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THE WORST GALE OF THE 19TH CENTURY IN THE ENGLISH MIDLANDS.

It is remarkable that the gale of March 24th, 1895, has not been completely discussed. Short papers were written respecting it for local scientific societies in Northamptonshire and Norfolk by the Rev. H. A. Boys and Mr. A. W. Preston respectively, and the same gentlemen sent very graphic letters, which, with one from Miss Stanton, of Stroud, were printed in this Magazine for April, 1895; but there is not, to our knowledge, any full record of it in the publications either of the Meteorological Office or of the Royal Meteorological Society.

In preparing the observers' notes for publication in *British Rainfall*, 1895, our attention was recalled to the subject, and we hesitated for a moment and considered whether the additional unutilized data which we possessed should be inserted in that volume, but as it was a storm of wind, not rain, it appeared more appropriate to print it in these pages. We therefore give in the present number part of a list of damage which we believe to be without parallel since 1703, and in the next number we hope to complete it, and to offer some general remarks upon the subject.

It is a curious coincidence that the day of the week, as well as the day of the year were identical with that of the disaster to the "Eurydice,"* and the hour of the day approximately the same:—

"Eurydice,"
Sunday, March 24th, 1878.

Midland Gale,
Sunday, March 24th, 1895.

Counties arranged as in *British Rainfall*, places grouped from South to North.

MIDDLESEX.

James Street, Commercial Road, E.—Some houses had been partly pulled down, an outside wall was blown over and killed three persons.

Hyde Park, London.—A large oak blown over about 4 p.m.

Earl's Court.—Several erections damaged.

* *Met. Mag.*, 1878, pp. 33, 57.

MIDDLESEX—(continued).

Tottenham Court Road.—A shop window at the corner of Chenies Street was wrecked. The glass fell outwards, and as the window faced W.S.W., this looks much like the result of expansion of the air in the shop.

Alperton, Harrow.—A man was blown under a passing vehicle and killed.

BERKS.

Windsor.—Six large elms blown down in the park.

BUCKS.

Newport Pagnell.—Three pinnacles blown off the church tower, one pierced the roof of the nave, and rendered it impossible to hold service. Trees and chimneys have suffered severely.

OXFORD.

Banbury.—Chimney blown down and woman killed.

NORTHAMPTON.*

Easton Neston.—Fearful gale, 2 p.m.

Blisworth.—Terrific hurricane, 0.30 to 2.30 p.m.

Fawsley.—Between 1.30 and 2 p.m., thousands of trees, chiefly elms, torn up by roots or snapped off.

Easton Mauduit.—Dangerous hurricane from 1.30 to 2.15 p.m. The very worst from 1.50 to 2 p.m.

Northampton.—A child killed by a falling wall; many roofs damaged, three churches and five chapels injured.

Althorp House.—Terrific gale between 1 and 2 p.m., especially just before 2 p.m. The gale lifted the lead of the roof over two of the high chimneys.

Boughton House.—About 1,000 trees down.

West Haddon.—Violent hurricane between noon and 3 p.m.

Wellingborough.—The lowest estimate for the damage in this town is £5,000. The bell turret at St. Barnabas blown on to the schoolroom, the Waterworks' chimney and that of Messrs. Dulley, each about 40 ft. high, were blown down, and there was damage in nearly every street. In the fens, hardly a straw stack is left.

Hargrave.—Phenomenal hurricane, 1.30 to 2.30 p.m.

Raunds.—The streets were strewn with thatch, slates, ridge-tiles and chimney pots; a window was blown in at the Post Office, and the wooden pavilion in the cricket field was blown to atoms.

Kettering.—During the gale, about 2 p.m., the town was a veritable pandemonium, the streets being thickly strewn with tiles and chimney pots. A factory chimney was blown down, and a horse buried in its stable. The neighbourhood is thickly wooded, and has suffered tremendously; at *Warkton* alone, 200 trees were down. All the roads out of the town were impassable on account of fallen trees.

Thrapstone.—Much damage to houses and trees.

Welford.—Gale at its height from 1 to 3 p.m.

Aldwinckle.—Gale at its height from 1.30 to 3 p.m.

* See *Met. Mag.*, April, 1895.

NORTHAMPTON—(*continued.*)

Oundle.—The damage is enormous; nearly every house suffered, and the streets were littered with wreckage from end to end. Six large chimneys (including that at the gas works) went down about 2 p.m., and unnumbered private ones. The roof of the cricket club pavilion was carried into an adjoining field. At *Polebrooke*, the top of the spire, and the weathercock fell through the roof into the church.

Weldon.—Full force of gale from 1.45 to 2.15 p.m.

Deene, Kingscliffe.—Hundreds of trees uprooted, and many houses damaged.

Apethorpe, Wansford.—Considerable damage to trees, ricks, and thatched cottages.

Kingscliffe.—Many chimneys down, in fact, few houses in the place entirely escaped.

Peterborough.—Few cities suffered more than Peterborough; the gale was heaviest shortly before 2 p.m. and began to subside about 3. Three pinnacles on the west front of the cathedral were blown down, and the roof was considerably damaged. The Deanery has a particularly wrecked appearance, the two chimney stacks on the wing nearest the cathedral both going down, and one of them taking part of the gable with it. A pinnacle was taken off St. John's Church, one window was blown in at Christ Church, and one at the Baptist Chapel. Several factory chimneys were overturned, but the special feature at Peterborough was the wreckage of private houses, not mere damage to roofs by the falling of chimney stacks, but the frequency with which gable ends were forced in or out, and the consequent wreckage of furniture; *e.g.*, in Gladstone Street a house had only the ground floor intact, and after the roof and wall of the front bedroom had gone, the wind blew a large wardrobe into the street. A wood and iron stable in the rear of Mrs. Bird's residence, on the London Road, was lifted up, and carried bodily into the grounds of Councillor Crawley's house, and then the wind ripped off the side and tore it into pieces.

Milton Park, Peterborough.—Between 300 and 400 trees blown down.

Eye.—A very large portion of the roof of the church was blown off; at least 50 houses were damaged, several gable ends were blown in; it was the fiercest gale remembered.

Easton.—Several houses unroofed, and the rectory and the Wesleyan Chapel each lost a chimney.

Barnack.—Nearly every house damaged and many hundred trees uprooted, one in falling killed a pony.

HUNTINGDON.

St. Ives.—Great damage about 2.30 p.m.

Godmanchester.—Scarcely a house or building escaped damage, the gable of the old Grammar School fell outwards; the damage is estimated at hundreds of pounds.

Huntingdon.—Six boys were standing under the shelter of a fence watching the tiles being stripped off the houses, when an elm tree was blown on to them, which killed one and broke the legs or arms of all the others. Nearly every house in the town was damaged, a finial was blown off the church and a tower window blown in. The roads out of the town were all blocked by fallen trees. *Buckden* church spire was blown down.

Ramsey.—Scarcely a house has escaped damage. Many chimneys and stacks overturned, and the roof of the waiting room at the railway station carried away.

CAMBRIDGE.

Cambridge.—About 2 p.m., chimney damaged in St. Andrew's Street. Abbey Church, Newmarket Road, partly unroofed. About 2.10 p.m., a chimney stack was blown over at *The Spring, Chesterton*. About 2.20 p.m., the top 30 feet of a brewery chimney was blown down. At 2.30 p.m., a chimney was blown down in York Street. About 2.50 p.m., the Sturton Town Hall was partly demolished.

Bottisham.—Many gables and chimneys, and scores of trees, blown over between 1 and 3 p.m.

Swafttham Bulbeck.—Great damage about 2.15 p.m.

Swafttham Prior.—Windmill smashed between 2.30 and 3.20 p.m.

Newmarket.—Great damage, especially to tall chimneys and to trees.

Waterbeach.—Great damage between 2 and 4 p.m.

Cottenham.—Unprecedented gale from 2 to 3.15 p.m., very few buildings escaped damage.

Willingham.—Nearly every building damaged between 2 and 3 p.m.

Soham.—No one remembers such a gale as occurred between 2 and 3 p.m. The principal street was covered with shutters, slates, tiles, and thatch; the pinnacle of the church fell through the roof into the nave, smashing a seat; several cottages had one end blown out, while barns and windmills went down in all directions.

Haddenham.—Great damage between 2.15 and 4 p.m., five barns completely wrecked.

Witchford.—One barn was turned over bodily, others lost their roofs, and about 150 feet of tiling was stripped off the church.

Ely.—Terrific gale, 2 to 3.30 p.m., the cathedral did not suffer seriously, though lead on the roof was rolled up, several windows were broken, and a pinnacle was overturned. The workhouse, brewery, and several private houses much damaged.

Chatteris.—Terrific storm from 2.15 to 3.30 p.m. Most of the large chimneys are down, also a new factory 150 feet long, and the turrets of each of the cemetery chapels, while hovels and sheds are down by the score. The soil was blown up from the Acre Fen in tremendous clouds, having the appearance of black smoke from a gigantic fire. Tons of straw are floating down the river in such masses as to impede navigation.

Littleport.—Much damage to chimneys and roofs.

Manea.—Great storm between 2 and 3.15 p.m.

Benwick.—The air was so filled with black earth that one could only see a few yards. The church, chapel, and school were all damaged.

Wimblington, March.—Church much damaged in afternoon.

March.—A terrific gale passed between 2 and 3 p.m.; the streets were covered with broken tiles, and hardly a house escaped. Seven railway carriages were on one siding, and one truck on another, both sets were blown along to the points, where a collision occurred. Baptist Chapel blown down and the Wesleyan one much damaged.

Whittlesea.—Serious destruction, every third or fourth house damaged.

Wisbech.—Very great damage, scarcely a house escaped. There is supposed to have been no such gale since 1703; its intensity did not last half-an-hour, and was between 2.10 and 3 p.m.

ESSEX.

Coggeshall.—Cottage damaged by the fall of a large poplar across it.

SUFFOLK.

Lowestoft.—The windows of two shops were blown in, houses were unroofed and trees blown down. To enumerate all the damage would be to give a list of one-third of the houses in the town.

Bury St Edmunds.—Two chimneys blown over at the hospital, about 3 p.m., and several pinnacles off the church.

NORFOLK.*

Denver.—Church very seriously damaged, the spire having fallen through the roof.

Yarmouth.—Much damage to house property, several houses unroofed, and the tramroads so blocked by fallen trees that traffic was suspended. The Parish Church, Post Office and Customs House are all damaged. The scene in Middlegate Street was remarkable, there are about 200 houses, and scarcely one had escaped injury, and there was hardly a square foot in the street not covered by some kind of wreckage. At 3.40 p.m., a roll of lead was blown across S. Howard Street, at about 25 ft. above the ground, it struck and demolished an upper window, and then fell back on to the pavement below. At Messrs. Brown's Yards, slates from neighbouring houses were imbedded an inch deep in the doors.

Norwich.—Part of Norwich Workhouse, consisted of three stories: (1) a basement; (2) the dining hall; (3) the chapel. The master, during the gale, was watching the roof, and saw it lifted bodily about 4 ft. and then dropped, when it crashed through the chapel carrying the floor of it, and of the dining room, into the basement, thus wrecking the entire building. In *Mill Hill Road*, the roofs of two cottages with the rafters and tiles thereon were carried across the road (more than 30 ft.). In *College Road* there was a stack of timber in readiness for house building, nearly the whole stack (in 12 ft. and 16 ft. lengths) was swept up into the air and carried over the Unthinks Road allotments.

St. Faith's (Norwich).—Scarcely a house for miles round escaped damage, the trees were down in all directions, and nearly every rick was either stripped of its thatch or blown away entirely. It is estimated that the Abbey Farm lost 6,000 tiles.

Lakenham.—Roads strewn with tiles and broken trees, walls and gates blown down, and roofs stripped and broken.

Thorpe Hamlet.—Terrible havoc; one little street (Harbour Road) was so strewn with tiles that it looked as if paved with them.

North Heigham.—This district suffered terribly, the whole place looked as if it had been bombarded, tiles, slates and brick ends were lying about in cartloads, the gables of several houses fell out, and scores were unroofed.

Acle.—Many houses, and also the church, damaged, and ricks blown away.

Lower Hellesdon.—Just before afternoon service, a tree was blown across the road which barred access to the church; this was sawn up and service commenced, but in a few minutes there was so much noise from falling slates, gutters, coping stones and broken windows that all had to leave. The roof of Sir H. Bullard's malthouse was lifted bodily and dropped on the ground below.

* See *Met. Mag.*, April, 1895.

NORFOLK—(continued).

Swaffham.—Nearly every house suffered severely. The chimney shaft of the brewery fell across the premises, and destroyed about 2,000 gallons of beer.

Walsoken.—Hardly a house escaped, and many fruit trees were uprooted.

South Walsham.—Furious gale from W.S.W. 3 to 3.30 p.m.; although the trees were without leaves, very large numbers were overthrown, and many houses and ricks damaged.

Beeston.—Between here and *Sprowston* the road was strewn with hay, pedestrians reported it to be in places knee deep.

E. Dereham.—Great damage to roofs and chimneys about 3 p.m., one thatched roof entirely carried away.

Worstead.—A window of the church blown in during afternoon service.

North Walsham.—Hundreds of trees blown down, ricks and chimney stacks overturned, the church steeple damaged and lead ripped off the roof. The gas holder (capacity 35,000 cubic feet) at the Gas Works, which was about half full, was so blown to one side that the pillars were drawn nearly off their brick bases, and the whole apparatus will have to be taken down and re-erected.

Lynn.—The damage is estimated at several thousand pounds, nearly every building has suffered. Several factory chimneys are down, nearly all the roof has gone off the Corn Exchange. 3,000 trees reported to be down on the *Castle Rising Estate*.

Sandringham.—Nearly 2,000 trees blown down, also about 30 yards of the garden wall.

Wells.—Many trees down, and the streets strewn with tiles and chimney pots.

SOMERSET.

Bath.—St. Michael's and St. Bartholomew's Churches both damaged, soon after 1 p.m., as well as many private residences.

GLOUCESTER.

Bristol.—Trees blown down, attic windows blown in, tiles and chimney stacks blown into the streets, and two children killed. The police cautioned persons against attempting to cross Princes Street Bridge, a four-wheel cab attempted it, and was blown over. The wind actually lifted the heavy planks in the timber yards and whirled them in the air, carrying some of them a considerable distance. The storm was worst about 0.45 p.m.

Gloucester.—Trees uprooted, roofs blown off, a wall blown out at a chapel, and a tall chimney blown down at the marble works.

HEREFORD.

Whitbourne (near *Worcester*).—An iron mission room was so forced out of shape that it could not be used.

SHROPSHIRE.

Bridgnorth.—Many houses unroofed, and hundreds of trees uprooted.

Stirchley, Coalport.—Church seriously damaged.

Ironbridge.—Part of the roof of the Wesleyan Chapel was blown in, and fell upon the organ, two windows were blown out at the minister's house; many ordinary chimneys were blown down, and two tall ones at the brick works.

Newport.—Two large chimney stacks blown over, each fell through the roof into the rooms below.

STAFFORDSHIRE.

Handsworth.—Top of spire at the Baptist Church blown off.

STAFFORDSHIRE—(continued).

Bilston.—The Town Hall roof, and the G. W. R. station, considerably damaged, as was also much small property.

Wolverhampton.—St. Peter's Church lost three out of its four pinnacles, and many factory and private chimneys demolished. The total damage was put at £15,000.

Walsall.—Two stacks of chimneys upset at the hospital ; one fell across a ward and brought down the whole building, carrying the patients and nurses into the board room below. Very serious injury and suffering resulted.

Tamworth.—Great destruction of trees south of this town. Roads blocked.

Lichfield.—Part of the parapet of the Lady chapel was blown down, and the roof of the cathedral stripped of an unusual number of slates. Many houses suffered either by broken roofs or overturned chimneys.

WORCESTERSHIRE.

Spetchley Park, Worcester.—Nearly 50 large elms overturned, and the contents of several stackyards in the neighbourhood scattered.

Worcester.—The roof of a tannery was lifted bodily, a pinnacle was blown off the cathedral, and much damage done to private property.

Droitwich.—The mischief here was chiefly among the trees, hundreds of which have fallen. The borough surveyor, with men and horses, were occupied all the afternoon removing seven large trees which had fallen across roads in the borough. Some damage was done to the roof of St. Augustine's Church.

Headless Cross, Tardebigge.—Wesleyan Chapel completely wrecked.

Bromsgrove.—All Saints' Church lost a pinnacle, which damaged the roof ; several of the crest tiles were also carried away. The storm was worst about 1.15 p.m., and many chimney stacks fell and broke through the roofs into the upper rooms. A hayrick has disappeared, it is supposed to have gone into an adjacent pool. Every road was blocked by fallen trees, but by Monday the main roads were cleared.

WARWICKSHIRE.

Sutton Coldfield.—The Parish Church, Congregational Church and Wesleyan Chapel were all damaged ; many trees were down, and two roofs damaged by the fall of chimney stacks.

Stratford-on-Avon.—Nearly all the roads blocked by prostrate trees, and roofs damaged in all parts of the town. Roof of goods shed at railway station lifted off.

Henley-in-Arden.—Dozens of trees uprooted, and several roofs damaged by falling chimney stacks.

Warwick.—The Gateway Chapel was much injured, also two houses in Market Square, and several in *Coten End* and *Emscote*.

Leamington.—Chimney stack overturned and broke through two floors to the dining room, where it injured three ladies ; they were taken to the hospital, where a similar but less serious accident had occurred.

Kenilworth.—Hundreds of trees uprooted, the bell turret at the National Schools, and a wall at the Abbey Hotel upset.

Rugby.—Hundreds of trees down, including 17 in the School Close.

Coventry.—Many trees uprooted, and the advertisement hoardings carried away.

Bedworth.—Innumerable trees uprooted, a wooden shed about 180 feet by

WARWICKSHIRE—(continued).

20 feet was blown over, and a house in King Street destroyed ; a window was blown in in High Street, and several walls and stacks were overthrown.

Birmingham.—The worst of the storm was between 1.30 and 1.45 p.m., and the number of houses of which the upper rooms were wrecked by falling chimneys is past all counting ; every 100 yards in any street will prove it, and it will be weeks before all can be repaired. Happily very few persons were in the streets, and most were at dinner downstairs, hence only three deaths have to be recorded, but there were a great many serious wounds. St. Lawrence's Church much damaged.

LEICESTERSHIRE.

Market Harborough.—Much damage in this neighbourhood. The worst case was the residence of Mr. Kennard, on high ground, at *Clack Hill*. The family was at luncheon when the window and surrounding framework was blown in, and they were battling with it, when a great crash told that a double Elizabethan chimney had broken through the roof and wrecked two bedrooms.

Leire.—Many trees down and three cows killed beneath them, several houses unroofed.

Frolesworth.—Farm buildings demolished, and many trees down.

Dunton Bassett, Lutterworth.—Much damage to trees, and at the new vicarage, of which the chimneys had been made the decorative feature, every one was blown over, and broke through the roof.

Broughton Astley.—A perfect tornado from 1.30 to 2 p.m. Trees torn up in great numbers, and many buildings seriously damaged ; a newly-built shed, 120 feet long and roofed with slate, was lifted bodily and carried some feet.

Hinckley.—Isolation hospital blown down, patients had to be wrapped in blankets and laid under hedges for protection.

Stoney Stanton.—Several gable ends demolished and some windows blown in, many chimneys broken, and ridge tiles blown away.

Kibworth.—Much damage both to trees and houses.

Wigston.—Terrific storm from 1 to 3 p.m., many brick walls blown over and houses unroofed.

Enderby.—Great damage, rows of chimney pots were swept away like skittles, roofs were broken through, and the roads blocked with fallen trees.

Oadby, Leicester.—Great destruction of trees.

Aylestone, Leicester.—Two men killed by a falling tree, and a girl by a falling wall. Wrecked roofs are too numerous to be counted, and many gable ends have gone.

Old Knighton.—Church so damaged that service could not be held.

Tugby.—Great damage to roofs, chimneys, and sheds.

Skeffington.—Much damage, several roofs lifted off bodily.

Billesdon.—Many trees uprooted, but not so much damage to houses as in adjoining parishes.

Braunstone.—Many trees down, but not much injury to houses.

Leicester.—Chimney stack fell through roof of workhouse, gable end of Clipstone Street Chapel blown in, two factory chimneys fell, and dozens of chimneys and walls damaged and blown down.

Tilton.—The church damaged, and the vicarage lost all its chimneys.

Bagworth.—Several stacks and trees blown over, and much damage done to houses in *Ellistown*.

LEICESTERSHIRE—(continued).

Birstall, Leicester.—Many trees and walls down and the roads blocked, house windows blown in, and roofs damaged.

Somerby.—Many trees down, and extensive damage to roofs and chimneys; the roofs of some outbuildings lifted off.

Syston.—Factory chimney, 75 feet high, fell through roof of engine house.

Sileby, Syston.—Many walls and chimney stacks overthrown.

(To be continued.)

ROYAL METEOROLOGICAL SOCIETY.

THE monthly meeting of this Society was held on Wednesday evening, April 15th, at the Institution of Civil Engineers, Westminster, Mr. E. Mawley, President, in the chair.

Mr. W. Ellis, F.R.S., read a paper on the "Mean amount of cloud on each day of the year at the Royal Observatory, Greenwich, on the average of the fifty years, 1841–90," in which he showed that a principal maximum occurs in winter and a principal minimum in autumn, with a secondary, much less pronounced, maximum in summer and a secondary minimum in spring. There is, however, considerable irregularity in the succession of daily values, the differences between which on consecutive days are in numerous cases relatively large. The means for the different months are:—

January	7.41	July	6.68
February	7.41	August	6.49
March	6.95	September ..	6.25
April	6.57	October ..	6.83
May	6.50	November	7.05
June	6.59	December	7.43

Mean of the twelve monthly values 6.85

Grouping the observations into five-day means, the principal maximum occurs January 16th–20th = 7.88: the principal minimum is double, August 29th–September 2nd, and September 18th–22nd, both = 6.06: the secondary maximum occurs June 5th–9th = 7.06, and the secondary minimum May 1st–5th = 6.14.

An examination was made into the distribution of days in different months as regards degrees of amount of cloud. Thus days having an amount of cloud between 0.1 and 3.0 were considered as days of little cloud, days with between 3.1 and 8.9 as days of medium cloud, and days with between 9.0 and 9.9 as days of much cloud.

The cloudless days are most numerous in spring and autumn, and least so in winter and summer, though the variation in this respect through the year seems scarcely so great as might have been expected. The days of little cloud are somewhat less numerous in winter as compared with other parts of the year, in which there is little variation, whilst the days of medium cloud are much more numerous in summer than in winter. The days of much cloud are

nearly equal in amount in all parts of the year. The overcast days are much more numerous and nearly equal in amount in the first and fourth quarters of the year, much less numerous in the second quarter, and again less numerous in the third quarter. The distribution of days of different degrees of cloud is altogether very similar in the months of December, January, and February, but in March and October differs very little from the distribution for the year as a whole. Decrease in the number of overcast days as summer is approached is accompanied by a nearly equal increase in the number of days of medium cloud, and by scarcely any change in the number of days of much cloud. That is to say the lesser number of overcast days of summer is supplemented, not by an increase in the number of days of much cloud (rather indeed by a slight decrease), but by increase in the number of days of medium cloud, and some increase in those of little cloud.

The paper concluded with a discussion of the relation between the mean amount of cloud and the duration of bright sunshine.

Mr. E. D. Fridlander, B.Sc., gave an account of observations of the amount of dust in the atmosphere at various places during a voyage round the world in 1894-5. The experiments, which were made with a form of Aitken's pocket Dust Counter, showed that there are often considerable variations in the number of dust particles in a very short space of time. Not only did dust occur in the air of inhabited countries, over the water surfaces immediately adjoining them, and up to an altitude of 6,000 or 7,000 feet amongst the Alps, but it was also found in the open ocean, and that so far away from any land as to preclude the possibility of artificial pollution, and its existence has been directly demonstrated at a height of more than 13,000 feet.

Major H. E. Rawson, F.R.Met.Soc., gave an analysis of the Greenwich rainfall records from 1879 to 1890, with special reference to the declination of the sun and moon.

FOG, MIST, HAZE.

To the Editor of the Meteorological Magazine.

SIR,—At meetings of the Royal Meteorological Society, when reference has been made to fog, &c., there has appeared to be an absence of unanimity as to the meaning attaching to the different words in general use, and it occurs to me that discussion of the subject in the *Met. Mag.* might be useful, even if it led to no final result.

In the hope of starting such a discussion, I have set down my ideas as clearly and simply as I am able, and offer suggested definitions.

When, by fall of temperature or other change, a mass of air becomes incapable of holding in invisible suspension the aqueous

vapour which it contains, a portion condenses into visible particles of water, and forms, in the higher regions of the atmosphere, clouds, and at or near the earth's surface fog or mist.

If the fall of temperature be gradual, the individual particles of water will at first be extremely minute, but by further condensation upon them, or by coalescence, they will increase in size till they become visible individually, and may be seen to fall by gravitation.

In the lower atmosphere the particles fall to the ground before they have time to attain such a size as would justify the name of rain-drops, but in the upper air they fall much greater distances, and have time to grow into rain-drops of all sizes.

This condensation from the air is, I take it, the only fog or mist provided by nature. Man at times adds to it the smoke of large towns, which may modify its effect on instruments and prevent its ready return to the invisible form.

The phenomena so far referred to are all the result of a humid, but perhaps not always a supersaturated, atmosphere.

Over and around towns, during anti-cyclonic conditions, with calm air, the smoke accumulates and causes obscuration; to this condition also the name of fog is popularly applied, though the phenomenon is a purely artificial one, and the water particles of Nature's fog are absent.

FOR DEFINITIONS I would suggest:—

Fog.—An obscuration due to the condensation of aqueous vapour in the atmosphere when the individual particles are too small to be seen with the naked eye.

Mist.—An obscuration due to the condensation of aqueous vapour in the atmosphere when the individual particles are large enough to be seen with the naked eye.

Note.—The addition of town smoke (including smoke from forest or prairie fires, &c.) to either of the above to be ignored.

Smoke-fog.—Town smoke without water particles, either *in situ* or drifting over the country.

Haze.—An obscuration of distant objects, so slight that the cause is not visible to the Observer in the air immediately surrounding him.

These definitions would, I think, interfere as little as possible with ordinary nomenclature, and are in fair agreement with recent dictionaries. They would leave the word fog for the majority of country town and sea fogs, mist for what is now frequently called Scotch-mist, and haze as I believe it is usually understood.

The work of Aitken does not, I think, enter into the question, as it is exceptional for the air near the earth's surface to be so free of dust, or other suitable particles, that aqueous vapour has any difficulty in finding nuclei upon which to condense.

Yours obediently,

F.R.MET.SOC.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, NOVEMBER, 1895.

STATIONS. (Those in italics are South of the Equator.)	Absolute.				Average.				Absolute.		Total Rain.	Aver.	
	Maximum.		Minimum.		Max.	Min.	Dew Point.	Humidity.	Max. in Sun.	Min. on Grass.	Depth.	Days.	Cloud.
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		
England, London	46·1	16	32·0	18	52·4	41·5	43·5	88	87·4	25·1	3·17	19	7·2
Malta.....	78·1	11	55·5	21	73·3	61·4	58·7	82	130·1	51·1	1·79	11	6·6
Mauritius.....	84·6	28	64·4	5	81·2	69·9	66·1	75	134·7	57·5	2·58	15	5·3
Calcutta.....	86·6	11a	58·4	23	83·5	66·0	64·4	70	147·2	50·0	·00	0	2·0
Bombay.....	91·2	19	72·3	29	88·3	75·2	70·4	70	142·5	61·6	0·6	2	1·3
Ceylon, Colombo ...	90·7	27	72·8	30	87·8	74·3	71·3	77	152·0	64·0	5·83	15	4·9
Melbourne.....	98·7	25	39·0	12	71·6	50·4	47·8	61	147·2	27·8	·25	5	4·8
Adelaide	103·7	24	43·8	8	79·2	54·6	46·4	48	157·0	34·8	·95	3	3·2
Sydney	89·7	7	53·8	5	73·0	60·0	55·0	70	151·6	44·6	2·62	12	5·8
Wellington	73·8	1	42·2	7	62·2	50·0	47·0	71	136·0	32·0	6·00	18	4·9
Auckland	68·0	21	46·0	27	63·7	51·5	48·8	72	134·0	42·0	5·54	22	5·4
Jamaica, Kingston.....	89·4	2	68·7	25	87·3	70·9	68·8	80	...	...	1·17	11	4·7
Trinidad .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Grenada.....	85·8	2	70·2	29	82·6	74·0	70·7	79	156·6	...	14·61	20	6·4
Toronto.....	59·2	7	13·3	21	43·2	30·6	32·6	83	76·3	8·0	4·27	12	7·4
New Brunswick, Fredericton }	63·7	7	6·6	30	46·1	25·5	31·1	76	...	...	9·96	10	6·3
Manitoba, Winnipeg }	42·9	17	-21·7	26	26·3	9·4	...	...	...	...	·95	11	6·8
British Columbia, Esquimalt }	58·1	15	20·1	5	48·3	38·7	41·8	94	...	...	3·44	19	7·4

a—and 14.

REMARKS.

MALTA.—Adopted mean temp. $65^{\circ}8$, $4^{\circ}0$ above the average. Mean hourly velocity of wind 7·8 miles. Average temp. of sea $70^{\circ}4$. Thunderstorms on 12th 14th and 19th, and Lightning on 8 other days. The mean temp. of the month is the highest on record in 12 years. Rainfall remarkably below the average.

J. F. DOBSON.

Mauritius.—Mean temp. of air $0^{\circ}5$ above, of dew point $1^{\circ}9$ above, and rainfall '64 in. above, their respective averages. Mean hourly velocity of wind 10·1 miles, or 0·8 mile below the average; extremes, 28·1 on 17th, and 0·0 on 11th and 14th; prevailing direction, E.S.E. to E.N.E. T and L on 16th.

C. MELDRUM, F.R.S.

CEYLON, COLOMBO.—Thunderstorms occurred on 10 days.

D. G. MANTELL.

Adelaide.—Mean temperature same as average of 38 years, rainfall '05 in. below the average.

C. TODD, F.R.S.

Sydney.—Mean temperature $0^{\circ}1$ below, humidity 0·7 above, and rainfall '56 in. below, their respective averages.

H. C. RUSSELL, F.R.S.

Wellington.—On the whole showery during the month, but a few fine days in the middle and at the end. Prevailing wind N.W.; strong on 9th, 10th and 11th, otherwise moderate. Snow on hills on 28th, and sleet on 26th. Mean temp. $0^{\circ}4$ below, and rainfall 1·83 in. above, the average.

R. B. GORE.

Auckland.—An unusually cold and wet November; the mean temp. being 3° below, and the rainfall more than 2·00 in. above, the average.

T. F. CHEESEMAN.

JAMAICA, KINGSTON.—Mean hourly velocity of wind 2·9 miles. Kingston rainfall one-half the average only; but the Island rainfall was one-third above the average, this result being about the same in each division.

R. JOHNSTONE.

SUPPLEMENTARY TABLE OF RAINFALL, APRIL, 1896.

[For the Counties, Latitudes, and Longitudes of most of these Stations,
see *Met. Mag.*, Vol. XIV., pp. 10 & 11.]

Div.	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
II.	Dorking, Abinger Hall .	·75	XI.	Lake Vyrnwy	2·03
	Birchington, Thor	·75		Corwen, Rhug	1·46
	Hailsham	·77		Carnarvon, Cocksidia ...	...
	Ryde, Thornbrough .....	..		I. of Man, Douglas	1·45
	Emsworth, Redlands ...	·49	XII.	Stoneykirk, Ardwell Ho.	1·41
	Alton, Ashdell	·38		New Galloway, Glenlee	2·48
III.	Oxford, Magdalen Col..	·56		Lilliesleaf, Riddell	·82
	Banbury, Bloxham	·66	XIII.	N. Esk Res. [Penicuik]	1·85
	Northampton, Sedgebrook	1·06		Edinburgh, Blacket Pl..	·96
	Alconbury	·51	XIV.	Glasgow, Queen's Park..	1·83
	Wisbech, Bank House...	·68	XV.	Inverary, Newtown	4·57
IV.	Southend	·61		Oban, The Corran	3·02
	Harlow, Sheering.....	·80		Islay, Gruinart Schools..	2·66
	Colchester, Lexden	1·02	XVI.	Dollar	2·35
	Rendlesham Hall	1·08		Balquhider, Stronvar...	3·59
	Diss .....	..		Ballinluig	1·15
	Swaffham	·76		Dalnaspidal H.R.S.	3·56
V.	Salisbury, Alderbury ...	·79	XVII.	Keith H.R.S.	2·05
	Bishop's Cannings	1·17		Forres H.R.S. ....	...
	Blandford, Whatcombe .	·54	XVIII.	Fearn, Lower Pitkerrie..	1·54
	Ashburton, Holne Vic...	·51		N. Uist, Loch Maddy ...	3·71
	Okehampton, Oaklands..	·82		Invergarry	4·13
	Hartland Abbey	1·06		Aviemore H.R.S.	1·96
	Lynmouth, Glenthorne..	1·04		Loch Ness, Drumnadrochit	2·27
	Probus, Lamellyn	·97	XIX.	Invershin	2·71
	Wellington, The Avenue	·49		Scourie	3·68
	Wincanton, Stowell Rec.	·79		Watten H.R.S.	1·42
VI.	Clifton, Pembroke Road	·78	XX.	Dunmanway, Coolkelure	·88
	Ross, The Graig	·81		Cork, Wellesley Terrace	·47
	Wem, Clive Vicarage ...	1·41		Killarney, Woodlawn ...	1·59
	Cheadle, The Heath Ho.	1·35		Caher, Duneske	·41
	Worcester, Diglis Lock	·74		Ballingarry, Hazelfort...	1·05
	Coventry, Coundon	1·03		Limerick, Kilcornan ...	1·06
VII.	Ketton Hall [Stamford]	·67		Ennis .....	...
	Grantham, Stainby	·85		Miltown Malbay	1·58
	Horncastle, Bucknall ...	·72	XXI.	Gorey, Courtown House	·41
	Worsop, Hodsck Priory	·94		Athlone, Twyford	·92
VIII.	Neston, Hinderton	1·19		Mullingar, Belvedere ...	1·19
	Southport, Hesketh Park	1·07		Longford, Currygrane...	1·41
	Broughton-in-Furness ...	2·55	XXII.	Woodlawn	1·40
	Ripon, Mickley	·82		Crossmolina, Enniscoe ..	2·08
IX.	Melmerby, Baldersby ...	·61		Collooney, Markree Obs.	2·31
	Scarborough, Obs.	·68		Ballinamore, Lawderdale	...
	Middleton, Mickleton ...	1·65	XXIII.	Lough Sheelin, Arley...	1·58
X.	Haltwhistle, Unthank...	1·93		Warrenpoint	1·28
	Bamburgh	·57		Seaforde	1·29
	Keswick, The Bank	2·97		Belfast, Springfield	1·97
XI.	Llanfrechfa Grange	·89		Bushmills, Dundarave..	2·07
	Llandovery	1·15		Stewartstown	1·44
	Castle Malgwyn	1·12		Killybegs	4·34
	Builth, Abergwesyn Vic.	1·86		Lough Swilly, Carrablagh	2·87
	Rhayader, Nantgwillt...	1·28			

APRIL, 1896.

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 1880-9.	Greatest Fall in 24 hours		Max.		Min.					
				Dpth	Date				Deg.	Date	Deg.	Date	
													inches.
I.	London (Camden Square) ...	.55	— 1.19	.08	4	11	68.4	26	32.8	24	0	11
II.	Maidstone (Hunton Court)...	...	...	...	...	...	...	...	...	...	...	...
III.	Strathfieldsaye .....	.87	...	.15	12	14	...	...	...	...	...	...
III.	Hitchin .....	.75	— 1.04	.14	12	13	65.0	22g	30.0	23	5	...
IV.	Winslow (Addington) .....	.83	— 1.09	.17	15	12	66.0	22	29.0	2	5	10
IV.	Bury St. Edmunds (Westley) ..	.85	— .81	.20	4	12	65.0	27	32.0	2	1	...	
V.	Norwich (Brundall)	1.43	...	.40	12	16	68.4	27	31.0	3	2	16
V.	Weymouth (Langton Herring) ..	.67	— 1.21	.44	13	9	64.0	26	35.0	2	0	...	
"	Torquay (Cary Greeu) ...	.10	...	.03	13a	5	61.9	26	37.6	22	0	0
VI.	Polapit Tamar [Launceston]..	.83	— 1.39	.21	13	14	62.4	22a	30.5	22	1	3	
VI.	Stroud (Upfield)	1.11	— 1.04	.28	13	14	65.0	27	34.0	1	0	...	
"	Churchstretton (Woolstaston)	1.28	— 1.06	.20	14	16	66.0	24	31.5	13	1	4	
"	Tenbury (Orleton)	1.13	— .95	.14	10b	15	68.8	22	30.1	2	1	8	
VII.	Leicester (Barkby) .....	.88	— 1.22	.13	15	15	...	...	23.0	1	10	20
"	Boston .....	.75	— .96	.22	4	11	68.0	20	30.0	3k	3	...
"	Hesley Hall [Tickhill] .....	.70	— 1.01	.12	10c	12	64.0	22h	29.0	2	3	...
VIII.	Manchester (Plymouth Grove)	1.69	— .02	.32	16	15	65.0	24i	33.0	12	0	2	
IX.	Wetherby (Ribston Hall) .....	.69	— 1.16	.26	11	7	...	...	...	...	...	...
"	Skipton (Arncliffe)	3.37	— .06	.44	10g	19	...	...	...	...	...	...
"	Hull (Pearson Park) .....	.87	— 1.05	.21	12	12	65.0	8, 25	30.0	3	5	9
X.	Newcastle (Town Moor) .....	.76	— 1.07	.12	7	14	...	...	...	...	...	...
X.	Borrowdale (Seathwaite)	5.67	— 1.47	1.03	26	16	...	...	...	...	...	...
XI.	Cardiff (Ely)	1.01	— 1.40	.18	30	14	...	...	...	...	...	...
"	Haverfordwest	1.16	— 1.47	.49	13	13	64.0	20	33.9	22	0	5	
"	Aberystwith (Gogerddan)	1.41	— 1.15	.40	13	13	63.0	21	...	...	...	...
XII.	Llandudno	1.35	— .46	.28	16	14	63.5	24	38.5	13	0	...	
XII.	Cargen [Dumfries]	1.98	— .25	.28	10d	14	62.0	24	32.4	2	0	...	
XIV.	Jedburgh (Sunnyside) .....	.74	— .96	.20	10	11	65.0	24i	27.0	16	3	...
XIV.	Colmonell	2.09	...	.57	10	12	69.0	20a	29.0	1, 30	4	...
XV.	Lochgilphead (Kilmory)	4.31	+ 1.50	.77	10	21	...	...	29.0	30	5	...
XV.	Mull (Quinish)	2.93	— .05	.65	15	22	...	...	...	...	...	...
XVI.	Loch Leven Sluices	1.30	— .92	.40	11e	6	...	...	...	...	...	...
XVI.	Dundee (Eastern Necropolis)	.85	— 1.20	.25	16	14	65.9	21	33.0	18	0	0	
XVII.	Braemar	1.05	— 1.37	.23	29	15	63.0	24	26.8	15	4	16	
XVII.	Aberdeen (Cranford)	1.48	...	.25	28	16	65.0	8	...	...	...	...
XVIII.	Strathconan [Beaully]	5.33	+ 2.52	1.16	28	13	...	...	...	...	...	...
"	Glencarron Lodge	8.84	...	1.25	7	25	59.7	25	27.8	15	4	...	
"	Cawdor	1.57	+ .05	.41	10	16	...	...	...	...	...	...
XIX.	Dunrobin	2.00	+ .27	.65	11	15	58.5	9, 21	31.5	14	1	...	
XIX.	S. Ronaldsay (Roeberry)	1.68	+ .07	.31	29	22	58.0	9	33.0	12	0	...	
XX.	Darrynane Abbey	1.41	...	.27	11	18	...	...	...	...	...	...
"	Waterford (Brook Lodge) ...	.46	— 2.01	.12	13	9	66.0	23	33.0	2	0	...
XXI.	O'Briensbridge (Ross)	1.41	...	.32	10	15	...	...	...	...	...	...
XXI.	Carlow (Browne's Hill) .....	.58	— 1.70	.11	13	11	...	...	...	...	...	...
XXII.	Dublin (Fitz William Square)	.88	— 1.24	.33	13	16	64.5	24	36.1	2	0	0	
XXII.	Ballinasloe	1.02	— 1.32	.23	26	13	65.0	23	32.0	30	1	...	
XXII.	Clifden (Kylemore)	2.76	...	.46	11	20	...	...	...	...	...	...
XXIII.	Waringstown	1.23	— 1.14	.21	15	14	70.0	19j	29.0	30	3	8	
"	Londonderry (Creggan Res.) ..	3.03	+ .79	.43	28	20	...	...	...	...	...	...
"	Omagh (Edenfel)	2.52	+ .29	.30	10f	18	64.0	21	33.0	10	0	4	

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

a—and 24. b—and 28. c—and 14. d—and 16, 28. e—and 17. f—and 13, 15, 28. g—and 27.
h—and 24, 25. i—and 25. j—and 20. k—4, 23.

METEOROLOGICAL NOTES ON APRIL, 1896.

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.

ADDINGTON.—A rather cold month, with a small rainfall. At no time was the frost severe enough to harm any vegetables. Stormy on the morning of the 11th. Sleet and S on the 12th. Foggy mornings on 21st and 23rd.

BURY ST. EDMUNDS, WESTLEY.—A dry month; R in small quantities on 12 days. Migratory birds several days later than usual; first swallow on 17th, cuckoo on 19th, nightingale on 22nd, sand marten on 27th, and turtle dove on 29th. H on 10th, distant T on 11th, and T on 12th.

NORWICH, BRUNDALL.—R 24 in. deficient, and for the first four months of the year 1·14 in. deficient. Mean temp. 47°·3. Vegetation rather early; earlier than in 1895, but later than in 1893 and 1894. H on 1st, 2nd, 29th, and 30th; T on 17th, at 4 p.m.; T and L on 29th; Solar halo on 21st, at 5 p.m.

WEYMOUTH, LANGTON HERRING.—With the exception of April, 1893, the driest April since 1875. The average 9 a.m. temp., 51°·1, is 3°·7 above the average of 24 years, and with the exception of 1893 and 1894, the highest in that period. Distant T and L on the 23rd. Fog on 27th. Hawthorn in blossom on the 27th. The rainfall of the first four months of the year (4·85 in.) is the smallest for 22 years, and only 56 per cent. of the average.

TORQUAY, CARY GREEN.—Rainfall 2·36 in. below the average; mean temp. 50°·5, or 2°·4 above average. Duration of sunshine 136 hours 40 minutes, being 53 hours 50 minutes below average; one sunless day.

POLAPIT TAMAR [LAUNCESTON].—Very dry, the rainfall being only two-fifths of the average; unusually free from storms or strong winds. Bar. throughout very high. Fog early on the 8th.

WOOLSTASTON.—A beautiful spring month; all vegetation in a very forward state. Mean temp. 48°·6. Gale, with S and H on the 12th, and a meteor of remarkable brilliance passed from N.W. to S.E. about 8·5 p.m. on the same day; the light was most intense and of a pale blue colour.

TENBURY, ORLETON.—A warm, dry month, the mean temp. being nearly 3°·5 above the average. No extremes of heat or cold. Cherries, damsons, and plums in full blossom at the beginning of the month; pears about the 16th, and apples at the end of the month. Cuckoo heard on 14th.

LEICESTER, BARKBY.—A fine but chilly month. Scarcity of water already felt. Abundant bush and tree bloom. First swallow seen on 2nd; first cuckoo on 21st. Mean temp. 48°·0. Only 4·52 in. of R in the first four months of the year!

MANCHESTER, PLYMOUTH GROVE.—Thick fog on 14th and 20th; dense fog in early morning of 22nd. T and L on 28th. Mean temp. 48°.

WALES.

HAVERFORDWEST.—The month was fine, bright, and sunny; although R fell on 14 days, the quantities were small, and the general character of the weather was mild and dry. Vegetation very forward, and fruit trees in full blossom. The oak in sheltered places was in leaf on the 22nd; lilacs, chestnuts, laburnums, and rhododendrons in full bloom. High bar. pressure characterised the whole month. R anxiously looked for at the close.

ABERYSTWITH, GOGERDDAN.—The weather was very good throughout the month; winds N. and N.W.

SCOTLAND.

CARGEN [DUMFRIES].—The meteorological conditions of the month were very favourable. Barometric pressure was higher and temp. considerably warmer than the average of 37 years; there was also less R and more sunshine; while easterly winds, usually prevalent during April, were practically absent. The min. temp. did not fall to freezing point, an experience only once previously (in 1867) recorded. Rains were always light, but 1·30 in. fell in the seven days 10th to 16th, immediately followed by a marked rise of temp., the effect on vegetation of all kinds being very beneficial. Many trees were in full leaf at the close, and lilac, laburnum, and horse chestnut just bursting into flower. Farm work very forward. Sleet on 10th; H on 28th.

JEDBURGH, SUNNYSIDE.—The weather was cold and ungenial, with much E. and N.E. wind and a low night temp., but a good deal of sunshine. The land being dry, seed sowing is far advanced. Swallows seen on 22nd.

COLMONELL.—Rainfall 24 in. below the average of 19 years. Mean temp. 48°·4, or 3°·7 above the average. H on 10th and 11th.

MULL, QUINISH.—Vegetation quite two weeks earlier than usual. Horse chestnuts and planes in full leaf by 15th. Cuckoo seen on 26th.

BRAEMAR.—A most favourable month for seed sowing. Duration of sunshine, 152 hours 10 minutes.

ABERDEEN, CRANFORD.—The month was very dull and cloudy.

S. RONALDSAY, ROEBERRY.—A cold month. Mean temp. 45°·2.

IRELAND.

DARRYNANE ABBEY.—A dry, fine month.

WATERFORD, BROOK LODGE.—Thick fog on mornings of 20th, 21st, and 22nd. H showers on 28th and 30th. Heavy T on 29th.

O'BRIENSBIDGE, ROSS.—The best month of April for many years; cloudless sunshine for many days, and scarcely a touch of frost. Vegetation good and very forward.

DUBLIN.—A very favourable fine and spring-like month. The steadiness of the bar. was a feature of the first ten days of the month. A relapse into winter took place on the 27th, from which day the weather remained cold to the end. Very little easterly wind. Mean temp. 50°·9, or 3°·2 above the average. Slight fogs on the 20th and 21st. High winds on 8 days, reaching the force of a gale on the 10th and 12th. H fell on the 10th, 11th, 12th, 28th, 29th, and 30th. T was heard on the afternoon of the 29th.

EDENFEL, OMAGH.—On the whole a seasonable April, with occasional raw cold spells, but nothing to check vegetation, which is full and forward for the season.

THUNDERSTORM OF MARCH 24TH, 1896.

TEAN VIC., STAFFORD.—A grand TS here on 24th, between 7.50 and 9.20 p.m. Storm came up—as usual with storms here—from S., hovered for some time between S. and S.E. at a distance of from 4 to 5 miles, then advanced to a point nearly overhead—time interval for some minutes = 3 to 4 seconds. Then it moved slowly to E. L very vivid, and T almost continuous till 9 p.m. T last heard at 9.15 p.m., L last seen at 9.30 p.m. G. T. RYVES.

SALT VIC., STAFFORD.—A severe TS occurred here on March 24th. It commenced at 6.15 p.m. in S.W., and worked away towards N.W. It then backed to S.W., and worked through S. to S.E., and then another storm approached nearer from S.W. and worked through S. to E., accompanied by vivid forked lightning and heavy rain; 25 in. fell in ten minutes. Lightning was seen in E. and N.E. until 10.30 p.m., and thunder was heard twice on the following day.

24th..... Max. 60° Min. 28° Rain 27 in.

25th..... „ 58 „ 39 „ 10 „

S. W. JONES.

SITES OF STRUCTURAL DAMAGE BY THE CALE OF MARCH 24TH 1895.

