

SYMONS'S

MONTHLY

METEOROLOGICAL MAGAZINE.

LXXIX.]

AUGUST, 1872.

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

THE THUNDERSTORMS OF JUNE 17TH, 18TH, AND 19TH.

It was originally our intention to have thoroughly discussed *all* the thunderstorms of the present summer, but they have been so unprecedentedly numerous, that the materials already in our hands would fill at least a hundred pages of this magazine; it is therefore impossible to carry out our first intention, and consequently we shall confine our remarks to the storms of the three days mentioned above.

In the first place, we have the pleasure of supplementing our previous notes with the following, which (as will hereafter be seen) have been very useful in defining the storm areas.

MIDDLESEX.

CAMDEN SQUARE.—17th. Distant T at 4.46 and 4.55 p.m. 18th. Distant TS in S.W. between 5 and 6 p.m., afterwards very fine. 19th. Fine morning, but stormlike after 11 a.m.—*G. J. Symons*.

SURREY.

FOREST HILL.—17th. No T. 18th. Distant T in N.W. from 5.2 to 5.27 p.m. 19th. Very distant T occasionally from 4.30 to 5 p.m.—*E. E. Glyde*.

HALFORD HOUSE, RICHMOND.—17th. No T. 18th. Loud claps of T about 4 p.m. 19th. No T. No rain between 17th and 21st.—*E. Mawley*.

NORTHBOURN, CHOBHAM.—No storm between 16th and 21st.—*J. M. Ward*.

SUSSEX.

BUCKINGHAM PLACE, BRIGHTON.—No electrical phenomena recorded on 17th, 18th, or 19th.—*F. E. Sawyer*.

HERTS.

HARPENDEN, ST. ALBANS.—17th. Distant L in N. about 9 p.m. 18th. T and L in S. and S.W., 4 to 6 p.m., T at times incessant, heavy storm in that direction. (This was the Watford storm.) 19th. T at 11 a.m., shower about noon.—*F. W. Stow*.

BUCKS.

NEWPORT PAGNELL.—No storm between 16th and 21st.—*R. Littleboy*.

OXFORD.

BROUGHTON, BANBURY.—17th. T in S. from 6.15 to 9 p.m. 18th. T in S.W., W., and N., from 0.10 to 5 p.m. 19th. TS passing from S.W. to N.E. at 10 a.m., and another from W. to E. between 11 and 11.45 a.m.—*E. C. Morrell.*

BEDFORD.

SANDY.—17th. T & L. 18th. T. 19th. Heavy TS & R.—*A. McFarlane.*

ESSEX.

AUDLEY END.—19th. TS at 3.15 p.m., and another from 8.30 to 9.30 p.m.—*J. Bryan.*

SUFFOLK.

SUDBURY.—No storm, except a slight one on 19th from S.W. at 4 p.m.—*J. Alexander.*

IPSWICH, BISHOP'S HILL.—19th. TS and heavy R between 6 and 7 p.m.—*G. A. Biddell.*

WILTS.

LUDGERSHALL.—No storm except at 8.15 a.m. on 19th.—*E. G. Fawcett.*

DEVON.

DARTMOOR PRISON.—18th. TS from 7.30 p.m., to 4.30 a.m. on 19th.—*H. Watts.*

ASHBURTON.—18th. Heavy TS from 8 p.m.

CORNWALL.

POUGHILL VICARAGE.—18th. Severe TS.

GLOUCESTER.

CLIFTON.—17th. No storm, thunder clouds about 5 p.m. 18th. No storm, but sudden development of thunder clouds about 3 p.m., and three or four peals of T without R. In evening, appearance of distant TS in W. and N.W. 19th. TS from 9 to 10 a.m., RR from 8.30 a.m. to noon.—*G. F. Burder.*

SHROPSHIRE.

SANSAW, SHREWSBURY.—18th. T. 19th. T.—*F. Gartside Tippinge.*

WARWICK.

BICKENHILL.—18th. 1.45 p.m., T; hygrometer bulbs 5° apart; incessant roaring of T; upper current of cloud S., lower current due W. Swallows flying about 20 ft. from the ground. 2.30., T still roaring, L very vivid. 3.50, T still continuing at a distance. 4.10, thundering still; rainfall .82; wind veered to S.W.; dry 72°, wet 70°. 19th, wind S. by E. 10.50 a.m., T distant, but approaching; L and T from S.W., wind veering to S.S.W.; very heavy R; vivid L from W.; hailstones; lightning from S.E. 11.10; storm receding towards E., ceased at 11.10; rainfall, .99.—*W. R. Capel.*

LANCASHIRE.

HURST BANK, BOLTON.—17th. No T. 18th. Distant T, 2 to 9 p.m. 19th. Distant T.—*J. Watkins.*

STONYHURST.—17th. T. 18th. Heavy TS; 19th. T and 0.77 in. of R.—*S. J. Perry.*

YORKSHIRE.

THICKET PRIORY.—17th. Heavy TS, passing from N.W. to S., between 2.50 and 3.15 p.m.; total R, 0.50 in. in 25 minutes. 18th. Very violent TS passed from S. to N. between 5 and 7 p.m.; 1.20 in. of R fell in the two hours; a man killed under an oak in the neighbouring village of Riccall. 19th. Slight TS and T most of the day.—*M. C. Dunnington-Jefferson.*

SKIPTON, BUCKDEN.—17th. T. 18th. Much T.—*W. R. Metcalfe.*

DURHAM.

GAINFORD.—17th. T. 18th. Distant T from 11 a.m., heavy TS at 1 p.m.—*A. Atkinson.*

USHAW.—On the 18th of June thunder began to be heard to the S.W., shortly before 1.0 p.m., and continued until about 5.30. At one period or another the storm appeared on every side, but the lightning was never very near, the shortest distance seeming to be from two to three miles. With the exception of a brisk south wind at 1.30, somewhat of the character of a whirlwind, and which lasted only for a few minutes, the air was very still. The sky was completely overcast and dark, being covered almost uniformly with clouds of a deep slate colour. Gentle rain fell almost incessantly, but so lightly, that during the whole time of four-hours-and-a-half, the rainfall was only 0.07 in. The atmosphere being free from haze, the distant lightning presented a magnificent spectacle, for the flashes succeeded each other with great rapidity, and consisted often of several shafts of forked lightning striking the earth at the same instant. Not unfrequently a succession of four, five or more distinct discharges followed each other in the same path, but so rapidly as to appear like a continuous stream of the electric fluid emitting a twinkling light of dazzling lustre. All this gave evidence of a state of electric disturbance of extraordinary activity—a fact which was soon confirmed by reports of mischief done to life and property at various points of the surrounding neighbourhood.—*J. Gillow, D.D.*

GATESHEAD FELL.—With unexampled violence the storm yesterday broke over this neighbourhood. To say that torrents of rain fell describes the downpour in the mildest of terms. At twenty minutes to two o'clock a tremendous crash occurred near the Low Fell National School. The electric fluid struck and demolished the chimney of a house on the opposite side of the lane to the school, occupied by two tenants, Mrs. Trotter and Mr. Firbank, and after a most erratic course through, and damaging more or less every one of the six rooms in the building, finally made its escape again through the roof, smashing a large hole three or four feet square, and throwing the slates and debris to a distance of quite twenty yards.

GATESHEAD.—The frightful thunderstorm which swept over this neighbourhood yesterday afternoon, damaged property to a considerable extent in Gateshead, but, fortunately, so far as we were able to learn, was not attended with any fatal results, although two or three persons had very narrow escapes with their lives. The lightning which preceded each awful brattle of thunder, was terribly vivid, and the rain, hail, and pieces of ice descended in a downpour perfectly unprecedented in the opinions of the oldest inhabitants. The best portion of Gateshead is built on a steep descent, and as soon as the flood set in, it ran with great rapidity and power down all the principal thoroughfares to Pipewellgate and other streets adjoining the river Tyne. From the

Windmill Hills, the water ran down Mulgrave-terrace like a perfect sea, as it did also down West-street, and the two streams joining each other underneath the railway arch, proceeded in one vast body down the Half Moon-lane, and on into High-street, where it mingled with another equally as powerful as the first two put together. As the immense rush of water ran down the Bottle-bank—one of the most steep descents in the borough—the sight was most appalling. At the foot of the bank the flood turned sharply round into Pipewellgate, and the damage done in this densely-populated and poor neighbourhood was beyond comprehension. In all the thoroughfares mentioned above, when the storm was at its height—shortly before two o'clock—the flags and paving were completely hidden from view, and it is estimated that there could not have been less depth than two feet of water on the streets. Such was the force with which the flood rushed on its course, that whenever it came against a lamp-post the spray leaped up right into the air. Hand-barrows left standing by the side of the flags were swept over and over again like straws. Huge stones were hurled along as if they were pieces of coke, flags were driven from their seats, paving stones were shifted, and wherever the stream came in contact with a horse the spray was sent right over its head. Carts standing about delivering perishable goods were soon filled with water, and in this way a considerable amount of damage was done. Notwithstanding that every precaution was taken by those occupying houses and shops in Mulgrave-terrace, West-street, High-street, and the lower part of the town, the water could not be stemmed back, and made its way into those premises with great force, and emptying itself into the cellars beneath, there were few tradesmen but what suffered considerable loss. In Pipewellgate the poor shopkeepers lost a vast amount of goods. The butter and candle shop of Mrs. Henderson suffered most damage, and in addition to the best portion of the stock being rendered totally unfit for sale, the force of the water broke nearly the whole of the glass front in, and having gained an entrance in this way, the premises became filled to a depth of between three and four feet. Two stones of bread were swept away into the Tyne, and the loose fixtures were quickly swimming about. A woman who had entered the shop for shelter was hemmed in, and had a narrow escape from drowning, but fortunately some men hearing her cries for assistance broke through the staircase and rescued her from her perilous position. The kitchen in the establishment of Mr. C. Ester, Brandling Junction Inn, at Redheugh, at the extreme west end of Pipewellgate, was flooded to a height of 5 ft. 2 in. An ash-pit at the head of the Bankwell-stairs was struck by the electric fluid, and shattered into pieces. At the corner of the Bottle-bank and Bridge-street, the stream divided itself into two courses, and filled all the cellars right away down both thoroughfares—that underneath Lambton's Bank, where the bullion is kept, being well filled amongst the rest. Two little children, between three and four years of age, whose parents reside in the immediate neighbourhood, were walking up Mulgrave-terrace when the flood was at its height, when the force of the water caught them and they were rolled down the street with great rapidity until approaching the tunnel, in which they must undoubtedly have been drowned, when a gentleman courageously and heedless of the great danger he ran in doing so, rushed into the stream and picked the youngsters up. One gentleman curious in such matters, picked up one of the hailstones which so freely came along with the rain, and weighing it found it to be half-an-ounce in weight. The damage done in the borough by lightning, although startling enough, did not amount to anything extraordinarily serious. In Forster-street, the fluid struck the gable of an occupied house, but beyond making a large rent in the wall, there was no other damage, the occupants being unhurt. Dr. Ridley's house, on the Windmill-hills, was also slightly struck, and for a short while Mrs. Ridley suffered severely from the effects of the shock. One of the servant girls in the same house was also slightly scorched about the face. The lightning gained admittance into Mr. B. J. Prockter's house, on the Windmill-hills, by means of the chimney, and, descending into the room below, broke a large mirror, as well as a handsome wardrobe. Mr. Prockter and those in the house, however, escaped uninjured.

SHIELDS.—North and South Shields and locality were, on Tuesday, 18th, visited by a terrible thunderstorm, accompanied by a deluge of rain and hail. Shops and houses in low parts of the town were flooded, considerable damage being done. John Purvis, pilot, while standing at Lawe, South Shields, was struck by lightning, rendered insensible, and severely injured. Lightning also struck a large stone beacon facing the sea at South Shields, and almost destroyed it. A wall in Thames-street, South Shields, was knocked down and fell on the roof of a dwelling-house, breaking it in, and the inmates had a narrow escape. The fishing smack, Ten Brothers, belonging to Eyemouth, returned to North Shields in the evening. While at sea, in the afternoon, engaged in the herring fishery, she was overtaken by the storm, and while the crew were preparing to run to Shields harbour, the anchor and chain were struck by the electric fluid, which passed through the hold, and then ran up the mast, which it shattered in pieces. The lightning struck and killed the captain, and one of the crew, named Leston Rutherford, was so severely injured that he is not expected to recover. The lightning also destroyed the flagstaff at Tynemouth Castle, carried away two chimney-pots belonging to the residence of Canon Bewick, at Tynemouth, and struck several iron steamers and ships in the river, but it did not do any serious damage in that respect.

JARROW.—The old pit cottages in High-street, Dogbank-row, and other localities, were completely inundated with the water, and no small amount of damage was done to the furniture of the poor people—principally Irish—who live there. Portions of the buildings connected with the High Jarrow Chemical Works, belonging to Messrs. Franks and Co., were injured by the storm.

SILKSWORTH.—A violent thunderstorm passed over Silksworth yesterday. The electric fluid struck a cottage, and cut it completely in two. Fortunately, no person was injured.

STOCKTON.—An immense chimney in course of erection at the Tees Bridge Iron-works, was cracked by a flash, and considerable damage was done.

SUNDERLAND.—Yesterday afternoon, a few minutes before two o'clock, a terrific thunderstorm, which has not been exceeded in violence or intensity for a great number of years, broke over the town of Sunderland, and caused a considerable amount of damage. The lightning was of the most vivid description, and flash succeeded flash with extraordinary rapidity, while, at the height of the storm, the thunder was almost a continuous roar. This terrible elemental war continued for at least half-an-hour, and many experienced ship-masters declared that they had never seen anything to approach it in violence. The force of the storm gradually subsided; but the lightning, thunder, and rain did not finally cease until after five o'clock. The rainfall was extraordinarily heavy, and the slope of High-street assumed the appearance of a mountain torrent, while in the slack below there was a perfect flood, owing to the high tide and rain pressure choking the sewers. During the height of the storm, the terrible rain was accompanied by hail, and at one time hailstones as large as marbles fell, followed by a shower of what were literally pieces of ice. A woman, who took refuge in the doorway of a shop in High-street, had her forehead struck and marked by one of these falling pieces of ice. They appeared, however, to fall most thickly at the harbour mouth and South Dock, where some were found of 1½ inches in diameter, and where, too, the storm seemed to have the centre of its intensity. On the east side of the dock the lightning struck the large Goliath crane belonging to the River Wear Commissioners, and smashed it absolutely to atoms. Fortunately the crane did no damage in its fall, and, wonderful to say, none of the tall masts of shipping near had attracted the lightning. During the storm the wind veered round from S.W. to N., and then to N.N.E.

NORTHUMBERLAND.

NEWCASTLE.—It would require the memory of the "oldest inhabitant" to recall a parallel to the dreadful thunderstorm which visited this district yesterday. We have

to recur for a comparison to the same date as yesterday in the year 1839, and even that storm, which deluged the lower parts of the town and destroyed a great amount of property, was exceeded in its violence and in the disastrousness of its results by the electric commotion and pluvial outburst of yesterday. The morning was clear and bright, but the atmosphere was extremely warm and oppressive. The sky grew overcast towards noon, the air became warmer and heavier, and the darkness and density of the clouds indicated a thunderstorm. Between twelve and one o'clock, distant peals of thunder were heard from the south-west; and about one, rain drops, which appeared on the pavement as large as a crown-piece, began to fall. Soon the storm burst, but did not at once reach the extreme of its violence. The thunder which the first shower accompanied, appeared to be directly over the west part of the town, and the sheet lightning, which was first observed, for a moment dazzled the eyes of all on whom it was reflected. A slight cessation in the downpour was followed by a fall of volumes of water. There were a few loud, rolling, successive peals, and then the heavens resounded with a number of sharp, crashing, simultaneous reports. Overhead was one mass of dark and seemingly immovable cloud. The storm was not confined to one quarter of the heavens; lightning flashes could be seen in all directions, and it was difficult to indicate the part from which any of the thunder peals came. The darkness increased; the density of the atmosphere, together with the smell of the sulphurous emanations, became most oppressive; and the ordinary avocations of the inhabitants were suspended, while the loud thunder peals and the long shooting lines of light, coloured with blue and violet, inspired terror and aroused interest. The electric storm had reached its height, when the rain, which was descending in torrents, gave place gradually to hail. The hail shower came down with great force, and lasted several minutes. Some of the hailstones were half and some three-quarters of an inch in diameter, and small pieces of ice mingled with the shower. The storm lasted an hour and twenty minutes. We record below more than one fatal occurrence; numerous instances of damage to property are also reported; but it is impossible to chronicle the whole of the results of the storm, or to compute the total of the disasters. The lightning struck dead one man in a house in the town, and scorched and stunned others; it shattered trees and injured front gardens. The situation of Newcastle renders the lower parts of the town particularly liable to damage by sudden and severe rainfalls; and when destruction is visible, as it is now in the high parts, it can be conceived that the low levels have suffered greatly. The rain and hail deluged the streets in the high parts; the gutter-streams widened as they flowed; and in steep streets, such as Dean-street, there were floods; which, in their impetuous course, did injury to almost every shop and house. The sewers became over-charged, and burst in several places; and when the storm had abated, and the water had ceased to flow, the gutters and street-sides were covered with mud-heaps, and many of the pavements were in a similar condition. The town contains scarcely a single street in which there is not a house with window-panes broken by the hail; and every building whose roof is partly of glass—such as the Central Station—has been injured in a similar manner. At No. 3, Regent-street, Forth-street, a young man named William Mitchell, 22 years of age, was killed by the lightning. In Forth-street, a short distance from Regent-street, Mrs. Anderson, wife of Sergeant Anderson of the Newcastle Police Force, was struck by the lightning. The force of the water which came in torrents down the Tuthill Stairs was so great that it broke away a large number of the stone steps, and carried them into the Close. The chimney and a portion of the stone work of the roof of a house at the west end of the same street were knocked down by the lightning. At a quarter to two the main sewer crossing the Sandhill from the side of the river, built at a time when the town was less than half its present size, became choked up with water, and burst, throwing a column of filth about five feet square to a height of eight or nine feet, resembling an Icelandic geyser, and continuing to discharge itself for nearly half an hour. The water thus liberated ran in a rapid orrent straight to the river, shutting in the inmates of the houses on the east side of

the Sandhill, and filling all the cellars. The pavement, too, between Printing-court-buildings and the new Royal Assurance Buildings was raised up for two or three courses, and the Quay-wall seriously injured. Mr. Sutherland's bar, No. 4, Sandhill, was filled with water, and his cellars were inundated, a very large stock of ales being damaged and rendered unfit for use. At the East end of the town the thunderstorm wrought damage of the most severe and serious character. Stockbridge, lying at the foot of Manor-street, and approached from another high part of the town by Pandon Bank, presented the appearance of a perfect reservoir, being the receptacle for heavy floods which poured with great velocity down these two named thoroughfares. Nelly Brown, a woman who was crossing from the foot of Manor-street, was washed completely from her feet and carried by the running flood towards the row of low dingy-looking structures at the bottom of the Stockbridge, where she was rescued after some difficulty. At the Burn Bank brewery, Mr. J. Mitchell's, jun., another scene of desolation was to be witnessed, a great portion of the flood from Pandon Bank and the Stockbridge having found outlet along Pandon, it rushed down Burn Bank, in the direction of the Quayside, carrying with it doors and shutters which it had brought away from the shops upon Stockbridge. The ale and valuable hop cellars of the brewery were deluged in a very short space of time, and notwithstanding the immediate employment of twenty men whom Mr. Mitchell set to work to save some of the stock, all effort was in vain, and the loss is estimated to be somewhat extensive. The keeper of the Corporation Toll House in Scotswood Road, and his wife, were knocked down by the lightning, which made a strange noise in the house, and caused considerable alarm.

RYHOPE COLLIERY.—The storm was experienced here in all its intensity, and owing probably to the elevated position of the colliery village, several places were struck by the lightning. At the colliery office, part of the roof was carried away, and the same thing happened to a house in Ryhope-street, and to two or three houses in Cory-street. Throughout the colliery, the village, and neighbourhood, the storm was felt very severely, and the rainfall was unusually heavy.

WALKER.—The damage to property by the flood was more or less severe in this locality. The low cooperage at the Walker Chemical Works was flooded, and a lot of bleaching powder destroyed. Before the water could be got away again apertures had to be made in the walls, under the direction of Mr. Wm. Call, the manager, the dining-room of whose house was also inundated. At the works the air-pumps were choked with the water, and as the engine kept going, the cog wheels were all broken. Fortunately, another set was on hand, and the damage was soon remedied.

WESTMORELAND.

APPLEBY.—Two men were struck by lightning at the Militia Camp, near Appleby, on Tuesday afternoon.

KIRBY LONSDALE.—At Barbon, near here, Miss Batty, aged 76, was found dead in her house, which had been much injured by a flash; and at the same place John Punch, a painter, was found in a dying state, but by prompt treatment he was somewhat restored.

MONMOUTH.

LLANFRECHFA GRANGE.—18th. T at 1.30 p.m. 19th. TS, 7.25 to 11 a.m.; rain from 7.40 to 11.30 a.m.; violent hailstorm four miles to S.—*F. J. Mitchell.*

WALES.

PRESTEIGN, RADNORSHIRE.—Monday, the 17th, there was some thunder and lightning in the evening, after four very hot days. Tues-

day, at 11 a.m., a black cloud came up from the S., and a short, very sharp thunderstorm took place, and $\cdot 17$ in. of rain fell in 17 minutes, and a spruce tree on the public promenade here was struck, 30 feet from the ground, and the lightning ran down it, corkscrew fashion, and tore off the wood and bark a foot in width and thickness. At 3.30 p.m. a tremendous storm came up from the S.E., and lasted into the night, with only $\cdot 19$ in. of rain during the whole of it. A groom was taking two horses to a field, a quarter of a mile from here, when the lightning struck and split a tree 20 yards in front of him, and knocked down one of the horses, but did not hurt it. At Fittey, a village three miles from here, 27 sheep were killed, and a man, a few hundred yards from them had his watch partially fused, and stopped at 4.15 p.m. His hat was cut, and in his head he had a hole the size of an orange, and his boots and stockings were split; a surgeon saw him next day, a friend of mine, and he said he was then quite offensive. The same afternoon, between 3 and 4 miles away, at Beresford, three ewes and three lambs were killed, and a hen turkey and her brood; and a carter told me large lumps of ice fell. Again, on Wednesday (19th), at 9 a.m., another fearful cloud, as black as ink, came up from the S., and a bad storm arose, lasting till 11 a.m., and from 9 to 12 a.m. $\cdot 63$ in. of rain fell, and I had to breakfast at 9 a.m. by candlelight. I don't think this storm did any damage, but all I can gather point to the storms of Tuesday as being the worst known here for years and years—certainly to my knowledge in 16 years. I may here add our rainfall to the 20th of June now is $23\cdot 57$ in., whereas last year to the same date it was only $13\cdot 30$ in.—*P. R. Hannam.*

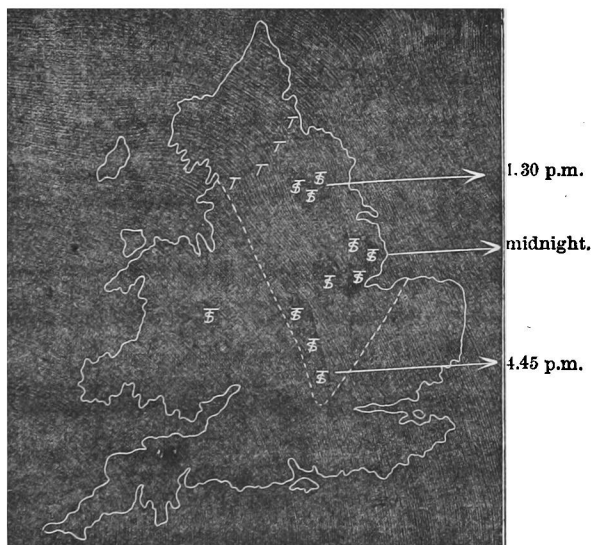
TREVALYN HALL, WREXHAM.—Tuesday, June 18th.—Very high temp. a.m., and fine (max. in shade, $84^{\circ} 2$) p.m.; almost continuous thunder. Three principal storms, viz., at 12.30, 3.30, and 9 p.m., but thunder heard constantly, except between 2 and 3.30 p.m.; greatest violence of storm 4 p.m., rain falling in torrents; amount $1\cdot 29$ in. The storms appeared to move chiefly from S.E. to S.; lightning very brilliant and frequent after 9 p.m., continuing to be seen far into the night. Wednesday, June 19th—Dense cloud canopy; temp. at 9 a.m. 71° ; at 10.15 an extraordinary obscuration, caused by dense black masses of clouds moving from S. at a low elevation. For some minutes it was too dark to read anything but the very largest print, and as the obscuration passed away the thunderstorm broke; rain fell heavily ($0\cdot 435$ in.), but the storm did not last very long. June 24th, Monday—After a brisk fall of the barometer, a thunderstorm began at 3 p.m., subsided about 4, but returned at 4.30 p.m. with increased violence. Rain fell very heavily both in the afternoon and again at 9 p.m., when another thunderstorm occurred; amount of rain $1\cdot 01$ in. A horse was killed by the lightning at about 4.30 p.m. in the park here, at a distance of about 400 yards from the house. Meadows near the Dee flooded in places, and much damage done to hay crops.—*Boscawen T. Griffith.*

PLAS BRERETON.—18th. Very vivid L and loud T.—*T. Turner.*

There must necessarily be some limit to the detail in which we can discuss these storms, and with a view to simplifying, concentrating, and therefore we hope rendering our remarks most useful, we shall consider the events of each day separately.

Of the storms of the 17th, we have not many more than a score of accounts, and therefore our inferences may, by more ample data, be proved incorrect, and although we do not anticipate any such result, we desire it to be understood that all deductions are open to correction by further information. The following chart shews the general features which, with the solitary exception of a local storm at Presteign, are very consistent and apparently simple. (1) Neither thunder nor lightning is reported except from stations north of the dotted line, (2) There was a rather heavy storm passed from a few miles N.W. of York, over that city, and onwards towards Driffield and the coast, between noon and 3 p.m. (3) There was a very slight storm in North Middlesex about 4.45 p.m. (4) There was a sharp storm in Northamptonshire about 7 p.m. (5) There was a violent storm in Lincolnshire about midnight. It is possible that (4) and (5) were the development of (3) and that it gradually travelled due N., but if so it is rather strange that so careful an observer as Mr. Stow should have heard nothing of it, and only seen it at 9 p.m. as "distant L in N."

Thunderstorms of June 17th, 1872.



The storms of the 18th seem also tolerably easy of explanation. The storm mentioned in the account of the 17th (5) as prevailing in Lincolnshire at midnight, again appears as a storm in the same district at 1 a.m. on 18th; its area is roughly indicated by the dotted space marked (c.) The storm which prevailed over the West of England between 11 a.m. and 2 p.m. (marked E) may have passed to N.E. and

become that marked (D), but there is no record from the intervening district. It seems, nevertheless, somewhat probable, as (D) cannot be (F) gone northward, since there is a distinct record of "no thunder" from the intervening district. Our own opinion is that the Watford storm, (F) was a purely local phenomenon, and did not travel far. We are inclined to assign a similar stationary character to the Tyneside storm (A), which for electric intensity was probably the fiercest of all, just as the Kettering storm (D) seems to have been the most productive of rain, if we consider the area of heavy rain as well as its amount. The largest fall actually recorded was (4.27 in.) at Macclesfield, just on the northern edge of (E), and if it be held that (D) was not (E) shifted to north-east, it would perhaps be permissible to suggest that the heavy fall at Macclesfield and thence to the Peak district, was due to a partial mingling of (D) and (E). It will be observed that with the exception of Devon (storm G), there was an entire absence of thunder and lightning in the east, south, and south-west of England. The Devonshire storm set in at the southermost part of Devon about 6 p.m., and gradually later further north, so that it began nearly three hours later in the neighbourhood of Exeter; all over the county it was, however, in full force from 9 p.m. till nearly midnight.

Thunderstorms of June 18th, 1872.



In the early morning hours of 19th storms were in full progress in Devon, and also in central Wales. Just as south Devon was the first by three hours to be visited by the storm on the evening of the 18th, it was first by three hours in welcoming its departure, which occurred in south Devon at 4 a.m., and in north Devon not till 7 a.m.; thence it seems to have passed up the valley of the Severn, and faded away in the west Midland counties shortly before noon. *Possibly, but not,*

we think, probably, we may recognize it again in the Winchmore Hill storm at 2 p.m., which passed Audley End at 3.15 p.m., Sudbury at 4 p.m., and reached Ipswich at 6 p.m. The difficulty in accepting this explanation lies in the fact that several careful observers within the dotted space report "no thunder;" another, though lesser difficulty, is that if the Devonshire storm be supposed to have spread fanlike over the country, it does not seem very obvious why it should have spread northwards so much faster than it did eastwards. The velocity of the wind will scarcely account for it, for there was hardly any motion in the air. Difference of barometric pressure will not account for it, for remarkable uniformity of pressure existed throughout the day, London and Manchester scarcely ever differing more than 0.02 inch. What then was the reason?

Thunderstorms of June 19th, 1872.



THE STORM OF JUNE 24TH.

CROWBOROUGH BEACON, TUNBRIDGE WELLS.—It may interest some of your readers to have a few notes of the remarkable storms which passed over Sussex and Kent on June 24th. The early morning of that day was fine, but sultry, and about noon some highly electric masses of cloud were moving slowly and in various directions. Distant thunder was soon heard from the westward, which continued more or less all the afternoon. There was a slight shower about 5.40, and at 6 a large mass of composite and highly electric cloud came up from S.W., opposed by a lateral current from E.S.E. As the storm approached, its eastern border was remarkably well defined, which at 6.15 proved to be a violent hailstorm, with little or no rain, and only two flashes of lightning. It lasted about twenty minutes, and passed over to the

N.E., where it soon met another storm which had passed over Hailsham, Brightling, and Wadhurst. Upon their junction, the whole mass appeared to remain nearly stationary for an hour, in the neighbourhood of Maidstone, during which time the rain poured down in torrents. At this observatory a large number of the stones were from 3 to 3½ inches in circumference, and few were of less size than an ordinary hazel nut. Mr. Patmore, of Heron's Ghyll, Buxted, situated about 3 miles to the south of Crowborough, wrote to me almost immediately after the storm, and his description of the character of the hailstones is so accurate, that I quote his remarks. He noticed the following facts:—"1st. Exactly half an inch of water fell, and nine-tenths of it must have been in certainly less than four minutes. 2nd. The mass of the hail shower consisted of stones somewhat, but not much, under half-an-inch in diameter; these were spherical and opaque, like ordinary hailstones. Among them were scattered a vast number of stones about three-fourths of an inch in diameter, spherical and opaque, and consisted, like ordinary hailstones, of concentric layers of ice; the largest I picked up, as it lay in my warm hand, melted into a tablet, in which I counted six of these layers, like the transverse section of a six-year old sapling. But besides these, which were only hailstones of an extraordinary size, there were hundreds of lumps of clear ice, most of which had a distinctly crystalline form. Some of these were square, others eight-cornered tablets, such as would be formed by the figure of one square within, or upon, another of equal size. These tablets were usually about an inch on the side, and about one-third of an inch thick. Many of these tablets had projecting limbs from two, and these two always the opposite sides, making their entire length often fully one inch and a half. The largest masses of all were formless, and resembled the coiled and sometimes hollow lumps formed by molten lead dropped in water; one of these was quite as large as a pigeon's egg, and was hollow. 3rd. These great masses of clear ice fell with lightness and softness, that reminded me almost of the way in which great flakes of semi-molten snow falls." I can corroborate Mr. Patmore's statement as to the lightness of these large hailstones, from the fact of my having only one pane of glass broken in the greenhouse, when it would not have surprised me to have found half of them broken.—*C. L. Prince.*

THE STORM OF JULY 25TH.

WANTAGE.—The curious phenomenon of a whirlwind was witnessed in this town and neighbourhood yesterday, July 25th, and though of only local occurrence, you may deem some details worthy of a place among the records of the storms which are such an extraordinary feature this summer. In the morning we had a very explosive thunder-storm, which brought nearly an inch (0.90) of rain. Soon after 3 p.m. a second storm began to gather up, and vast masses of cumuli met overhead from opposite quarters, N. and S., with wandering currents

of vaporous clouds from other directions. Both the thunder and rain however passed off in half-an-hour, and then occurred a sudden rush of wind from eastwards. It lasted one minute, and the results here were not particularly serious. A whirling cloud of dust, a violent slamming of open doors all round the market place, a few shop blinds displaced, a chimney blown down, and all was over. But the effects were more conspicuous three miles to the north-west. At Challon station, between Didcot and Swindon, a signal-post and lamp were carried off to a considerable distance. Close to the station is a large timber-yard, with three wooden sheds covering saw-pits; the three sheds were all uplifted, the planks were whirled about in the air, and some passed over the station inn. A large saw was broken in two, and the men hid themselves among the trees of timber to escape the flying planks. The inn itself suffered most; every chimney pot was dislodged, the slates ploughed up for a yard wide, a dovecot destroyed, lead sheeting torn up and deposited on an adjoining cottage, 15 feet of strong palisading laid flat, &c. From an open bed-room window, a looking-glass and various items of jewellery were swept out and carried not less than 150 yards. A tradesman of Wantage seeing the commotion in the air, took refuge in a shed attached to the inn, but at that moment the wide door was wrenched off and fell heavily upon him; before he could recover himself, a number of planks from the timber-yard, each three or four feet long, showered on his head and body, struck him with great violence, and bruised him most severely.—*E. C. Davey.*

P.S.—I have since learnt other facts in proof of the violence of the wind last Thursday. A truck on a siding was driven on to the main line, forced over the protecting blocks, and on through gravel for 60 yards. Heavy baulks of timber, which require three men to carry, were thrown several yards. One of the men declared that the planks flew about "just like swallows," but I think his imagination was like Byron's, "boiling and o'erwrought."—*E. C. D.*

EVAPORATION.

SIR,—Dr. Ballot says, "What sort of atmometer is most to be recommended for the indication of the quantity of water evaporated from the surface of water? Shall we use the common one, or those proposed by Viviani, Lamont, or Prestel?"

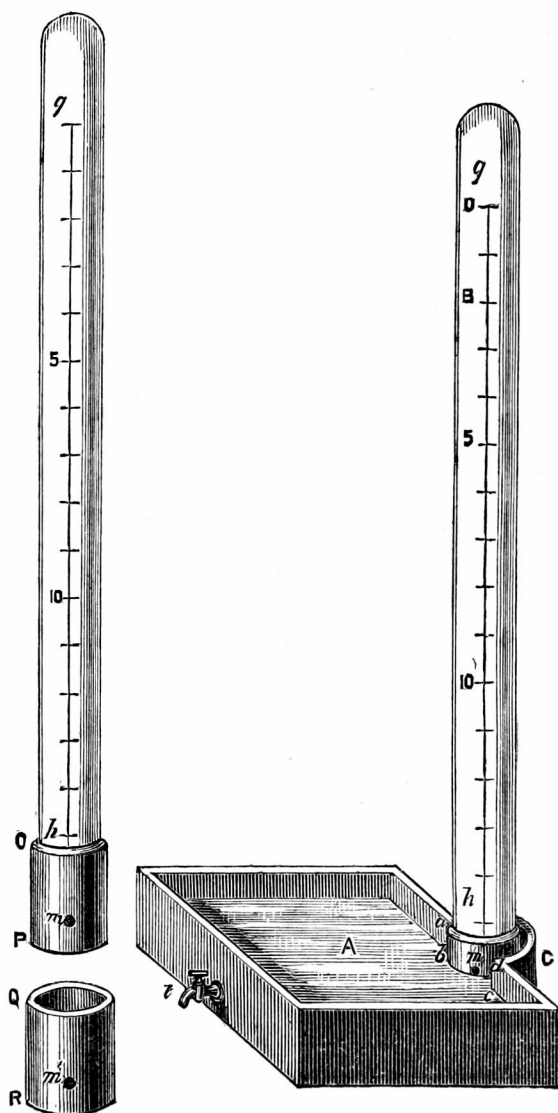
Would you inform your readers what methods were suggested by those gentlemen. It might be very useful for them to know.

I am, Sir, yours truly,

SAM. H. MILLER.

[We have much pleasure in complying with Mr. Miller's request, and append the following description of Prestel's apparatus, extracted from the *Proceedings Meteorological Society*, Vol. III., pp. 338-339.

"The following engravings will render its general design easily under-



stood. *A* is an open square vessel to contain the water to be evaporated ; *B C* a measuring tube with an opening *m* through which there is a communication between the interior of the tube and the water in *A*. The water which evaporates from *A* will be continually replaced from that in the tube through the opening *m*. Thus the water in *A* will be always kept at the same height, the quantity evaporated after the tube has been filled and fixed in its place being read off from the scale *g h* on the measuring tube.

"The opening *a b c d* being closed with a slide made of fine wire gauze fixed in a frame, and the vessel *A* filled with sand, mould, turf,

or with earth thickly covered with vegetation, the quantity of water evaporated from these substances can be read off from the scale of the measuring tube as easily as before, and the co-efficient of evaporation determined.

"I have had the instruments made of various sizes, and furnished with various measures. For observations of the same kind, all have given results which agree very well."

After recounting some unsuccessful arrangements for closing the aperture at *m*, Dr. Prestel proceeds, "I have therefore now given to the measuring tube the following simple and successful mounting, which is more easily constructed than the valve, shuts closer after the tube is filled, and what is of more importance, the interior of the tube can be reached through it, and its surface cleaned and polished each time before it is refilled.

"This mounting consists of a ring of thin brass, *o p* fig. 2, into which the open end of the tube is forced about half the breadth of the ring, and there firmly soldered. In the lower half of the ring a semi-circular [shown in the engraving as circular—*ED. M.M.*] opening *m* is filed, having a radius of about 0.1 inch. On to this ring a cap of brass, *q r*, fits tightly. In the side of the cap there is also an opening, *m'*, which may be brought exactly over the opening *m* by turning the cap, which will allow the water in the measuring-tube to flow out into the vessel *A*, if the tube is in the cylinder *c* attached to the vessel *A*. To fill the tube, hold the open end upwards, closing the hole *m*, at the same time, with the finger, pour in the water, and then force on the cap *q r*, but so that *m* and *m'* shall not come together. Invert the tube, and place it thus closed and filled in the cylinder *c*, fig. 1; then turn it round so that *m* shall coincide with *m'*, and then there will be a free communication between the water in the measuring tube and that in the evaporating vessel.

"Now turn the tap *t*, and let enough water flow off to bring the top of the column of water in the measuring-tube down to the zero of the scale. The shortening of the column of water in the measuring-tube for any time afterwards can be read off from the attached scale, and will give, if subtracted from the previous reading, the amount of water evaporated since that reading."

GAUGES TILTED AT 45°.

To the Editor of the Meteorological Magazine.

SIR,—I am inclined to think Mr. Warren's explanation substantially correct, although it is scarcely likely that the deflection of rain from the vertical is nearly as great at Aldershot as at Hawsker, where there is twice as much wind. The greater density of rain deflected at a greater angle will be partially corrected in many cases by the more direct fall of the less dense rain into the tilted gauge. Suppose the angle at 30 ft., 56°, and at 6 ft., 50°, then the density of rain should be as 64 : 56, but the area of aperture as 98 : 996, the amount caught,

therefore, as 100 : 88. The elevation difference for such a (winter) rain at Aldershot appears to be about 75 : 100 (being 81 : 100 for the whole year between 6 ft. and 25 ft.); this would more than counter-balance the above gain. On the contrary, however, the gauge at 30 ft. *exceeds* that at 6 ft., in winter, by about one per cent. ; this would seem to imply that only a part of the elevation difference affects tilted gauges. This may be the case, although that portion of it due to vertical currents would affect them, since they cause a real increase of rain *where the gauge is*. But one can only guess in this matter.—Your obedient servant,

F. W. STOW.

Harpenden, St. Albans.

ART AND METEOROLOGY.

To the Editor of the Meteorological Magazine.

SIR,—I have read with much interest Mr. Haviland's letter on "Art and Meteorology" which appeared in the last number of your magazine. I trust it will direct the attention of many artists to a study which must enhance the interest and beauty of their works, and at the same time add a new power to aid scientific students of weather in the solution of their puzzling problems.

I have myself done something in the way proposed by Mr. Haviland, though necessarily in a desultory and imperfect manner. Within the last four years I have made more than 200 studies of skies, with notes of date, locality, and subsequent weather. These I shall have much pleasure in showing to any one whom you or Mr. Haviland may furnish with a card of recommendation.

If my studies are such as may be thought useful to the meteorologist, I shall gladly give to them more systematic attention for the future.

I am, Sir, yours obediently,

WM. BAKER.

197, *Adelaide Road, St. John's Wood, July 28th, 1872.*

THE RAINFALL OF JULY 26TH.

CARDIFF.—A storm of rain fell in this neighbourhood this morning about 2 o'clock, accompanied with lightning and thunder. The rain fell in sheets for a considerable time, completely flooding the roads, and some of the lower stories of the houses. The fury of the storm appeared to be about due east, but the atmosphere in an arc of 90 to 100 degrees was highly disturbed, the sheet lightning from the northern portion being of a pink colour, whilst that from the E. and S.E. being of a pale blue. The thunder, although at some distance, was incessant, and the lightning extremely vivid and very rapid in succession, illuminating the atmosphere with a continuous blaze of pink and blue light. The storm abated about 2.30 a.m. The amount of rain in my gauges was, Ely .87, Lisvane .97 ; wind S.S.W.—*Thos. G. South.*

JULY, 1872.

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.	Differ- ence from average 1860-5	Greatest Fall in 24 hours.		Max.		Min.					
				Dpth.	Date.	Deg.		Date.	Deg.	Date.			
											inches.	inches.	in.
I.	Camden Town	2.57	+ .78	.89	23	13	92.3	25	47.2	31	0	0	
II.	Maidstone (Linton Park)	2.21	+ .23	.49	12	15	93.0	25	46.0	19	0	...	
"	Selborne (The Wakes)	3.49	+ 1.29	1.46	24	14	82.5	25	43.0	31	0	0	
III.	Hitchin	2.27	+ .37	.45	7	18	82.0	25	44.0	30	0	...	
"	Banbury	4.43	+ 2.37	1.50	6	17	85.0	21	42.5	31	0	...	
IV.	Bury St. Edmunds (Culford)	6.21	+ 4.22	1.39	23	15	86.0	25	43.0	2	0	0	
V.	Bridport	3.93	+ 1.82	.82	13	12	81.0	25	45.0	3, 4	...	...
"	Barnstaple	6.35	+ 3.49	3.00	6	16	89.0	22	50.0	12	...	...
"	Bodmin	3.25	+ .14	1.98	6	12	75.0	20	51.0	5	0	0	
VI.	Cirencester	4.65	+ 2.21	1.29	29	12	...	...	...	...	...	...
"	Shiffnal (Haughton Hall)	3.84	+ 1.67	1.01	7	11	80.0	21+	43.0	10	0	...	
"	Tenbury (Orleton)	3.71	+ 1.33	.85	25	13	85.6	21	41.5	31	0	0	
VII.	Leicester (Wigston)	5.88	+ 3.78	1.34	9	16	90.0	21	42.0	30	...	...
"	Boston	3.31	+ 1.01	.75	12	14	88.0	21	47.4	18	0	0	
"	Grimsby (Killingholme)	4.84	...	1.93	12	12	83.0	22	47.0	16+	0	...	
"	Derby	4.68	+ 2.49	1.12	6	13	86.0	21	46.0	10	...	...
VIII.	Manchester	7.66	+ 4.97	4.00?	12*	17	89.0	21	43.0	31	0	0	
IX.	York	4.30	+ 2.36	1.35	12	13	83.0	22	47.0	4	0	0	
"	Skipton (Arncliffe)	3.42	+ .19	.71	11	16	86.0	21	40.0	17	...	...
X.	North Shields	2.39	+ .58	.48	26	18	81.0	21	46.8	10	0	0	
"	Borrowdale (Seathwaite)	5.90	— 2.24	1.30	7	12	...	...	...	...	...	...
XI.	Cardiff (Ely)	5.25	+ 2.10	2.15	7	10	...	...	...	...	...	...
"	Haverfordwest	4.61	+ 1.31	1.93	7	11	78.0	21	44.5	9	...	...
"	Rhayader (Cefnfaes)	5.43	+ 2.58	2.35	6	17	78.0	...	...	...	...	...
"	Llandudno	3.46	+ 1.17	1.62	7	12	83.7	21	47.1	10	...	...
XII.	Dumfries	4.01	+ 1.76	1.45	7	13	77.0	28	41.0	10	...	...
"	Hawick (Silverbut Hall)	5.62	...	1.52	26	15	...	...	...	...	...	...
XIV.	Ayr (Auchendrane House)	2.94	+ .78	1.04	7	12	78.0	26	39.0	10	0	0	
XV.	Castle Toward	4.83	+ 1.69	1.00	8	14	...	...	...	...	...	...
XVI.	Leven (Nookton)	3.37	+ 1.10	.79	27	11	79.0	5	39.0	17	0	1	
"	Stirling (Deanston)	3.65	+ .25	.90	7	15	78.0	28	36.4	18	0	1	
"	Logierait	3.41	...	.75	12	12	80.0	5	40.0	9, 16	...	...
XVII.	Ballater .....	...	...	...	...	...	...	...	...	...	...	...
"	Aberdeen	1.99	...	.56	7	19	75.8	4	44.3	18	0	0
XVIII.	Inverness (Culloden)	3.14	...	.81	26	13	74.2	5	46.7	17	0	0
"	Portree	4.30	— 1.77	1.51	20	19	...	...	...	...	...	...
"	Loch Broom	1.80	...	.35	8	20	...	...	...	...	...	...
XIX.	Helmsdale	2.62	...	.64	20	18	...	...	...	...	...	...
"	Sandwick	2.60	+ .71	.46	28	16	71.8	5	47.0	19	0	0	
XX.	Cork	6.94	...	1.34	25	14	...	...	...	...	...	...
"	Waterford	2.76	— .55	.58	30	15	75.0	14	43.0	1	0	...	
"	Killaloe	1.89	— 1.30	.35	1	17	82.0	16	44.0	8	...	...
XXI.	Portarlington	2.62	— .92	.64	29	19	77.5	4	47.0	1	...	...
"	Monkstown .....	.99	— 1.44	.24	25	10	84.5	5	42.0	16	0	0
XXII.	Galway	2.80	...	1.22	26	15	75.0	29	51.0	20§	0	...	
"	Bunninadden (Doo Castle)	3.15	...	...	...	...	...	...	...	...	...	...
XXIII.	Bawnboy (Owendoon) .....	...	...	...	...	...	...	...	...	...	...	...
"	Waringstown	3.11	...	1.15	25	12	84.0	26	43.0	16	...	...
"	Strabane (Leckpatrick) .....	...	...	...	...	...	...	...	...	...	...	...

* And 13. † And 22. ‡ And 17, 18. § And 27.

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

METEOROLOGICAL NOTES ON JULY.

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 PARK.—A remarkable month for the frequency of T, but not near here, and perhaps we have had fewer rain storms than most of our neighbours, and no H, the general character of the weather being a few hot days followed by a period of dull cold weather, then again hot. Mostly hot from 18th to 29th, with T most of these days, the last two days cool. Ther. ranged above 80° on 15 days, the 25th being the hottest day; wind changed often but never high. Rainfall about the average, and the same may be said of the temp. of the month as a whole, the cold period detracting so much from the hot ones. Harvest later than usual. Bar. never reached 30.00 during the month.

SELBORNE.—Bar. steady but rather low; temp. very oppressive, the max. on the 25th higher than I have ever recorded during the last ten years, the nights also were warm, and the min. on the 26th the highest I ever recorded in the same period the electrical disturbances unusually great. The thunderstorm on the morning of the 25th was accompanied by torrents of R, 1.50 in. fell in about half-an-hour; near Petersfield, about 7 miles from hence, 5 horses were knocked down, two of them killed, and three men much injured. In the storm of 30th a cottage on Short Heath in this parish was struck by L, the chimney and woodwork shattered, and the thatch set on fire.

HITCHIN.—Constant TSS throughout the month, but none within a mile or two of this station. Highest night temp. ever recorded on 26th.

BANBURY.—Sudden and violent electric wind before TS on 6th; 1.25 in. of R fell in an hour; a second storm very severe and lasting till 7.15 p.m.; 0.40 in. of R fell in half-an-hour soon after noon on 7th; short storm on 18th man and horse struck at the bottom of the town, but not much injured. Bright meteors on 22nd and 25th, on the former day a little before 9 p.m., while still light; three thunderstorms on 25th, first very near and severe. Tree on the outskirts of the town struck in the 4 p.m. storm; T and L almost incessant from 8.30 to far into night; L very fine, much damage done in the neighbourhood by these storms; trees blown down by the wind on 6th.

CULFORD.—This has been a month of extreme heat, excessive R and much T. The rainfall, 6.21 in., is greatly in excess of any single month during the last 16 years. Max. temp. of month 86° on 25th, and the min. or lowest night temp. of that date was as high as 64° ; during the early part of the night of this day (viz. 25th,) the south-western sky was incessantly illumined by the most brilliant flashes of L unaccompanied by T. Mean temp. of the month 64° .

BRIDPORT.—From the 14th to 23rd no R fell, fine sunshiny days, sheet L on 6th, 13th, and 23rd, and on the 25th it illuminated the whole heavens, T on 22nd and 25th. Heavy R on the night of the 6th, 0.82 in. in about 5 hours in night of 13th, 0.62 in. in 3 hours of the early morning of 24th, and 0.65 in. in the night of 25th, when the min. temp. during the night did not fall below 63° registered on morning of 26th.

BODMIN.—A heavy and long continued TS. Rainfall 1.98, the heaviest recorded during the past six years. Average bar. 29.97, average temp. $63^{\circ}.8$.

CIRENCESTER.—On the 25th a heavy TS, which did considerable damage in the neighbourhood.

HAUGHTON HALL.—A month remarkable for severe TSS. On 7th, at 5.30 p.m., a fearful one with violent R and H. On 25th another almost tropical commencing at 4 p.m. in S.E., met by another from S.W., and a third from N., the L most vivid and T continuous till 7, without a minute's interval, but no H, the sheet L afterwards till 11.30 wonderfully fine. Bar. remarkably steady during month. Temp. high, 62° on nights of 24th and 25th; wind chiefly from N.W. and S.W. No wasps or hornets, scarcely any butterflies, not even white ones. Foxgloves unusually numerous and fine, scarcely any hay undamaged.

ORLETON.—Temp. about $2^{\circ}.2$ above the average; many bright hot days,

followed by great storms of T and L, and violent R. Bar. steady, and but little affected by the great falls of R. A violent TS occurred about 4 p.m. on the 7th, with a fall of .840 of R; about two miles from here more than 2.00 inches must have fallen, as the brooks were higher than ever remembered; Teme overflowed its banks, and covered the meadows before morning; a summer flood has not done so since 1839. On the 25th a violent TS set in about 8.30 a.m.; by 9, 0.300 of R had fallen, and in 12 minutes more than 0.500 had poured down in sheets of R; at 9.30 the R ceased, and about 10 the sun burst out. At 3 p.m. another TS commenced in E.S.S., and crossed to N.E. of us, with brilliant L and loud T at a distance of seven or eight miles, passing off to the N. at 5 p.m.; as night drew on, L recommenced; at about 10 p.m., for the space of an hour, the flashes averaged 30 a minute, and the T clouds one beyond another, as revealed by the L, were grand beyond any former display. The lowest temp. on the night of the 24-25th was 63°.8, and 25-26th, 65°.

WIGSTON.—The month has been characterized by very frequent and unusually violent storms of T, R and H. The temp. above the mean, and rainfall more than double the average for the month. The high temp. of the last fortnight has brought forward the corn rapidly, the pastures never finer both in quantity and quality.

BOSTON.—Very hot all the month, with frequent electrical disturbances of the atmosphere. TSS on 6th, 9th, 11th, 12th, 13th, 14th, and 23rd. Max. of month 88° on 21st, on which day 129.5 was registered in the sun by the blackened bulb *in vacuo*.

GRIMSBY.—The wettest July for many years past. This place has enjoyed its usual immunity from the heavy TSS which have been so frequent in other parts. Fruit scarce, much hay seriously damaged.

DERBY.—This month will always be remembered as one of the most wonderful in recollection; the TSS were magnificent in appearance, but, contrary to the usual experience, failed to lower the temp., the air throughout the month varying but a few degrees. The rainfall for the month is nearly double the average, the temp. exceeded the mean by 4°.

MANCHESTER.—The rainfall on the 12th and 13th, amounting to 4.00 in 35 hours, caused a most disastrous flood in the Medlock. The week ending July 27th had a mean temp. of 72.8, being 12° above the mean (for July) of the last twenty-three years, and 15.2 above the corresponding week of last year. On 29th, during a TS, hailstones fell measuring one-third of an inch in diameter.

ARNcliffe.—A most unusual amount of T and L during the month.

N. SHIELDS.—TSS on 11th, 14th, 22nd, 25th and 26th.

SEATHWITE.—T on 7th, 8th, 9th, 11th, 12th, 22nd to 25th, and on 29th.

W A L E S.

HAVERFORDWEST.—Ther. reached 70° on 13 days, the average night temp. 55°, so, that although we had not more than 4 days during the month which could be considered as very hot, yet the temperature was about the average for July; the hay crops were very heavy, oats look well and likely to give a heavy yield, wheat and barley not so good, all green crops luxuriant; the month has been very wet and more than the usual T and L. A storm of terrific character occurred on the 25th. General health very good, no epidemic prevailing, no cases of zymotic disease. A tremendous storm of wind and R on 7th, doing great damage to the hay crops, 1.93 in. fell in 23 hours. The storm of the 25th commenced here at 12.15 a.m.; during the whole of the day the heat had been very oppressive, sky cloudy, thick copper coloured haze, great stillness, temp. 76°, continuing high all the afternoon and evening; towards midnight an almost Egyptian darkness prevailed; distant T heard at 11.45 p.m., and faint L seen coming nearer and nearer till the storm burst in all its grandeur, the roar of the T for more than an hour was continuous, sometimes resembling the blasting of rocks, then the smart crack of the rifle, then the roar of artillery; the L was incessant extremely vivid and at times very forked. The storm was unaccompanied by R during the first hour of its continuance, it lasted till 3 a.m. and extended over the whole county, it travelled in a curve from S.E. to S. and W.N.W. Amongst the casualties six cows and a bull were killed at Lawhaden, and a barn and outbuildings set on fire at Park-clas.

CEFNFAES.—Temperature variable, wind S.W., last four days N.E.; frost on 30th and 31st; T frequent on 6th and 25th, very violent, and the L remarkable; hay harvest dilatory.

LLANDUDNO.—TS at 9 a.m. on 7th, and again at 7.30 p.m. on same day; on 22nd clouds close down into the seat at noon, T at 6 a.m.; 24th very fine T and L during the night, but no R. Slight TS at 9 a.m. on 25th, clouds down into the seat till 1 p.m., afterwards fine till 11 p.m. then a TS. T in the distance 9.36 a.m. on 26th, a fine rainbow at 5.30 p.m. on 27th.

SCOTLAND.

DUMFRIES.—First six days fine, on 7th excessive rainfall (1.45), weather wet until the 14th, then fine to the 23rd; much R and TS the four following days; the month closed fine. T on 11th, 12th, 22nd, 24th, 25th, 26th and 27th. Rainfall 1.40 above the average of the last five year, temp. $61^{\circ}7$, or $1^{\circ}5$ higher than corresponding month. Crops of all kinds look well, but are three weeks later than last year.

SILVERBUT HALL.—Fine warm growing month with a deal of thunder-rain, 1.20 fell in an hour on the night of the 10th, which flooded many houses in Hawick; a severe TS on the 26th, when 1.52 of R was registered, which brought the rivers in full flood. The whole of the country round here is looking beautiful.

AUCHENDRANE.—This month has been remarkable over the British Isles for violent TSS and heavy floods, but these have not been so severe here as in other places; including all the thunder plumps, yielding 1.04 on the 7th, and 1.24 on 25th and 26th, the rainfall this month here is little above the July mean, and not including the thunder plumps or rainfall, is far below the July mean, and the air beside being warm has been dry, as the humidity was 2° below the mean for July. The river was in full flood only on four days; the TSS of 25th and 26th were most alarming, particularly during the night and early morning of the 26th, since the erection of a L conductor the protection to the house has been complete; but on two previous occasions, two of the large neighbouring trees had been struck and totally destroyed.

CASTLE TOWARD.—From 1st to 13th dull and cloudy, with R almost daily, heavy fall (1.00) and flood on 8th; 13th to 24th fine and warm, distant T on 12th. Strong wind on 20th from S.E. doing much damage to the exposed fruit trees; on 24th and 25th a great TS; during the night of 25th the L was frightful. Crops of all sorts look well, hay in abundance, pasture for cattle plentiful, the month on the whole has been good for carrying on out-door employment.

NOOKTON.—T and heavy R from 6 to 7 p.m. on 25th, T on 26th.

DEANSTON.—First week of the month little rain, hot and sunshiny, second week wet, mild and little wind, third week hot and dry to 19th, then rainy till 27th. 25th and 26th much R, and distant T on 26th.

LOGIERAIT.—A month of genial weather.

ABERDEEN.—A month of very dull quiet weather with frequent fogs often very dense, high night temp. and rather low day temp. Potatoe blight first seen on 18th, TS on 24th, also silent L at night.

CULLODEN.—T on 22nd and 26th,

PORTREE.—On the whole a fine month. Potatoe blight making great progress in both gardens and fields, hay crop generally secured, T and L from 6 p.m. till 9 p.m. on 24th, and from 6 a.m. to 8 a.m. on 25th.

LOCHBROOM.—A dry and good working month but upon the whole an unusually cold month.

SANDWICK.—July has been 0.24 in. wetter, and $1^{\circ}15$ warmer, than the mean during the whole period of observation. There has been rapid vegetation, superabundance of grass, and a promising appearance of grain crops. A peal of T and several flashes of L on 28th, about 11 p.m.

IRELAND.

MONKSTOWN.—A fine warm month, T and L on morning of 25th at 5 a.m.

GALWAY.—Thunderstorm on 26th.

DOO CASTLE.—A fine month.

WARINGSTOWN.—Fine warm month with occasional rain, tremendous TSS and rain on 12th and 25th.