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THE COWES STORM.

ALTHOUGH it has not been, and will not be, possible for us to examine personally, or by deputy, the track of this storm, we think that it would be inappropriate to allow it to pass without notice in these pages. We hope, however, that some one will come forward and prepare a complete record like Mr. Rowell's narrative of that at Calne;* that by Mr. Beesley and ourselves of the Newbottle whirlwind;† or that which we gave of the storm at Hitchin.‡ We incline to the belief that this Cowes storm was more remarkable than either of those above-mentioned, and will well repay any one who will devote a week or ten days to its examination. Meanwhile, that no time may be lost, we shall be glad to receive any notes, letters, or newspaper cuttings referring to it, and to forward them to whosoever intimates his intention to work up the subject.

Our Ryde correspondent (Mr. R. Taylor), after personal inspection of the state of Cowes, sent us the account which we append, and reported that it might be accepted as correct. All other statements which we have yet seen are confirmatory, but nearly all add some facts which are useful. As we are not attempting to compile the history of the storm, we quote only one other record, viz., that from *The Times* of what occurred N.E. of Fareham.

We have been strongly tempted to correct the grammar and language of the following report, but have decided upon reprinting it *verbatim*, merely adding a few stops.

DISASTROUS WHIRLWIND AT COWES.

A terrific whirlwind passed over Cowes early on Thursday morning, with most alarming and disastrous effects. It was in character akin to the cyclone of the tropics, and seldom have the ravages of a storm been more severely felt in this country. From all that can be gathered it originated in the neighbourhood of Brixton, at 7.15 a.m., one of the first to suffer from it being Miss Arnold, of Wyeate-court, whose outbuildings were stated to have been demolished. Thence it appears to have whirled across country by Tinkers-lane, and by way of Mill-hill into

* A Lecture on the Storm in Wiltshire, Dec. 30, 1859, read at a meeting of the British Meteorological Society, by G. A. Rowell. Printed at the request of the Society, and published by the Author, Alfred-street, St. Giles, Oxford, 1860.

† Met. Mag. Vol. VIII., pp. 150-154, 167-171.

‡ Met. Mag. Vol. X., pp. 83-88.

the town of Cowes, its route being marked throughout by a continuous line of wreckage. Of course the individual sensations produced by the phenomenon vary, but it is generally agreed that the whirlwind was heralded or accompanied by a lurid glare of electric light, and its appearance is described as a small spiral cloud, which blasted everything as it swept by. In most cases people had a few minutes' warning of it, from the rushing noise of its progress, and there was a feeling at the same time that something dreadful and unnatural was about to happen. Those who had observed the mercury were also in some measure prepared by its unusual depression for an extraordinary atmospheric disturbance. The appearance of Cowes shortly after the occurrence was astonishing. The parade, where the whirlwind made its exit from the town, was strewn with articles of furniture and *debris* of all descriptions which had been whisked over the house tops like whisks of straw. What was once the well known Globe Hotel had in a moment become a mere tottering ruin, the front being blown completely in, exposing the bed-rooms, in most of which lay heaps of bricks which had crushed through from the roof and walls. The Globe cottage attached to the hotel was similarly demolished, and in each house goods of all descriptions were demolished and in the wildest confusion. Luckily at this season the hotels are not crowded, but the inmates of the "Globe" had one and all miraculous escapes from death, and in fact only one—a Swedish Captain, who lay asleep in an upper room, was seriously injured. This gentleman's ankle was broken, and he was found almost buried in the *debris* from the wall. Mr. A. Wallace, who was occupying a second floor bed-room, had a marvellous escape, the bed from which he had just risen being buried beneath the rubbish. Major and Mrs. Birch were in a similar predicament, but happily were unhurt. Mr. G. A. Mursell, the landlord, was standing at his front door, when hearing the rushing sound, he stepped back, and as he did so he was terrified to see the front of the house collapse, his first thought after ascertaining that his wife and family were safe, was to rush to the rescue of his lodgers. Outside and around the hotel were other striking evidences of the force of the gust. As for windows, nearly all along the parade were blown in, but none of the houses suffered to anything like the extent of the Globe. At Alberta-cottage the iron railing was twisted, and just opposite the iron lamp post was snapped clean off. Many of the pleasure and fishermen's boats upon the beach were much damaged, several being lifted with the blast from off the ground and then dashed down again. An old fisherman, named James Cork, had his boat turned right over upon him, but was not severely injured. Town End House, Dr. Koffmeister's residence, was, so to speak, dislocated, the side wall being nearly burst out. Eye witnesses with whom we conversed on the parade stated that the whirling in the air of the heavy things dislodged by the whirlwind was one of the most startling sights imaginable, and we have it from good authority that the yacht "Palatine," owned by Lord Wilton, the Commodore of the Royal Yacht Squadron, which was steaming up half-a-mile away in the offing, was strewn with barley blown from the stacks on shore, while a brick from one of the houses of the town, struck the fore-castle deck with great force. In another instance a brick was blown across the harbour, and through a sign-board at East Cowes. Leaving the parade, and passing the much abused pier, constructed by Dr. Ker-net, its pagoda-like buildings now laid level with the flooring, we passed up the High-street, through an avenue of broken windows, Sea View House and the Royal Pier Hotel having suffered particularly. The course of the wind can be unmistakably traced up Sun Hill, which is heaped up with slates and tiles, to the police-station, generally so neat and trim, but now in a sad state of dilapidation, all the windows and part of the walls burst in, and two hundred weight of sheet lead, torn from Mr. Halliday's house opposite, lodged in the front parlour. In the station garden, a fine mulberry tree of some two feet girth has succumbed, and on looking around at Mr. Damant's house, and in other directions we behold broken walls, stripped roofs, and tottering chimneys in all directions. Almost all the windows in the Catholic Chapel were broken. At Gravel Lane we see a slate actually driven half-a-foot deep into a wooden window sill. Coming upon the terminus of the Newport and Cowes railway there is another scene of desolation; the engine-house, a large wooden building,

is wrecked, four heavy carriages are blown over on their side, and the water-tank has overturned and smashed down on top of an engine. Down the Victoria-road the same state of things prevails, the scaffolding and part of the brickwork of the new Baptist Chapel is upset; above that, the parapet wall of the reservoir is knocked over for several hundred feet; and on the right the dwelling of Mr. Maggs is nearly blown down, several houses adjoining having also been in the wars. Mr. Bull and Mr. Thomas, builders, have had their workshops much damaged; and further on, at Egypt Hill, Mr. Saunders, florist, has had his stock heavily touched by the hurricane, and many pounds worth destroyed.

Proceeding into the open country we find a new phase of the affair. Here the storm has had full play unconfined. The havoc wrought, though less dangerous to life, is not a whit the less significant of the war of elements. For a couple of miles across country big trees of long growth are torn up by the roots; fences and hedges are swept ruthlessly away; stacks are overturned; barns are raised; and last, though most important, cottages are unroofed and rendered untenable. At Moor farm, Mrs. Jolliffe has had a fine row of trees destroyed. Broadfield's farm, occupied by Mr. John Davies, is a terrible scene of waste. Here the fields are strewn with the wheat and barley swept from his overturned ricks. The out-buildings of the farm are upset, and unfortunately three men—Leonard Drudge, Isaac Dunford, and George Parsons—were crushed beneath the falling barn. They were rescued as speedily as possible, and their injuries, though serious, are, we are informed, not of a dangerous character. At Place farm, occupied by Mr. Moor, there is a similar state of things, and taking the route of Tinkers-lane, passing several ruined labourers' cottages, the owners thereof pitifully bemoaning their fate, we came upon a summer residence of Mr. Redfern, who was fortunately away with his family when the whirlwind seized it and left it a miserable ruin with nothing but a staircase—leading to nowhere—left standing. Among others to swell the list of sufferers in sheds and ricks, are Mr. Blandford, Mr. F. Cooper, Mr. W. Slade, Mr. W. Early, Mr. Ward, Mr. Drake, Mr. C. Flux, Mr. Paige, Mr. H. Dunford, the landlord of the Travellers' Try Inn. Several out-of-the-way places felt the storm, but those mentioned above bore the brunt of it.

The most surprising thing, after viewing the whole scene of the disaster, and considering that in Cowes the storm is considered to have lasted for about two minutes, during which frightful missiles were flying about in all directions, is that no one was—indeed, that dozens were—not killed on the spot. As it is, we know of no case of fatal injury, though of numerous wonderful escapes. In the High-street a little girl was blown some fifteen feet in the air, but she alighted uninjured. Of course, the greatest interest was felt by all the inhabitants and visitors in ascertaining the effects of the storm, and the chief scenes of disaster have since been visited by the leading clergy and gentry, who were most sympathetic with the sufferers, Mr. Mursell, of the Globe Hotel, as chief amongst them, being greatly commiserated. Mr. Horan, the deputy chief constable, with his local staff of police, was very early on the spot, and has been indefatigable in providing for the general safety, and all unsafe buildings are being shored up. It may truly be said that the loss of property—estimated at upwards of £15,000—is deplorable, and it is to be hoped that the suggestion that a public subscription should be got up for the sufferers will be generously acted upon.—*Portsmouth Times*, September 30th.

“The destructive tornado experienced at West Cowes on Thursday morning, seems to have crossed over the Solent from that place in a north-easterly direction, and, striking the main coast of Hampshire near the entrance of the Southampton Water, passed up the county between Titchfield and Portsmouth, effecting much damage in the course of its progress. The shore at the point named (which is about five miles from Cowes) and some of the roads leading towards Fareham, were thickly strewn with portions of barley sheaves supposed to have been carried by the wind across from the Isle of Wight, where ricks totally disappeared. The storm is described by persons who saw its advance, as having the appearance of an immense black cloud sweeping along the ground. Accounts which have been received from different parts of the district state that turnips and other growing

crops were literally dragged out of the ground, and at Southwick-park (the residence of Mr. Thomas Thistlethwayte), about four miles north-east of Fareham, several fine oak trees were uprooted. In the neighbourhood of Meonstoke, a small village nine miles north-east of Fareham, five miles east-north-east of Bishop's Waltham, and about 16 miles north-east of Cowes, as the crow flies, a great deal of damage was done to several farms and homesteads. One man was killed and a boy injured. A barn, on the floor of which a man was at work, was lifted bodily and converted into a heap of ruins, the man miraculously escaping. All the windows in the farmhouse were blown out. Some sheaves of wheat in the valley of Meonstoke were carried up on to a hill called Old Winchester-hill, a distance of 400 to 500 yards. A clean sweep was made through a thick copse, the path of the hurricane being about 100 ft. in width, along which the trees and underwood were all uprooted, as though men had grubbed up everything, while in some cases the corners of ricks and also of cottages were cut off as if with a knife. Iron pig-troughs were carried a distance of 300 or 400 yards, and gates were lifted off their hinges and thrown into the adjacent fields. A rough estimate of the damage at Cowes by the whirlwind gives the amount at £10,000 or £12,000. The ruins in the town have been visited by large numbers of people.—*The Times*, October 2nd.

Perhaps it may be well to state in a single paragraph what at present *appears* to have occurred. The wind at Hurst Castle on the morning of the 28th ult., was W.S.W., and the general direction of the wind over South Hampshire appears to have been between S. and W. An ordinary rapidly revolving whirlwind, looking like a waterspout, or a huge funnel, point downwards, came on the S.W. shore of the Isle of Wight, about half-way between Black Gang Chine and the Needles. The same, or another, passed north-eastwards over Cowes, causing by its updraught, great wreckage in the town, carrying off corn, light articles, and even one or more bricks, dropping some in the Solent, and carrying some north-eastwards on to the mainland south of Titchfield. Then there comes a puzzle—considerable damage is reported at Southwick, and also at Meonstoke. Now, a straight line from Motteston (where the whirlwind is reported to have come on the shore of the Isle of Wight) to Meonstoke passes exactly over Cowes, and we believe over the Hampshire shore, where the Isle of Wight barley was found. And thus we should have the usual fact of the whirlwind moving in the same direction as the general wind, viz., S. 30° W. to N. 30° E., the most noticeable feature being the extraordinary length of the path, 28 miles. But Southwick Park lies five miles E. of this track, and, although the damage reported to have occurred there is limited to "several fine oak trees uprooted" this is more than we should have expected to occur so far from the central line.

Probably, however, it is fortunate that all the facts do not fall in with our theory, because even a single exception throws doubt upon the whole, and, therefore, raises the probability that whoever devotes himself to this storm will gain much useful information.

THE BRITISH ASSOCIATION AT GLASGOW.

METEOROLOGICALLY the recent meeting cannot be regarded as satisfactory. There has hardly ever been so few papers upon Meteorology; although there were several first-rate Meteorologists present, they scarcely spoke, and there was not a single paper on Scottish Meteorology or by a Scotchman, for Sir W. Thomson is a cosmopolitan.

We believe that the following list of Meteorologists present is nearly complete :—

* Barrett, Prof. ....Dublin.	M'Cullough, Dr.....Abergavenny.
* Boyd, J. K.....Belfast.	Mackeson, H. B. ....Hythe.
Brenan, Rev. S. A. ....Pomeroy.	* Mello, Rev. J. M. Chesterfield.
* Brooke, C., F.R.S.....London.	Miller, Dr. T. ....Perth.
* Buchan, A., F.R.S.E....Edinburgh.	* Muirhead, H., M.D. ....Cambuslang.
Chapman, Dr.....Hereford.	Mylne, R. W., C.E. ....London.
* Crompton, Rev. J. ....Norwich.	Pengelly, W., F.R.S...Torquay.
Dowson, E. T.....Beccles.	* Pim, Capt. Bedford, M.P. London.
Dunlop, W. H. ....Kilmarnock.	Rawson, Sir R. W., G.C.B. ,,
Everett, Prof. J. D. ....Belfast.	* Rodwell, G. F. .. ....Marlborough.
* Field, Rogers, C.E. ....London.	* Sewell, Rev. Prof. ....Ilkley.
* Gilbert, J. H., F.R.S...Harpenden.	Smith, B. W. ....Hampstead.
* Gilchrist, J., M.D.....Dumfries.	Smyth, J. Junr., C.E..Banbridge.
Glaisher, J., F.R.S. ....Blackheath.	Sopwith, T., F.R.S. ....London.
Grant, Prof. R., F.R.S. Glasgow.	* Stevenson, W.....Dunse.
* Harrison, J. P. ....Norwood.	* Symons, G. J. ....London.
Hart, R. ....Glasgow.	Verney, Capt., R.N. ...Bangor.
Hennessey, Prof. H. ....Dublin.	* Whipple, G. M. ....Kew.
Herschell, Prof. A. S....Newcastle.	Willis, G. O.....Monmouth.
Home, D. Milne ....Wedderburn.	Woodd, C. H. L. ....Hampstead.
* Jackson, M. ....Ramsgate.	

There were only eleven reports and papers read upon Meteorology, viz. :—

1. Report of the Underground Temperature Committee.
2. " " " Luminous Meteor Committee.
3. " " " Rainfall Committee.
4. Sir W. Thomson. Physical Explanation of the Mackerel sky.
5. G. J. Symons. New Form of Thermometer for observing Earth temperature.
6. " " Unmistakeable True North Compass.
7. Prof. Clerk Maxwell. On the Protection of Buildings from Lightning.
8. Prof. Hennessey. On the Decrease of Temperature with height on the earth's surface.
9. " " On the Distribution of Temperature over the British Isles.
10. J. Y. Buchanan. On a new Deep Sea Thermometer. (Read in the Geographical Section.)
11. C. Meldrum. On the Cyclones of the Indian Ocean.

THE METEOROLOGICAL BREAKFAST.

This was, probably, the best meteorological feature of the Glasgow meeting. As mentioned in our August number, the breakfast was this year given by Dr. Muirhead, of Cambuslang, and as his instructions were that the term Meteorologists should include persons interested in the subject, there was, at the usual hour, a gathering of 40 persons. We have not a perfect list of those present, but we have prefixed an asterisk to the names (in the above list) of such persons as we re-

member to have seen. The whole passed off very well, and we trust that as in previous years the great aim of the movement, viz., increased communication between fellow-workers, was kept in sight.

UNDERGROUND TEMPERATURE.

Professor Everett gave in the report of the Underground Temperature Committee. He began by explaining some of the thermometers which had been used for particular purposes, and afterwards said that the subject which had been under the consideration of the committee was the convection of water in bores and of the means to prevent it. There was an exceedingly deep bore at Sperenberg, about 20 miles from Berlin. It was 4,172 English feet, deep, and the bore was almost entirely through rock salt, and full of water, and the temperature at the surface was $48^{\circ} \cdot 2$ F.; at 720 feet the temperature was $70^{\circ} \cdot 7$, and at 3,490 feet, the deepest point at which reliable observations were obtained, the temperature was $115^{\circ} \cdot 7$, and that gave one degree F. to $51\frac{1}{4}$ feet. These observations showed that there was a decided decrease of the rate of increase as the bore was deepened. The committee had next directed their attention to plugging, and the most careful observations had been made to ascertain the effect of convection, and whether plugging was necessary. The first experiment was made to ascertain whether the water at the bottom of the bore had the normal temperature of the surrounding rock, because if the water at the bottom did not possess that qualification the water in other parts would not. The way in which it was tested was, that when the bore had gone to a certain depth, an advance bore was made of smaller diameter; and into that advance bore a thermometer was let down, and the bore then plugged at the place where it communicated with the big bore. The thermometer on being taken out gave a temperature of something more than $113^{\circ} \cdot 0$, and the same thermometer let down without the bore being plugged gave a reading of $106^{\circ} \cdot 2$. Another thermometer of a different construction gave readings similar to those of the other. The committee had under consideration the obtaining of a plug which would effectually separate the water of the bore below from that above, and at the same time be easy to let down and draw up. Great difficulty had been experienced in reference to that point, and the aim of the committee would now be to secure such an appliance in order to get correct observations.

Additional experiments had been made at a place called Swinderby, near Scarle, Lincoln, 2,000 feet deep, which he understood was the deepest bore in the East of England. At that depth the temperature was found to be 79° F., and deducting from that the temperature of the surface (50°) gave a difference of 29° . Another observation at 1959 feet gave a temperature of 78° . Favourable observations had also been taken at Angers, in the North of France.

In answer to questions,

Professor Everett said that he had heard of the observations taken at a bore in St. Louis, in the United States, at a depth of 3,800 feet; but they had been taken under such circumstances as tended to make the results obtained untrustworthy. He also understood that several experiments were to be made in the Mont Cenis tunnel during the next year.

REPORT ON LUMINOUS METEORS.

Professor Herschel (for Mr. J. Glaisher, F.R.S.) submitted the report of the Luminous Meteor Committee. He said that during the past year they had had several remarkable instances of meteoric showers, two of them the most remarkable which had ever come under their notice. On the 7th and 14th September, two very brilliant detonating meteors were seen. The one terminated over Cheltenham, and the other over the borders of Yorkshire, the latter coming to within fourteen miles of the surface of the earth. There could be little doubt that these meteors were composed of solid material, and were the only instances that they had of meteors precipitating solid substances to the earth. The present year's recurrence of the August shower was less plentiful than had been visible for several years past, and had amounted to a real minimum of intensity of its

unusual apparitions. Some researches and investigations relating to meteoric astronomy were described and concluded with an account of recent remarkable occurrences. One of the most interesting was that of a mass of iron, weighing 7½ lbs., that fell at Rowton, near Wolverhampton, which was only the seventh instance where such a mass had actually been seen to fall.

Mr. Glaisher thanked the secretary of the committee (Professor Herschel) for having read the report for him, and moved that it should be received and adopted. He expressed his sense of the great industry of Professor Herschel, who, notwithstanding his great labours, had devoted much time to the work of the committee. The Association, by appointing a committee, had taken a most important step, as their knowledge in regard to this subject was just beginning, and their efforts would increase that knowledge.

REPORT OF THE RAINFALL COMMITTEE FOR THE YEAR 1875-6.

IN accordance with the resolution of the Association, the Rainfall Committee originally appointed in the year 1865, now present their final report.

They gave in the report presented at Bristol in 1875, a condensed account of the contents of their previous reports.

This year they present the various tables and explanatory remarks upon them necessary to complete the work up to the present time, excepting that which is referred to in the seventh following paragraph.

Examination of Rain Gauges in situ.—Annexed to this report are the results of the examination of 26 rain gauges visited since August, 1875. This brings the entire number which have been visited and examined up to 655. The position and wide distribution of these inspected stations are illustrated by the annexed map. The Committee regard this as a very important subject, and the best guarantee of the accuracy of the records furnished by the observers. They have more than once expressed their conviction that the proper course would have been to appoint a travelling inspector, so that the whole of the gauges might be properly examined; but they have never had adequate funds for the purpose. In fact, the total amount they have been able to devote to it in the 15 years during which the inspections have been going on, has only been £210, or an average of exactly £14 a year. The explanation of the smallness of the amount in comparison with the work effected (about 6s. 5d. per station visited) arises from the fact that it has been almost entirely done by our Secretary, who, as a member of the Association, received nothing for his services but merely repayment of actual expenses, and even these have been materially reduced by the hospitality of the observers.

Rainfall of the years 1874-5.—The usual biennial tables of monthly rainfall at selected stations are appended. Ever since their appointment the Committee have continued these biennial tables, and as Mr. Symons had submitted similar ones for some years previous to their appointment, the entire series embraces sixteen consecutive years. Subject only to changes rendered necessary by the removal or death of observers, the same stations have been quoted in each biennial table, and thus these tables contain about 200 perfect records, each extending over sixteen consecutive years. Only those persons who are aware of the great importance of continuity in physical researches will fully realize the value of this series, both for physical and hydrological purposes.

The Rainfall of 1874 was slightly below the average, owing to a rather dry spring and exceedingly dry summer. The most remarkable feature of the year was the heavy fall of rain on October 6th, when the average fall over England and Wales was slightly above 1 inch in the 24 hours, and the fall at many stations in North Wales and the Lake District was upwards of 5 inches. So heavy a fall over so large an area is a very rare occurrence.

The Rainfall of 1875 was greatly above the average in England (especially in the Midland Counties), and irregular in Scotland and Ireland. A very heavy rainfall occurred in Wales and the Southern parts of England on July 14th, the fall in 24 hours exceeded 1 inch at 252 stations, 2 inches at 109, 3 inches at 39, 4 inches at 7, and 5 inches at 3 stations.

New Irish Stations.—We reported last year the success of our efforts to in-

prove the geographical distribution of Rainfall Stations in Ireland, showed that the gauges started at the cost of the Association had been supplemented by many others established at the cost of private individuals, and gave a map showing the present complete distribution of stations. Almost all the observers have proved good ones, and, as the table shows, the returns have been forwarded with regularity. The period is too short to yield precise results, but a good system has been inaugurated and is in full operation.

At the commencement of this report it was stated that there was one very important exception to the otherwise satisfactory completion of the work up to the present time. This exception is the classified list of stations, and the results of the "position-returns" which we intended to have incorporated therewith. In 1865 we published a complete list of every station in the British Isles at which rainfall observations were known to have been made, giving the observers' names, the height of the stations above mean sea level, the epoch of the observations, and various other details. Owing to the large development of rainfall work during the subsequent 10 years, the list has become very imperfect, and the Committee have been actively engaged in the preparation of a revised list. In addition to the details previously given, the list was also to have contained other most valuable information. The "position-returns" obtained from the various stations and which have been mentioned in previous reports, were to have been summarized, and the results indicated by symbols affixed to the stations in the classified list, and references to publications in which the records could be found were also to have been added. The classified list of stations would thus have formed a complete *catalogue raisonné* of all the existing rainfall data, and have given most useful information at present non-existent. To the great regret of the Committee, the Association declined to publish the portion of this list presented last year, and the Committee have therefore felt compelled to relinquish its completion. They the more deeply regret this, as they consider that the publication of this list would have been a fitting termination of their work, and would have redounded to the credit of the Association.

Notwithstanding the above most important omission, the Committee feel they have done good service to rainfall work. When they commenced their labours, the weakest part of rainfall observations was the defective geographical distribution of the stations. This defect has now been very materially lessened. By the grants of the Association nearly 250 gauges have been erected in districts hitherto without observations. The work done in the inspection of stations has already been mentioned. A definite unit has been adopted for the term "rainy day," namely, any day on which one 100th of an inch of rain falls. A complete code of rules has been drawn up, so as to secure uniformity of practice among observers. The secular variation of the rainfall of the British Isles has been investigated. A determination of the average proportion of the total yearly rainfall which occurs in each month has been effected. Elaborate observations have been made and discussed on the relative quantity of rain indicated by gauges of various sizes and shapes, and erected at different heights above the ground.

To sum up their labours in a sentence, your Committee have aimed—they hope not without success—primarily at obtaining unimpeachable records; and, secondarily, at so discussing and arranging these records as to render them as useful as possible to physical enquirers and hydraulic engineers.

Mr. SYMONS (Secretary) having read the report,

Mr. F. J. BRAMWELL, F.R.S., said that he was aware that it was contrary to the rules of the Association to discuss reports, but he felt much inclined to ask Mr. Symons a question with reference to the continuance of rainfall observations after the cessation of the labours of the Association's Committee. "What was to be the future of rainfall observations?"

Mr. SYMONS having intimated that a reply to that question would occupy some little time,

The PRESIDENT put it to the meeting whether the members desired to hear Mr. Symons' statement or not, and it was unanimously decided affirmatively.

Mr. SYMONS said that up to 1858 there had been no attempt whatever to collect in any single publication all systematic rain records. Accordingly, in 1860, he himself had commenced by issuing a leaflet, containing such returns as he could collect, and this had gone on till matters had reached their present stage. The action of the Association had been to supplement his work, principally by defraying the expenses of branches of it which could not otherwise have been met. In early years a large proportion of the grants was expended in providing rain gauges gratuitously to persons resident in districts where observations were necessary, and had not been made, thus observers had been scattered throughout the country. They belonged to all classes, from shepherds who took the gauges on the mountains, and were paid by himself, to noblemen and gentlemen who bore some portion of the expense of the inquiry. The consequence was that at the present moment we had in this country a system of observation which was the admiration of other countries, and was being imitated in France, America, &c.; that system now embraced some 2,000 stations, so disseminated that it was scarcely possible to drop on any district in the British Isles which was more than four or five miles distant from a station. Therefore, also, when hydraulic and water-works questions turned up, data were almost always available, which did not exist ten years ago, for ascertaining the quantity of water which could be collected from any given gathering ground.

With respect to the future maintenance of this system it simply rested with himself, and if anything happened to himself he did not quite see how the work could be maintained, but he hoped that a sufficient amount of interest would be awakened to make the sale of publications yield a sufficient revenue to maintain it. He was thankful for what the Association had done in the past, and regretted any breach in the connection between it and the Committee.

Captain GALTON, C.B., F.R.S., referred to the remark in the report respecting the desirability of appointing a permanent inspector of rain gauge stations, the whole or nearly the whole of whose time should be devoted to travelling inspection, and asked if Mr. Symons could state what such an officer would cost.

Mr. SYMONS said that the cost would be so far in excess of any funds hitherto at the disposal of the Committee or himself, that he had made no estimate; but as such an officer must be a person of scientific attainments, and would be brought into contact with all classes of observers, the salary could hardly be less than £100 or £150 per annum. To that must be added hotel and travelling expenses, for which he believed commercial travellers were allowed £1 per diem, at that rate the total cost would be nearly £500 per annum, which he need not say was far beyond what he could reasonably spare upon public work.

Dr. C. W. SIEMENS, F.R.S., explained that the work of the Committee had such an important bearing on the professional work of engineers, that it was felt that observations should be supported, if not by Government, by the leading engineering bodies. That was simply the reason why the grant to the Committee was not intended to be renewed by the Association.

Sir J. HAWKSHAW, F.R.S., stated that no one failed to appreciate the importance of the work undertaken by the Committee, but it was thought that that work should now be undertaken by engineers, who were so largely interested in it.

Mr. EDWIN CHADWICK, C.B., urged the importance of the work, as contributing to sanitary science, and that it should be comprised within the functions of the local sanitary authorities, beginning with the greater provincial centres, such as Glasgow and the chief provincial cities. The Registrar-General included the observations of the rainfall in his periodical reports of the meteorology, and the local sanitary authorities should follow the practice closely for their respective districts. Agriculture would be interested in these observations, and in connection with sanitary administration they would be best utilized and popularized.

Mr. BRAMWELL thought it would be well to bring the influence of the section to bear on this question, and he, therefore, moved :—

“That in the opinion of Section G, the labours of the Rainfall Committee have proved most useful, that it is in the highest degree desirable that the Committee should be continued, and that further money grants should be made as occasion may require.”

Sir JOHN HAWKSHAW supported the motion, it was put by the President and unanimously agreed to.

The PRESIDENT considered that it would be a great misfortune were the observations referred to discontinued, but it was generally felt that the funds of the Association are best employed in initiating any good and valuable work of this kind, and that when once set agoing it should be left to those chiefly interested in maintaining it. It was also objectionable to grant anything like a permanent annuity out of the funds of the Association, but he should take care that the matter was considered in Committee.

On the following day the President reported that the matter had been considered in the Committee of the Section, and that the following resolution had been passed :—

“The Committee have taken into consideration the resolution of the Section as to the re-appointment of the Committee on the Rainfall of the British Isles ; but after conferring with Mr. Symons, they have concluded that the time has now arrived when this work should be taken up in a larger public spirit, and consequently that the grant hitherto made should now cease. The Committee do so with the confident expectation that those who have hitherto so greatly benefited by

the laborious and successful work carried on by Mr. Symons for the Association, will come forward and make this work of the Rainfall their own. The Committee of Section G records its most hearty and warmest thanks to Mr. Symons for his valuable services, which have proved so important to many branches of science, and have redounded to the credit of the British Association."

PHYSICAL EXPLANATION OF THE MACKEREL SKY.

Sir Wm. Thomson explained the relation of the clouds and their movements, and that it was not essential to the formation of a mackerel sky that there should be two different temperatures. All that was essential was that portions of air should be moving up and down; and further, that the up and down motion should seem as though it resulted from the slipping of one stratum of air upon another and the production thereby of waves; and the second essential was that one or other of the two portions of air should be very near the point of saturation—that it would be clear when down at its lowest point and cloudy when up at its highest.

Professor Andrews said he had had great pleasure in listening to Sir Wm. Thomson, for that was a subject in which he had himself been interested for the last ten years. He was happy to hear it so well explained, as the subject was one of enormous difficulty. He had been given to understand that a mackerel sky was an indication of fine weather, and that the primary cloud formation was the reverse. He further expressed a desire that some of the photographers should devote their attention to these clouds and get some photographs of them.

Mr. Glaisher said he had heard it said that there were no flat-bottomed clouds; but on one occasion when up in a balloon to the height of 2,400 ft., he passed through a cloud which was decidedly flat-bottomed. The dry east wind was acting on the lower part like a knife, and so making it flat. On other occasions, at whatever height he was, when he passed from a low temperature to a higher, he was always sure to find the clouds flat-bottomed.

Captain Abney, R.E., Rochester, remarked that he had taken numerous photographs of the clouds, and especially of the mackerel sky, and he would be happy to send a series of them to the President of the Association for his study.

THERMOMETER FOR OBSERVING EARTH TEMPERATURE.

Mr. G. J. Symons submitted a new form of thermometer for getting the temperature at small depths below the surface with ease and facility, and which was specially applicable for determining the temperature at which plants grow. The old form of thermometer was extremely inconvenient, as the observer had to put his head down upon the ground in order to read the thermometer, whereas by the new plan all inconvenience of that sort was avoided, and at the same time it would enable a thermometer of greater delicacy to be employed. It was also available for determining the temperature of the inside of hay ricks, in the holds of ships, and in other places where spontaneous combustion was likely to occur. An iron tube of the required depth is sunk into the ground, and the thermometer attached to a chain is dropped to the bottom, a lid being placed on the top of the tube to exclude the rain. This thermometer, which can be sunk to a depth of 10 feet or more, has given good results.

The thanks of the section were awarded to Mr. Symons for his new form of thermometer.

UNMISTAKEABLE TRUE NORTH COMPASS.

Mr. G. J. Symons read a paper on his patent Unmistakable Compass. He said it was not generally known, except to nautical and to scientific men, that the compasses usually sold did not point to the true North or South Pole of the earth, or agree with the positions represented upon maps. The fact was, the magnetic Pole, to which all compass needles pointed, was not identical with the geographical pole, which was the north point of all maps. The difference

between the two was considerable, and was no doubt often the cause of tourists losing their way. The difference between true and magnetic north was not absolutely the same in all parts of the United Kingdom, and *à fortiori* in all parts of the globe, nor was it absolutely the same from year to year. One of the essential superiorities of these instruments was their pointing to the true north, the other was their "unmistakableness." These compasses were corrected for use in the United Kingdom, but could be adapted to any specified locality in any part of the world. They, as well as the thermometer above-mentioned, were made by Mr. Casella, of Holborn.

PROTECTION OF BUILDINGS FROM LIGHTNING.

Professor Forbes read a paper by Professor Clerk Maxwell on the Protection of Buildings from Lightning. The paper stated that those who erected lightning conductors had paid great attention to the upper and lower extremities of the conductor—having a sharp point above the building, and the lower extremity carried into the earth as far as possible. The effect was to tap, as it were, the gathering charge by facilitating the discharge between the atmospheric accumulation and the earth. That would cause a greater number of discharges than would have otherwise occurred; but each of them would be smaller than those which would have occurred without a conductor. That arrangement was, therefore, more for the benefit of the surrounding country, and for the relief of the clouds labouring under an accumulation of electricity, than for the protection of the building on which the conductor was erected. What was really wanted was to prevent the possibility of an electric discharge taking place within a certain region. An electrical discharge could not occur between two bodies unless the difference of their potentials was sufficiently great compared with the distance between them. If, therefore, they could keep the potentials of all bodies within a certain region equal or nearly equal, no discharge would take place between them. That might be secured by connecting all these bodies by means of good conductors, such as copper wire ropes. It would, he considered, be sufficient to surround a powder mill with a conducting material, to sheath its roofs, walls, and ground floor with a thick sheet of copper, and then no electrical effect could occur within it on account of any thunderstorm outside. There would be no need of any earth connection. They might even place a layer of asphalt between the copper floor and the ground, so as to insulate the building. If the mill were struck it would remain charged for some time, and a person standing on the ground outside or touching the wall might receive a shock, but no electrical effect would be perceived inside, even by the most delicate electrometer. A sheathing of copper was by no means necessary in order to prevent any electrical effect taking place, supposing a building were struck by lightning; it was quite sufficient to enclose it with a network of good conducting substance. For instance, if a copper rod were carried round the foundations of a house, up each of the corners and gables, and along the ridges, that would be a sufficient protection for an ordinary building against any thunderstorm in this climate; but it might be well to prevent theft, to have it built in the wall, and then it would be necessary to have it connected with some metal, such as lead or zinc, on the roof. In the case of a powder-mill, it might be advisable to make the network closer by carrying one or two rods over the roof and down the walls to that at the foundation. If there were water or gas pipes entering the building from without, these must be connected with the system of conducting wires, but if there were no such metallic connections with distant points, it was not necessary to take any pains to allow the escape of electricity into the earth; still less was it advisable to erect a tall conductor with a sharp point in order to relieve thunder-clouds of their charge. It need scarcely be added, says the writer, that it is not advisable during a thunderstorm to stand on the roof of a house so protected, or to stand on the ground outside, or to lean against the walls.

On the motion of Mr. Symons, it was agreed to thank Professor Maxwell, and that the paper be printed entire in the transactions of the Association, in order that there might be time to study the subject which he had introduced.

SEPTEMBER, 1876.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.				Days on which "01 or more fell.	TEMPERATURE.				No. of Nights below 32°		
		Total Fall.	Difference from average 1860-5	Greatest Fall in 24 hours.			Max.		Min.				
				Dpth.	Date.		Deg.	Date.	Deg.	Date.			
		inches	inches.	in.								In shade	On grass
I.	Camden Town	2·86	+ ·60	·64	4	22	71·4	21	41·3	13	0	0	0
II.	Maidstone (Linton Park).....	3·34	+ 1·12	·49	5	25	74·0	5*	43·0	13	0	0	0
III.	Selborne (The Wakes).....	5·32	+ 2·88	·74	30	23	67·0	22	35·8	15	0	0	0
IV.	Hitchen	5·08	+ 3·22	1·12	5	20	66·0	4	39·0	12	0	0	0
V.	Banbury	5·80	+ 3·43	1·40	28	23	69·0	22	39·0	20	0	0	0
VI.	Bury St. Edmunds (Culford).....	4·45	+ 2·84	·66	5	21	72·0	5	36·0	14	0	0	0
VII.	Norwich (Sprowston).....	5·07	...	·68	13	25	...	...	...	...	...	...	...
VIII.	Bridport	5·65	+ 3·33	·80	23	20	80·0	21	43·0	15	0	0	0
IX.	Barnstaple.....	5·77	+ 2·01	·75	7	24	74·0	22	49·0	13	0	0	0
X.	Bodmin	6·29	+ 2·62	·94	29	26	68·0	22	46·0	12	0	0	0
XI.	Cirencester	5·66	+ 2·80	·76	30	22	...	...	...	...	...	...	...
XII.	Shifnal (Haughton Hall)	4·52	+ 2·57	·60	28	23	67·0	5	...	...	0	0	0
XIII.	Tenbury (Orleton)	5·51	+ 2·83	1·09	30	24	71·7	21	39·7	19	0	0	0
XIV.	Leicester (Belmont Villas) ...	5·60	...	·80	18	20	73·5	21	41·8	15	0	0	0
XV.	Boston	5·24	+ 3·67	·71	30	25	72·0	22	43·0	15	0	0	0
XVI.	Grimsby (Killingholme)	3·26	...	·51	30	23	68·0	4, 5	44·0	12†	0	0	0
XVII.	Mansfield	4·49	...	·92	30	27	71·4	21	39·4	15	0	0	0
XVIII.	Manchester	3·17	— ·52	·58	24	21	75·5	22	39·5	3	0	0	0
XIX.	York	5·08	+ 2·75	·86	22	23	70·0	22	41·0	11	0	0	0
XX.	Skipton (Arncliffe)	5·60	+ ·64	1·01	4	26	72·0	21	34·0	18	0	0	0
XXI.	North Shields	2·74	+ 1·04	·52	26	23	64·0	5	41·0	12	0	0	0
XXII.	Borrowdale (Seathwaite).....	8·23	— 4·98	1·37	5	15	...	...	...	...	...	...	...
XXIII.	Cardiff (Ely) .....	...	...	...	...	...	...	...	...	...	...	...	...
XXIV.	Haverfordwest	7·82	+ 4·11	1·98	27	16	68·0	23	42·5	28	0	0	0
XXV.	Machynlleth	6·12	...	1·02	24	23	76·0	24	32·5	14	0	0	0
XXVI.	Llandudno	4·06	+ 1·72	·76	30	24	74·6	21	41·5	15	0	0	0
XXVII.	Dumfries (Crichton Asylum)	3·84	+ ·90	·65	3	17	71·8	23	35·3	12	0	0	0
XXVIII.	Hawick (Silverbut Hall)	2·55	...	·41	1	17	...	...	...	...	...	...	...
XXIX.	Kilmarnock (Annanhill).....	2·56	...	·59	4	16	67·0	22	35·6	14	0	0	0
XXX.	Castle Toward	2·87	— 1·75	·79	25	10	67·0	21	34·0	14	0	0	0
XXXI.	Mull (Quinish)	2·71	...	·52	6	10	...	...	...	...	...	...	...
XXXII.	Leven (Nookton).....	...	...	...	...	...	...	...	...	...	...	...	...
XXXIII.	Grandtully	2·72	...	·71	24	10	...	...	...	...	...	...	...
XXXIV.	Braemar	2·55	— ·09	·52	24	20	68·0	22	30·2	3, 30	3	6	6
XXXV.	Aberdeen	3·30	...	·85	4	20	64·2	5	38·5	3	0	1	1
XXXVI.	Loch Broom	3·17	...	·28	25	24	...	...	...	...	...	...	...
XXXVII.	Portree	3·17	— 7·59	·83	5	21	...	...	...	...	...	...	...
XXXVIII.	Inverness (Culloden)	3·64	+ ·95	·54	25	18	65·7	22	35·9	30	0	2	2
XXXIX.	Helmsdale	2·35	...	·43	6	23	...	...	...	...	...	...	...
XL.	Sandwick	3·18	— ·48	·80	5	22	57·8	16	39·3	4	0	0	0
XLI.	Caherciveen Darrynane Abbey	7·11	...	1·30	6	23	...	...	...	...	...	...	...
XLII.	Cork	5·24	...	·85	24	17	...	...	...	...	...	...	...
XLIII.	Waterford	5·76	+ 2·63	·95	15	24	68·0	1, 2	44·0	19	0	0	0
XLIV.	Killaloe	5·30	+ 1·14	·93	25	22	76·0	24	34·0	15	0	0	0
XLV.	Portllington	3·82	+ ·54	·83	26	27	66·0	23	33·5	14	0	0	0
XLVI.	Monkstown, Dublin	3·39	+ 1·40	·53	22	17	...	...	...	...	...	...	...
XLVII.	Galway	5·61	...	1·18	9	17	66·0	1	31·0	20	2	2	2
XLVIII.	Ballyshannon	3·70	...	·88	4	18	...	...	...	...	...	...	...
XLIX.	Waringstown	3·29	...	·45	16	20	70·0	4	34·0	14	0	1	1
L.	Edenfel (Omagh)	4·06	...	·83	4	20	65·0	20	32·0	14	1	1	1

* And 21, 22. † 13.

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

METEOROLOGICAL NOTES ON SEPTEMBER.

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.

LINTON.—A wet, but not cold month, R falling more or less on every day but the 3rd, 11th, 13th, and 26th. A little T on the 7th; winds mostly from S. and S.W., but never very high. On the whole the ample rainfall was needed, as well for domestic use as for vegetation.

SELBORNE.—A very wet month, greatly retarding vegetation and all garden work; 20th, a swarm of bees in my garden; temp. 62°. Dense fog on 21st, 22nd, and 23rd; 28th, violent wind and R before 9 a.m.

HITCHIN.—The wettest and most thundery September on our record, extending over 27 years.

BANBURY.—High winds on 4th, 5th, 23rd, 24th, 28th and 30th; TS on 17th.

CULFORD.—The weather throughout the month has been excessively wet, exceeding the average by nearly 3 in.; W. and S.W. winds prevailed on 24 days; T on 7th, 9th, 18th, and 28th. A meteor of extraordinary brilliancy startled all who were out of doors about 6.30 p.m. on Sunday the 24th.

SPROWSTON.—The wettest September almost ever known in Norfolk. A very bright meteor seen at 6.30 p.m. on 24th. Rainfall of the 9 months is 22.13 in., or about 5.50 in. above the average.

BODMIN.—Average temp. of the month 59°·5; rainfall 2.37 in. above the average of 27 years.

SHIFNAL.—A rainy, damp, unpleasant month. The nights were cold for the time of year, and the max. ther. never rose above 67°. Autumnal butterflies rare, only *one* red admiral, and but few white ones seen. Damsons a very poor crop, their substitute—blackberries—abundant. Few strong winds, not even at the equinox.

ORLETON.—A very rainy damp month, with only a few dry days, from the 19th to the 22nd, these fortunately allowed some of the late crops to be secured. Great rainfall after the 22nd to the end of the month. Storms of T and L on 17th and 23rd. Mean temp. of the month nearly 1° below the average, but the fluctuations were less than usual.

LEICESTER.—More rain (5.60 in.) has fallen than in the four previous months, only 1.11 in. fell during the first half of the month, and 4.49 in. in the latter half; the 19th, 20th, 21st, and 22nd were unusually fine and cloudless days. Severe TS between 4 and 5 p.m. on 18th, L very vivid. From early morning of 23rd to the end of the month 3.34 in. fell (none falling on 29th). Owing to the deficiency of R in the previous months there have been no floods.

BOSTON.—The heaviest rainfall (5.24 in.) ever known in September; the quantity has only been exceeded three times in the last 26 years, viz. in July, 1851, 5.73 in.; August, 1860, 5.35 in.; and Dec., 1868, 5.87 in.

GRIMSBY.—A wet, ungenial month, the exact reverse of the preceding September. A little corn still left in the fields; turnips, swedes, and mangolds a heavy crop; fears are felt for the potatoes still in the ground. T on 7th, 8th, and 17th. Brilliant meteor at 6.30 p.m. on 24th.

MANSFIELD.—This month is noteworthy for its almost uninterrupted sequence of wet days, or more properly days on which R fell, for none of them, except those at the end of the month, could properly be called wet days, the R falling frequently in the night or early morning. 19th, 20th, and 21st were the only ones without rain, and they were beautifully bright days.

NORTH SHIELDS.—Lunar halo on 3rd; TS on 17th; T on 14th.

SEATHWAITE.—T on 22nd and 24th. Only three days on which 1.00 in. or more was measured, and they were the three consecutive days, 3rd, 4th, and 5th; the total fall, 8.23 in., is near five inches below the average.

WALES.

HAVERFORDWEST.—A cold, ungenial, gloomy, and wet month; a few fine days from 15th to 23rd. Rainfall 1'00 in. or more on 3rd, 22nd, and 28th; on the latter date 1'98 in. fell between 2 and 5 a.m., causing great and sudden floods in many places. Temperature considerably below the average throughout the month. Great damage to the potato crop from the excessive rain, the fall (7'82 in.) being more than double the average. Severe T S on 24th at St. David's, forked L; two houses struck, one little girl killed, the rest of the family paralyzed for a time. Heavy storm of R and wind from 2 to 4.30 a.m. on 28th.

MACHYNLETH.—A very wet month; the temp. has been rather low all the month, only twice reaching 70°, but it has never fallen to 32°, the lowest being 32'5 on 14th. R daily till 11th, fine 12th, 13th, 14th, and 15th, followed by three wet days, and these by three fine ones, after which R fell daily to the close.

LLANDUDNO.—In every respect an unsettled month. Rainfall more than an inch above the average, and temperature 1'5 below it. 10th very fine, sheet L in the evening; 19th, 20th, and 21st, very fine; stormy nights on 25th and 26th.

SCOTLAND.

DUMFRIES.—This month has been humid, R having fallen on 17 days, the quantity (3'84 in.), being considerably above the average. The winds have been chiefly northerly, and hence the mean temp. (51'81) is 3'5 lower than last year. There have been no violent gales, and T has been but once recorded.

HAWICK.—The latter half of the month has been rather unfavourable for housing the grain, and there are complaints of some of the stacks heating, and having had to be taken down and spread out to dry. Potatoes are fine in quality, a good crop, and I have not yet seen one diseased tuber this season. Dahlias, heliotropes, and all the floral beauties of the garden are yet blooming gaily, not one of them having suffered from frost.

ANNANHILL.—Ozone scarce. Winds principally E. and W. usually light; eclipse of the moon on 3rd, not well seen; atmosphere foggy. T heard on 5th, 10th and 21st; L seen on 21st. Harvest generally secured, except in high lands in county; pastures still fair; potatoes shewing disease; lime-trees beginning to lose their leaves.

CASTLE TOWARD.—From 3rd to 9th showery, the weather then became fine, and we had a splendid week or two for the ingathering of the crops, which was taken advantage of, and towards the end of the month the fields were looking very bare. This month has made a great change in the appearance of the trees, many having lost their leaves, and those still on look very withered.

BRAEMAR.—A very wet unfavourable harvest month.

ABERDEEN.—Bar. pressure and temp. below the average, rainfall above it. Winds from N.W., N., N.E., and S. more frequent than usual; wind pressure below the average. A month of most unseasonable weather, chilly and damp rather than wet. Much grain still in the fields. 25 in. of R fell on the 8th in about an hour, the shower was local.

LOCHBROOM.—A very unpropitious month to the grain farmer, as he cut his crop the latter end of August, and the continued R and moisture of this month have prevented him from housing it yet, and such as was stacked is in a very unsatisfactory state, many stack-yards having to be spread out to dry.

PORTREE.—A dull damp month, very backward for harvesting, most of the corn is cut, but none of it has been carried. Strong frost on 1st and 2nd. Disease is making sad havoc amongst the potatoes. Solar halo all the afternoon of 3rd, and lunar halo at night. The driest September on record.

SANDWICK.—September has been rather cold in consequence of the northerly winds, and there were six days of continuous haze from 21st to 26th inclusive, but there was not much rainfall after the 18th, so the harvest work has been carried on, and in some districts the grain has all been cut.

IRELAND.

DARRYNANE.—A wet disagreeable month ; wind almost constantly N.W. till 19th, thence to end chiefly S.E. Fresh gale on morning of 24th. Hay harvest very backward, very few of the smaller farmers having theirs saved. TS on morning of 7th.

KILLALOE.—High westerly winds prevailed for the earlier part of the month. Temp. generally about the average, and vegetation good. 77 in. fell in about 20 minutes on the 17th, it was quite a tropical shower, and the most violent rainfall in the time ever noted here.

BALLYSHANNON.—The month has been a favourable one for the ingathering of the harvest. The potato crop is plentiful, and almost free from blight. Rainfall 35 in. greater than corresponding period in 1875.

WARINGSTOWN.—The month was on the whole favourable for harvest operations, and has left the country well cleared up. Crops fair, and saved in good condition.

EDENFEL, OMAGH.—The R. has been above the average, but having mostly fallen during the night, the ingathering of the harvest was not so much impeded as had been expected. Latter part of month very mild.

SUPPLEMENTARY TABLE OF RAINFALL IN SEPT., 1876.

[For the Counties, Divisions, Latitudes, and Longitudes of these Stations, see Met. Mag., Vol. XI., p. 28.]

Station.	Total Rain. in.	Station.	Total Rain. in.
Acol	3·23	Llanfrechfa	8·50
Hailsham	4·11	Castle Malgwyn	5·13
Andover	4·87	Heyope .....	...
Strathfield Turgiss	4·23	Rhug, Corwen	4·82
Addington Manor	4·84	Port Madoc	4·23
Oxford	5·60	Melrose	3·53
Cambridge	4·36	Cessnock, Glasgow	2·64
Sheering	3·51	Gruinart	3·22
Ipswich	3·57	Keith	7·92
Diss	4·76	Stratheonan	3·54
Swaffham	4·28	Springfield, Tain	3·32
Compton Bassett	5·81	Skibbereen	7·26
Dartmoor	12·77	Glenville, Fermoy	6·14
Teignmouth	6·38	Tralee	3·98
Torrington (Langtree) ..	7·02	Newcastle W., Limerick ..	3·99
Trevarrick, St. Austell..	6·23	Kilrush	3·40
Taunton	5·89	Kilkenny	3·98
Bristol	5·41	Kilsallaghan	4·28
Sansaw	5·20	Twyford, Athlone	6·07
Cheadle	5·69	Ballinasloe .....	...
Ashby-de-la-Zouch .....	...	Kylemore	6·15
Coston, Melton Mowbray	4·85	Bangor .....	...
Bucknall	3·61	Carrick on Shannon	6·45
Walton, Liverpool	4·07	Rockcorry	4·15
Broughton-in-Furness ..	5·67	Warrenpoint	4·43
Stanley, Wakefield	2·96	Bushmills	3·66
Gainford	3·78	Buncrana	3·84
Shap	4·73		