining solid? Why does not hail fall in winter, whilst the true meteorites fall at all seasons? &c.

All these questions, which may appear to be serious objections to my theory, are for me only so many sources for deductions of the highest interest, which, however, I cannot condense into a few pages. I will content myself by observing here that, great as the progress of science may appear to be to-day, it is necessarily flecked with prejudices of ancient date, which can only be effaced with great pains, and which make us see an obstacle where our descendants will see only a corroboration and a proof.

"ROGERS' BLAST."

[THIS term was quoted by Mr. F. Coventry, in Vol. XV., p. 58, of this Magazine, as a common name for a small local whirlwind. We are indebted to him for calling our attention to two exhaustive notes upon the subject which appeared in *Notes and Queries*, for July 3, 1880, and which we reprint with great pleasure.]—ED.

I found what I suspect to be the right explanation of this expression in less than a minute in the first book I opened. I will give the process of reasoning as an example. When words occur of which the former element is obscure, we expect both elements to have the same meaning. This is very common in English, especially in place-names. Thus *Derwent-water* means "white-water-water;" *water* being added from ignorance of the sense of *Der*.* Hence *rodges-blast* must mean "blast-blast," and *rodges* is a corruption of a foreign word meaning "blast." But it is notorious that Norfolk words, if not Anglo-Saxon, are mostly Scandinavian; and the best representative of Scandinavian is Icelandic. Next, since English *dg* commonly stands for *g* (as in *bridge* for *brig*), one will have to look for *rog*, or, as *g* is often put for older *k*, for *rok*. So I said to myself, suppose I look for *rog* or *rok* in Vigfusson's *Icelandic Dictionary*.

* There are few subjects on which opinions differ more than upon derivations. The above translation of Derwent struck us as unfamiliar, and on turning to the latest Lake Guide Book (Jenkinson's) we find :—

Derwent, Dwr-gwyn, "clear-water" (Taylor); or from Derwyn, equivalent to the "winding river" (Ferguson). Sullivan suggests a third derivation, dur-gwent, "the beautiful water." The course of the river Derwent is not tortuous. Either of the other two names would be more characteristic. *Jenkinson's Practical Guide to the English Lakes.*

These various opinions do not differ as much as usual, and we suppose it may be accepted that Der (Celtic Dwr) represents water (possibly in the form of a river, but at any rate water.) And if "went" is the equivalent of clear, white or beautiful; and if the true line of beauty is a curve, we may, perhaps, recognize the equivalent of "beautiful" in Ferguson's "winding."—ED.

On opening it, the first word I raw was *rok*, the splashing, foaming sea; the second was *roka*, a whirlwind. Now *roka* would regularly pass into *rogga* and *rodge* or *roger*, the former if it became one syllable, the latter if pronounced as two syllables. The rest of the derivation now becomes easy. *Roka* is one of the numerous derivatives of the strong verb *rjúka*, to reek, being formed from the pp. *rokinn*. *Rjúka* is cognate with A.-S. *reócan*, whence modern English *reek*, and with the G. *riechen*, whence the substantive *rauch*. So little is English etymology understood that, in a very recent number of the *Academy*, the English word *reek* was actually derived from the German word *rauch*, which is much worse than deriving Portuguese words from Italian. I believe that a little thought in these matters will often save a great deal of labour and guesswork.

WALTER W. SKEAT.

This expression should rather be "rogers-blast," and it is so given by Halliwell, with the explanation quoted from Forby: "A sudden and local motion of the air, no otherwise perceptible but by its whirling up the dust on a dry road in perfectly calm weather, somewhat in the manner of a waterspout." This explanation is good so far as it goes, but the term includes whirlwinds of a more violent character, the leading idea being that of a rotatory motion. It is derived from a Scandinavian source, and will be found in use, I think, principally in those districts where the Danish element has been predominant. *Roka* in Icelandic or Old Norse is a whirlwind. *Rok* is explained by Holmboe (*Det Norske Sprogs*) as "en storm, som hvirvler Vand og Sand op i Luften," a storm which whirls the water and sand up in the air. *Roka-blástr* in Icelandic is the blast of a whirlwind. From the same radical idea of twirling comes the term *rock* for the distaff used in spinning, which is common to all the Teutonic tongues, though the radical from which it springs has been lost in all except the Norse. It is true that it was the spindle, and not the *rock*, which gave the twist to the thread, but it was one and the same operation. Our old ballads and poetry are full of allusions to the *rock*, both before and after the introduction of the spinning wheel. Thus in the ancient song of "My Joe Janet," the lady sings :—

"My spinning wheel is auld and stiff,
The *rock* o't winna stand, sir;
To keep the temper-pin in tiff
Employs aft my hand, sir."

The "temper pin" was a wooden peg used to regulate the motion of the wheel. So Parnell :—

"Flow from the *rock*, my flax, and swiftly flow;
Pursue thy thread, the spindle runs below."

Wachter (*sub voce* "Rocken") connects *rock* with Gr. τρόχος, the *t* disappearing by aphæresis. The Greek word undoubtedly means a circular course, but Fick, who is usually very accurate, gives no countenance to the connexion of the words.

J. A. PICTON.

Sandyknowe, Wavertree.

REMARKABLE RAINFALL.

To the Editor of the Meteorological Magazine.

The following are the quantities of rain which have fallen in Clifton during the last four days, each "day" of rainfall ending at 9 a.m. of the day following that to which the quantity is assigned :—

October 21	... ...	0·395	inches
,, 22	... ...	1·240	,,
,, 23	... .	1·789	,,
,, 24	... ...	0·286	,,
Total	... ...	3·710	

Actually, nearly the whole of this quantity fell within a period of 60 hours, namely, between midnight on Saturday and noon on Tuesday.

The records of thirty years supply no complete parallel to this persistent downpour. The nearest approaches were on March 11—13, 1859, when 3·041 inches fell in 48 hours; on August 6, 1865, when 2·682 inches fell in 24 hours; and on July 14—15, 1875, when 3·080 inches fell in 38 hours.

Thick snow fell with the rain on Tuesday morning, partially whitening the roofs of houses and other exposed surfaces. The 24th of October is an unusually early date for the first snow.

GEORGE F. BURDER.

Clifton, 25th October, 1882.

[In thorough agreement with the above is the information which we have received, through Mr. H. J. Martin, C.E., from Mr. T. Howard, C.E., of Bristol, that the flood produced by the above rain was the highest on record, reaching for the total discharge through the Avon (say under the Suspension Bridge at Clifton) 48,000,000 cubic feet, or about 300,000,000 gallons per hour.—ED.]

HEARING THE AURORA BY TELEPHONE.

An observer of the recent aurora at Mont Clair, N.J., August 4, writes that on connecting the two poles of his telephone, one with the water pipe leading to cistern near his dwelling, and one with the gas pipe leading all over town, he heard the electrical crackle going on substantially the same as is heard when the same connection is made during thunder-storms. He, however, reports that the aurora crackle was more delicate in its sound than the thunder-storm crackle, and that besides the crackle there were at intervals of perhaps half a second each, separate short taps on the telephone diaphragm that gave a slight ringing sound.—*Scientific American.*

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, MAY, 1882.

STATIONS. (Those in italics are South of the Equator.)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0–100	°	°	inches		0–10
England, London	74·2	29	37·3	16	66·9	45·5	44·8	69	129·7	32·8	1·20	11	4·8
Cape of Good Hope ...	75·8	6	34·2	29	67·0	48·3	52·8	80	...	...	2·78	7	5·7
Mauritius..................	81·3	5, 12	63·1	31	79·2	68·7	64·1	72	...	...	·87	8	3·7
Calcutta......................	100·3	3	66·2	7	93·0	73·8	72·7	71	161·7	61·8	6·05	12	4·9
Bombay......................	91·8	31	76·6	3	89·5	79·7	74·8	72	148·6	68·7	·02	1	3·0
Ceylon	91·2	6	71·8	16	87·6	77·2	73·2	74	156·0	68·3	12·78	20	7·0
Melbourne	69·0	4	38·0	20	62·6	48·9	46·2	73	120·0	30·6	2·55	16	6·4
Adelaide	77·5	11	44·0	8	65·4	53·0	48·9	68	141·6	34·5	2·21	17	6·6
Wellington	64·0	19	39·0	25	58·3	47·2	...	...	114·0	31·0	5·62	17	...
Auckland	66·1	2	42·6	23	62·5	49·6	49·5	79	97·0	38·0	3·35	21	5·4
Falkland Isles	48·8	12	24·4	29	41·6	33·1	34·6	88	104·1	20·0	5·19	28	6·6
Jamaica......................	88·3	31	67·8	1	85·9	72·8	71·6	77	...	61·8	2·17	5	4·3
Barbados	83·0	var.	70·0	var.	82·0	72·0	72·2	77	146·0	69·0	2·93	19	6·0
Toronto	70·9	30	30·0	2	57·3	40·6	38·0	65	128·0	24·0	3·58	11	6·2
New Brunswick, S. John	60·0	13	27·0	5	51·8	36·7	37·5	76	...	...	3·15	11	5·5
Cape Breton, Sydney...	68·6	29	26·7	5	50·6	34·0	34·8	78	...	...	5·52	17	5·9
Newfoundlnd, S. John's	...	...	...	...	...	...	...	...	...	...	...	..	...
Manitoba, Winnipeg ...	78·2	16	20·0	22	62·7	36·9	37·4	61	135·8	...	1·41	10	4·1

REMARKS, MAY, 1882.

Mauritius.—Rainfall 3·27 in. below average, mean temp. 0°·7 above it, mean pressure 30·073 in. ·020 in. below average. Mean hourly velocity of wind 8·9 miles; greatest 22·5 miles; least 1·9 miles, prevailing direction S.E. to E.; L on 7th, T and L on 22nd. C. MELDRUM, F.R.S.

Melbourne.—Mean temp. 1°·8, and rainfall 0·41 in. above average; pressure, humidity, and amount of cloud all about the average; prevailing wind N, strong breezes occurring on 12 days; violent westerly squalls on the 12th and 15th; heavy dew on 4 days, hoar frost on 20th, lunar halo on 5th. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean temp. about 1°·5 above average, but the weather over the agricultural portions of the colony was fine and showery and suitable to the young wheat crops. Mean pressure slightly above average, and rainfall about 1·00 in. below it.
C. TODD.

Wellington.—Dull, showery weather up to 14th, with strong winds on 8th, 9th, 12th, and 13th; cold and wet with fresh wind from 14th to 19th; remainder of month fine and pleasant (excepting 21st); prevailing wind N.W.; T on 5th; slight earthquakes on 14th and 15th. Mean temp. about the average; pressure below it.
R. B. GORE.

Auckland.—Very showery till 21st, but fine from 22nd to 29th; prevailing wind S.W. E. B. DICKSON.

BARBADOS.—Mean pressure slightly, and mean temp. (76°·1) 1° below the average; prevailing wind N.E., average velocity 15·2 miles, extremes 21·3 miles and 10·1 miles. Rainfall 52% below the average, and the evaporation (5·30 in.) 20% above it. Five days were clouded. R. BOWIE WALCOTT.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, JUNE, 1882.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Absolute. Maximum. Date.	Absolute. Minimum. Temp.	Absolute. Minimum. Date.	Average. Max.	Average. Min.	Average. Dew Point.	Average. Humidity.	Absolute. Max. in Sun.	Absolute. Min. on Grass.	Total Rain. Depth.	Total Rain. Days.	Aver. Cloud.
	°		°		°	°	°	0–100	°	°	inches		
England, London	74·3	27*	41·5	13	66·8	49·4	47·6	71	130·0	36·9	2·30	18	6·8
Cape of Good Hope ...	75·0	21	34·0	18	63·8	46·6	48·8	80	...	...	3·29	12	4·8
Mauritius	80·3	3	58·2	29	74·8	65·0	59·4	70	...	...	2·86	12	5·0
Calcutta	98·9	3	72·2	2	90·1	77·9	78·3	84	158·4	70·2	9·99	20	7·5
Bombay	90·8	1	74·6	3	85·8	78·1	77·4	86	148·6	69·0	27·5	25	8·0
Ceylon	86·7	16	74·3	6, 23	84·7	77·7	72·3	75	152·0	64·0	6·61	16	7·1
Melbourne	62·0	10	31·5	9	55·7	42·1	40·9	77	110·0	24·4	1·37	13	5·4
Adelaide	63·0	7	36·8	28	57·9	44·1	43·0	74	134·0	29·5	1·62	16	6·5
Wellington	60·1	21	38·7	6	54·9	47·1	...	...	109·0	33·0	5·98	19	...
Auckland	64·5	16	40·2	6	59·9	49·7	49·9	83	...	40·0	5·54	22	8·2
Falkland Isles	45 1	15†	19·5	5	39·8	31·7	34·1	90	86·1	17·7	2·24	20	7·4
Jamaica	90·9	3	71·1	13	88·7	74 8	73·5	75	...	64·7	·76	2	5·1
Barbados	83·0	19‡	70·0	29	82·0	73·0	73·4	84	148·0	68·0	4·28	16	6·5
Toronto	85·4	25	37·0	2	70·7	52·0	51·5	69	144·0	35·0	2·63	12	5·4
New Brunswick, S.John	79·0	26§	41·0	6	62·8	48·7	49·5	80	...	...	6·65	13	6·3
Cape Breton, Sydney ...	77·7	24	35·0	13	65·8	46·3	49·2	82	...	...	6·17	19	6·8
Newfoundlnd, S.John's	...	...	...	...	...	...	...	...	...	...	...	...	...
Manitoba, Winnipeg ...	84·5	6	30·8	1	72·2	45·9	46·6	67	154·0	...	1·37	6	4·0

* And 29. † And 20. ‡ And 20. § And 27.

REMARKS, JUNE, 1882.

Mauritius.—Rainfall ·90 in. above the average, mean temp. 0°·3 below it; mean pressure 30·173 in., ·010 in. below average. Mean hourly velocity of wind 10·4 miles; greatest 37·0 miles on 14th, least 2·3 miles on 10th and 21st, prevailing direction S.E. by S. to E. by S. C. MELDRUM, F.R.S.

Melbourne.—Mean pressure about the average, mean temp. of air, of dew-point, amount of cloud and rainfall all below the average; prevailing direction of wind S.W., W. and N., strong breezes occurring on 7 days; heavy dew on 8 days; hoar frost on 6 days; ice on the 9th, dense fog on the 8th and 27th. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean temp. nearly 3° below average of 25 years, rainfall likewise below the mean; but the mean pressure was slightly above it. C. TODD.

Wellington.—First 3 days fine; then wet unpleasant weather till 10th, and stormy on 4th and 5th; a few fine days followed, but from 15th to 22nd was stormy with heavy rains; remainder of month fine; H on 5th, fog on 12th, 13th, 14th, and 28th; prevailing winds N.W. and S.E., slight earthquakes on 6th and 11th. Mean temp. 2°·0 above average; pressure also above it. R. B. GORE.

Auckland.—Rain very heavy and continuous throughout the month, max. fall 1·80 in. on the 4th; wind mostly light to moderate, moving from W. to N.E. and back to W. twice in the month; very strong on 15th; dense mist on 1st, 2nd, 19th, and 20th. E. B. DICKSON.

BARBADOS.—Mean pressure and temp. (76°·8), both slightly below the average. Prevailing wind N.E., average velocity 15·7 miles, extremes 22 miles and 10 miles; rainfall 30% below the average, and evaporation (4·45 in.) 22% above it; six days were overcast. R. BOWIE WALCOTT.

SYDNEY, NOVA SCOTIA.—Snow banks 3ft. deep on country roads on 9th.

SUPPLEMENTARY TABLE OF RAINFALL,

OCTOBER, 1882.

[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	6·78	XI.	Solva	6·17
,,	Margate, Birchington	5·04	,,	Castle Malgwyn	6·62
,,	Littlehampton	8·08	,,	Rhayader, Nantgwillt	6·67
,,	St. Leonards	8·01	,,	Carno, Tybritle	6·17
,,	Hailsham	9·89	,,	Corwen, Rhug	3·70
,,	I. of W., St. Lawrence.	8·14	,,	Port Madoc	6·63
,,	Alton, Ashdell	6·62	,,	I. of Man, Douglas	5·27
III.	Great Missenden	7·32	XII.	Carsphairn	6·84
,,	Winslow, Addington	6·02	,,	Melrose, Abbey Gate	2·97
,,	Oxford, Magdalen Col.	5·59	XIII.	N. Esk Res. [Penicuick]	3·35
,,	Northampton	5·18	XIV.	Ayr, Cassillis House	2·73
,,	Cambridge, Beech Ho.	4·78	,,	Glasgow, Queen's Park.	3·36
IV.	Southend	4·32	XV.	Islay, Gruinart School	4·67
,,	Harlow, Sheering	5·04	XVI.	St. Andrews, Newton Bk.	3·95
,,	Diss	6·80	,,	Aberfeldy H.R.S.	3·49
,,	Swaffham	4·65	,,	Dalnaspidal	5·89
,,	Hindringham	4·71	XVII.	Tomintoul	...
V.	Salisbury, Alderbury	6·57	,,	Keith H.R.S.	1·63
,,	Calne, Compton Bassett	6·05	XVIII.	Forres H.R.S.	1·24
,,	Beaminster Vicarage	9·58	,,	Strome Ferry H.R.S.	3·33
,,	Ashburton, Holne Vic.	9·11	,,	Lochbroom	1·21
,,	Torrington, Langtree W.	7·46	,,	Tain, Springfield	1·43
,,	Lynmouth, Glenthorne.	7·59	,,	Loch Shiel, Glenaladale	6·72
,,	St. Austell, Cosgarne	...	XIX.	Lairg H.R.S.	1·87
,,	Taunton, Fullands	7·24	,,	Forsinard H.R.S.	1·92
VI.	Bristol, Clifton	7·14	,,	Watten H.R.S.	2·54
,,	Ross	5·80	XX.	Fermoy, Glenville	5·95
,,	Wem, Sansaw Hall	4·22	,,	Tralee, Castlemorris	4·40
,,	Cheadle, The Heath Ho.	5·37	,,	Cahir, Tubrid	4·56
,,	Worcester, Diglis Lock	4·97	,,	Newcastle West	4·31
,,	Coventry, Coundon	5·53	,,	Kilrush	...
VII.	Melton, Coston	5·11	,,	Corofin	4·72
,,	Ketton Hall [Stamford]	5·58	XXI.	Kilkenny, Butler House	...
,,	Horncastle, Bucknall	4·27	,,	Carlow, Browne's Hill	3·32
VIII.	Macclesfield, The Park.	3·78	,,	Navan, Balrath	3·58
,,	Walton-on-the-Hill	2·90	,,	Athlone, Twyford	3·44
,,	Broughton-in-Furness	5·44	XXII.	Mullingar, Belvedere	3·33
IX.	Wakefield, Stanley Vic.	3·90	,,	Clifden, Kylemore	10·32
,,	Ripon, Mickley	4·51	,,	Crossmolina, Enniscoe	4·12
,,	Scarborough	4·70	XXIII.	Carrick-on-Shannon	3·20
,,	East Layton [Darlington]	3·30	,,	Dowra	2·65
,,	Middleton, Mickleton	3·54	,,	Rockcorry	2·72
X.	Haltwhistle, Unthank	3·87	,,	Warrenpoint	4·08
,,	Carlisle, St. James Rd.	2·69	,,	Newtownards	3·26
,,	Shap, Copy Hill	4·17	,,	Belfast, New Barnsley	2·97
XI.	Llanfrechfa Grange	8·25	,,	Bushmills	2·70
,,	Llandovery	5·79	,,	Buncrana	3·08

OCTOBER, 1882.

iv		STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL. Total Fall.	Difference from average 1870–9	Greatest Fall in 24 hours. Dpth	Date.	Days on which ·01 or more fell.	TEMPERATURE. Max. Deg.	Date.	Min. Deg.	Date.	No. of Nights below 32° In shade.	On grass.
			inches	inches.	in.								
I.	ENGLAND.	London (Camden Square)	4·96	+ 2·26	·59	21	23	70·4	1	31·9	26	1	4
II.		Maidstone (Hunton Court)	5·81	+ 3·35	1·01	28	22	...	...	...	...	...	...
,,		Strathfield Turgiss	5·79	+ 3·05	·99	15	23	69·0	1	27·9	26	2	9
III.		Hitchin	5·62	+ 3·44	1·12	27	25	64·0	1	30·0	25	1	...
,,		Banbury	5·84	+ 3·08	1·11	24	27	65·5	1	28·0	26	2	...
IV.		Bury St. Edmunds (Culford)	5·31	+ 3·14	1·04	24	25	69·0	1	29·0	24	4	..
,,		Norwich (Cossey)	5·83	+ 3·50	1·34	21	19	69·0	1	31·5	26	1	2
V.		Bridport	8·37	...	1·70	23	22	...	..	...	...	...	...
,,		Barnstaple	7·38	+ 1·93	1·27	23	21	70·0	2, 3	39·0	30	0	..
,,		Bodmin	7·32	+ 1·05	1·25	23	26	61·0	1	35·0	29	0	3
VI.		Cirencester	6·29	+ 3·05	1·04	23	23	..	...	...	...	...	...
,,		ChurchStretton(Woolstaston)	5·46	+ ·86	·72	24	26	62·5	1	36·0	27	0	3
,,		Tenbury (Orleton)	5·76	+ 2·52	·90	24	28	66·8	1	26·7	26	3	5
VII.		Leicester	5·56	...	1·28	24	28	67·4	1	30·2	26	1	4
,,		Boston	4·78	+ 2·75	1·48	24	17	70·0	1	32·0	26	1	...
,,		Grimsby	4·99	+ 2·34	1·51	24	25	68·5	1	37·0	25*a*	0	...
,,		Hesley Hall [Tickhill]	4·88	...	1·53	25	23	70·0	2	29·0	26	1	...
VIII.		Manchester (Ardwick)	3·11	— 1·32	·56	24	18	68·0	2	35·0	25	0	...
IX.		Wetherby (Ribstone Hall)	3·90	+ ·54	1·08	24	16	...	...	...	...	...	...
,,		Skipton (Arncliffe)	6·13	— 1·13	1·04	19	28	64·0	3	34·0	29	0	...
X.		North Shields	2·96	+ ·45	·47	15	19	68·8	1	31·5	26	2	2
,,		Borrowdale (Seathwaite)	9·14	— 7·41	1·49	19	21	...	...	...	...	..	...
XI.	WALES.	Cardiff (Ely)	8·56	+ 3·33	1·32	23	21	...	...	...	...	...	...
,,		Haverfordwest	7·56	+ 1·11	1·26	31	20	63·0	1, 2	34·0	28	0	7
,,		Plinlimmon (Cwmsymlog)	7·34	...	·91	30	22	...	...	...	..	...	...
,,		Llandudno	2·64	— 1·95	·38	14	20	71·2	1	38·4	26	0	...
XII.	SCOTLAND.	Cargen [Dumfries]	4·57	— 1·14	·94	19	17	66·0	1	30·0	26	1	...
,,		Hawick	2·73	— ·44	·60	16	22	...	...	..	...	...	...
XIV.		Douglas Castle (Newmains)	3·41	— 1·53	·69	15	19	...	...	...	...	...	.
XV.		Lochgilphead (Kilmory)	4·58	— 3·74	·56	30	20	...	...	25·0	29	4	...
,,		Appin (Airds)	5·96	...	...	...	...	...	...	...	...	...	...
,,		Mull (Quinish)	6·23	...	·97	21	22	...	...	...	...	...	...
XVI.		Loch Leven Sluices	3·90	— ·41	·80	8	17	...	...	...	...	...	...
,,		Arbroath	3·06	+ ·19	1·19	15	15	62·0	4	33·0	26	0	...
XVII.		Braemar	3·22	— 1·26	·37	7	24	63·0	1	23·0	26	5	19
,,		Aberdeen	2·93	...	·58	15	24	64·0	1, 4	30·0	29*b*	2	...
XVIII.		Skye (Sligachan)	7·70	...	1·71	3	14	...	...	...	...	..	...
,,		Culloden	1·79	— ·50	·67	16	...	68·0	1	29·5	30	3	13
XIX.		Dunrobin	1·50	...	·54	19	11	...	...	...	...	...	...
,,		Orkney (Sandwick)	3·10	— 1·19	·77	19	17	63·5	2	35·7	26	0	5
XX.	IRELAND.	Cork (Blackrock)	5·35	+ ·61	2·22	18	19	65·0	4	31·0	24	3	...
,,		Dromore Castle	7·25	...	1·54	18	18	65·0	4	34·0	24	0	...
,,		Waterford (Brook Lodge)	5·72	...	1·91	18	19	61·5	14	30·0	26	2	...
,,		Killaloe	4·52	...	·92	18	14	67·0	4	29·0	26	1	...
XXI.		Portarlington	2·42	— 1·05	·66	18	18	62·0	14	29·0	25	4	...
,,		Dublin (Monkstown)	...	...	...	...	...	...	...	...	.	...	...
XXII.		Ballinasloe	3·43	...	·92	18	21	64·0	1	28·0	26	5	...
XXIII.		Waringstown	2·42	— 1·19	·54	18	17	66·0	1	28·0	24*c*	3	6
,,		Londonderry	...	...	...	...	...	...	...	...	...	...	...
,,		Omagh (Edenfel)	2·50	— 1·82	·85	18	15	64·0	1	26·0	28	5	...

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

a And 26, 30. *b* And 30. *c* And 28.

METEOROLOGICAL NOTES ON OCTOBER.

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

ENGLAND.

STRATHFIELD TURGISS.—A very wet and unsettled month, stormy and changeable; all agricultural work suspended. Rainfall more than double the average, temp. also much above the average. Lowlands flooded on 16th; rooks reforming their nests on 20th.

HITCHEN.—With two exceptions the wettest October for more than 30 years; temp. much below the average; terrific gale on the 24th, more violent than that of October 14th, 1881.

BANBURY.—A singularly wet month, both in amount and frequency of R, the total fall being more than twice the average, and the largest recorded in October during 22 years, with the exception of October, 1875 (7·80 in.). Mean temp. 48°·5. Heavy gale on 24th, with heavy R, S, and sleet: 1·73 in. fell in about 12 hours, causing great floods, which threw down many trees and walls; the bar. fell to 28·715 (corrected and reduced). High wind on 5th, 15th, 27th, and 28th; distant T and L on 8th; aurora on 2nd.

CULFORD.—Very wet and stormy during the month. Gale on 24th, with S, H, and R, and very low temp. and pressure. L on 11th.

COSSEY.—An unfavourable month for farm work, the heavy rains delaying wheat sowing on all but the light lands. Heavy gale with torrents of R and a rapid fall of temp. on 24th.

BRIDPORT.—T and L on 24th.

BODMIN.—Mean temp. of the month 51°·4.

CIRENCESTER.—A very wet month. On the morning of the 24th a remarkable storm occurred with heavy R, which turned to S about 10 a.m.; the ground was quite covered for some hours; on the Cotswold hills the S lay in places for two days.

WOOLSTASTON.—A month of constant R and fog, only five fine days; a good deal of grain still standing in the fields in the higher lands at the end of the month. Mean temp. 48°·1.

ORLETON.—A very cloudy rainy month with occasional sunshine; the nights were generally cloudy, and in the middle of the month very dark, and there were few frosts. Rainfall more than double the average; the bar. was low and very unsteady, with frequent gales of wind; temp. more than ·5° below the average. On the 24th, at 5.30 a.m., R set in, falling in sheets after 6 a.m., with a rapid decrease of temperature, and changing to S at 10 a.m., which covered the ground in half an hour, and continued to fall till noon, when it again changed, and R fell lightly till 3 p.m., with an increase of temp.; more than 1·50 in. of R and S fell in 7½ hours. L on 20th and 22nd.

BOSTON.—The total rainfall was more than double the average, and has only once been exceeded in October in 20 years, viz., October, 1880, when 7·14 in. fell. In consequence of this heavy rain, there was a great deal of land flooded, and several of the protecting banks gave way. On the 28th the tide rose 3 ft. 8 in. above its ordinary height (17 ft. above Ordnance datum), a rise which has only been equalled twice within the last 20 years.

KILLINGHOLME.—First week of the month very fine, but during the remainder there were only three days without R. Very little wheat sown on heavy land.

SEATHWAITE.—With the exception of a few H showers the month was remarkably mild and fine. T on 23rd and 29th.

WALES.

HAVERFORDWEST.—The month commenced stormy, but the weather soon became fine and calm, with very high pressure on the 4th (bar., 9 p.m., 30·593 in., corrected and reduced); the fine weather lasted, with the exception of a slight disturbance on the 11th, till the 14th, after which date it gradually became unsettled, and the last ten days of the month were very cold, wet, and stormy. The month was, on the whole, very mild, several wild roses and a wild strawberry being seen in the last week. T, L, H, and R and heavy floods on 26th; furious gale with heavy R and great floods on 31st.

LLANDUDNO.—At Llandudno, October is, on the average, the wettest of all the months, but this year is an exception, and we happily escaped the deluges of R which have fallen at many other stations. The month was showery, certainly (as well as cloudy), if we count the number of days on which R fell, but the aggregate fall was nearly 60 per cent. below the average of 21 years; the humidity was also below the average. Mean temp. 51°·1, a fraction of a degree below the average; range 32°·8, mean daily range 8°·7.

SCOTLAND.

CARGEN.—A dull gloomy month, but very mild; a considerable number of ripe strawberries having been gathered; temp 1°·7 above average; duration of sunshine 90 hours, 37 hours below average. Gale on 1st; T and L on 2nd.

HAWICK.—The month, on the whole, though mild, was one of drizzle, which aggravated the potatoe disease. and delayed the harvest, which was not quite finished at the end of the month. Hurricane on 1st; T nearly all day on 26th; first frost on 25th.

QUINISH.—Nearly all the grain in the district was secured during the last half of the month with great difficulty in indifferent condition. During the whole of this season the saving of hay and corn has been exceptionally difficult, and should the rainfall of November and December equal the average, this year will be one of the wettest on record.

BRAEMAR.—An exceedingly damp and dull month, doing much injury to an excellent crop; lunar rainbow on 21st.

ABERDEEN.—Although the weather was damp and misty during the greater part of the month, the rainfall was below the average. Brilliant aurora on 2nd.

SLIGACHAN.—The month was ushered in by a hurricane from S.W., which continued for 24 hours, doing great damage to corn which was partly in stook, scattering it over the fields, and carrying some out to sea. Hay crop good, but injured by wet; potatoe crop much diseased. Gale on 1st; T and L on 2nd.

CULLODEN.—The month was fine generally, some days, between the intervals of rainfall, particularly so. None of the heavy storms experienced in England reached the northern parts of this kingdom.

SANDWICK.—October was mild and dry, the rainfall being considerably below the average. October is generally the wettest month here, but this year there have already been four months that have exceeded it. Strong breezes occurred from S E., but no such storms as visited England. On the last four days N. and N.W. winds prevailed reducing the temperature. Aurora on 9th and 10th.

IRELAND.

CORK.—Very stormy on 1st, wind pressure 40lbs. to the square foot; mean temp. of month 49°·3.

DROMORE.—Very heavy gale on 1st, which culminated in a squall about 9·30 a.m., doing very great damage to trees, houses, and stacks; all the mischief was done in the space of about 20 minutes and the gale quickly abated. With this exception the early part of the month was very fine, but a good deal of R fell in the latter half.

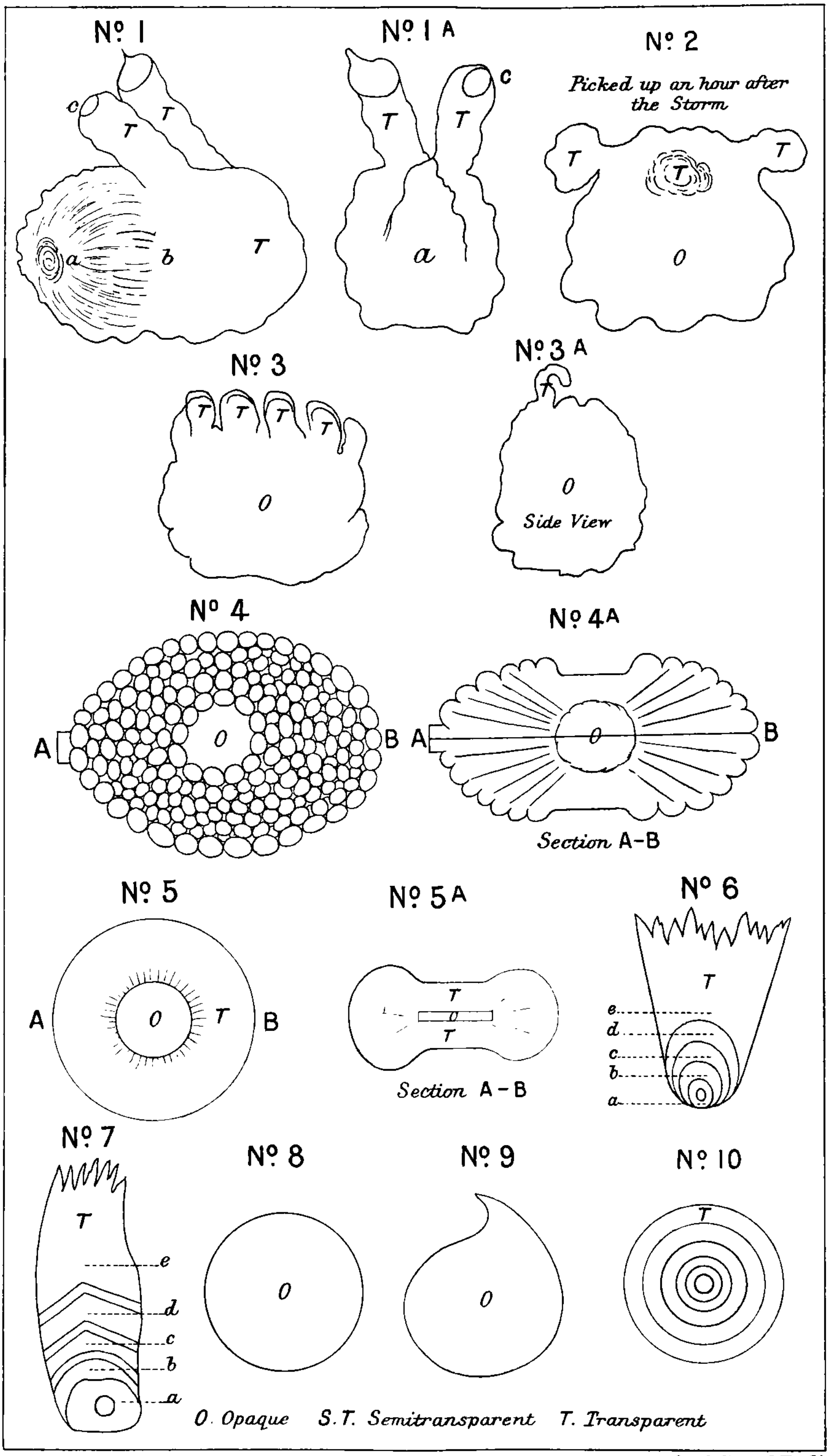
WATERFORD.—Gales from S.W. on 1st and 18th; T on 2nd; TS on 7th; L on 11th; fog on 8th, 9th, and 13th.

KILLALOE.—Gale from S.E. on 1st of great violence from 10 a.m. to 4 p.m.

BALLINASLOE.—Month generally cold, wet, and blustery, but the rainfall was slightly below the average. Violent storm on 1st, doing much damage to trees and houses.

WARINGSTOWN.—Very severe gale S.S.E. to S S.W. on 1st.

EDENFEL.—We experienced here during the past month weather finer than that reported from any other district in the three kingdoms.



Stanford's Geog! Estabt

HAILSTORM AT OBER GRAINAU 4th JUNE 1882.