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THE VIENNA METEOROLOGICAL CONGRESS.

Our readers are aware that at the Leipzig meeting it was resolved that an official congress should be held this year in Vienna. We are glad to announce that the congress is now sitting, and embraces at least one representative of every European state, except France and Greece (whence M. Schmidt is daily expected), while Austria and Germany have five and six delegates respectively. Great Britain (for reasons which may some day be published) has but two, Belgium has two, while all others have but one each. This inequality in the nationality of the delegates is to a certain extent counteracted by a rule apportioning weights to the votes of the delegates, according to the population of the states which they represent. It is fortunate, perhaps, that there is a fixed maximum for populations of 30 millions and upwards, or the gentleman whom we are glad to see representing China, would surely have had it entirely his own way.

We must, *en passant*, welcome the representative of the Celestial Empire at an international meeting of meteorologists.

The following is a complete list of those present during the first week of the congress, which opened on September 1st and was to sit until the 15th :—

Name.	Delegate for	Name.	Delegate for
A. Aguilar	Spain	J. Lorenz	Austria
H. Buys-Ballot	Netherlands	H. Mohn	Norway
C. Bruhns	Germany	R. Müller	Austro-Hungary
A. Buchan	Great Britain	G. Neumayer	Germany
J. D. Campbell	China	E. Plantamour	Switzerland
G. Cantoni	Italy	E. Quetelet	Belgium
A. Coumbary	Turkey	R. Rubenson	Sweden
V. Czelechowsky	Austria	G. Schenzl	Hungary
F. Doergens	Germany	H. Schoder	Germany
E. Ebermayer	Bavaria	R. H. Scott	Great Britain
F. da Silveira	Portugal	C. Sohneke	Germany
M. Gloesener	Belgium	H. Wild	Russia
J. Hann	Austria	F. Winnecke	Germany
Capt. Hoffmeyer	Denmark	A. Zamara	Austria.
C. Jelinek	Austria		

We congratulate the Committee on the very able delegates who have assembled in response to the invitation of the Austrian Government, and hope that their proceedings will be reported at least as fully

as those of the preceding congress ; if more fully so much the better.

The programme of proceedings is more systematically arranged than that prepared for Leipzig, but its subjects are mostly identical. The mode of procedure is to refer each question to a committee, and then to discuss their report in a full meeting of all the delegates.

What has been said and done will be more appropriately told in a future article.

THE HEAT AND THUNDERSTORMS OF JULY 22ND.

(Continued from page 104.)

IN our previous article we gave details of the temperature on the above date. We now proceed to supply an epitome of the effects of the thunderstorms which raged over a large part of the British Isles during the 18 or 20 subsequent hours.

To avoid useless repetition a few initials and rules have been adopted in drawing up the following report; the initials are as follows: **T**, thunder; **L**, lightning; **T S**, thunderstorm; **T S S**, thunderstorms; **R**, rain. The rules are (1) that all entries are sorted into counties, and then grouped in the order in which they follow in *British Rainfall*; (2), that no dates are given; all those entries which are p.m. being on July 22nd, and all those which are a.m. being on July 23rd.

We may first sum up the casualties. There is one feature in the following table whereby we are able to form an estimate of the small proportion of the total number of casualties which have been reported to us. It depends almost entirely on the severity and extent of a storm what class of accidents are reported. If there is a **T S** over a small area, and of moderate intensity, there will be perhaps one accident to human life, three to cattle, and five or six to trees. As the storm increases in severity and extent it is evidently probable that the numbers should each be similarly increased, but with say five times the number of fatal accidents to human life, we never get reports of other accidents multiplied to the same extent. The following table remarkably illustrates this rule, which is obviously due to the fact of the more important accidents being alone thought worthy of notice. In the present case, with 28 human beings struck, the number of trees reported to be struck is not 150, which is probably the truth, but seven.

Accidents by lightning between 7 p.m. July 22nd, and 10 a.m. July 23rd.

Men killed.....	13	Cattle killed.....	38
Women ,,	3	Sheep ,,	36
Men struck	12	Boats struck.....	2
Houses ,,	25	Haystacks fired ...	3
Horses killed.....	14	Trees struck.....	7 (?)
Miscellaneous objects struck—granary, abbey, barn, monument, mill, tannery.			

Evidently hardly any one has thought accidents to trees worth reporting, we know otherwise, but cannot convey to the minds of

others conviction of the fact, that for meteorological purposes it is desirable that the site of *every* downstroke should be reported and mapped. To do this is far beyond our power, but we are certain that it would repay any one with the leisure and the inclination to devote himself to it, and we on our part would render to such an one all the help in our power.

We must, however, pass on to the second part of the subject—the intensity of the storms and their geographical distribution, and here (as always will be the case until some one works up the phenomena of thunderstorms as Professor Herschel has those of luminous meteors, or Mr. Symons has those of rainfall) we are met with a difficulty which most persons who see the data on the following pages would not suspect. There is a deficiency of information. We are glad to have it in our power to explain the general features of the phenomena which occurred, but the minor details are sadly deficient.

In England and Wales there was no T S except in a tract of country approximately oval in shape, with its longer axis reaching from Plymouth to Northampton, and its shorter from Portland to Hereford. Within this area occurred the Bath storm, which seems to have come on the Dorsetshire coast from the S. about 9 p.m., and died away in the N.E., after traversing about 130 miles at some 15 miles per hour.

Another T S occurred in North Wales about 5 p.m., and seems to have passed on to Liverpool and thence northwards at least as far as Preston. Whether it was the same which was on the south-west coast of Scotland between 8 p.m., and midnight, there is no evidence to show. Another storm, of great intensity but short duration, burst forth in South Yorkshire about 6 a.m., and seems to have travelled with great rapidity north-westward over Leeds and Bradford, then N.N.E. to the Durham coast, and thence along that of Northumberland to Berwick.

With the exception of Argyleshire and the Hebrides, Scotland appears to have been visited with furious storms, lasting off and on from about 8 p.m. to 8 a.m. It does not seem possible with the present data to individualize them or describe their tracks, but they evidently began earliest in the S. or the centre of the country.

The storm experienced in Dublin about 2 a.m., and which “passed out to sea,” is probably that of the early morning hours at Llandudno, and *possibly* that which we have already mentioned as beginning in South Yorkshire.

ENGLAND.

MIDDLESEX.—No T S occurred in this county, but distant L was seen in W. and W.S.W. from *Camden Square* between 1 and 3 a.m., and at *Winchmore Hill* thunder clouds were observed passing to N. about 5 a.m.

KENT.—*Margate*. No T S here.

OXFORD.—*Banbury*. T S 3.40 to 4.10 a.m., and T at 6 a.m.

SUFFOLK.—*Bury St. Edmunds*. No T S.

WILTSHIRE.—*Trowbridge*. House struck.—*Lyneham*. Three sheep killed.—*Marlborough*. Violent T S with heavy R.

DORSET.—*Lyne Regis*. T S began about 0.30 and lasted till 2 a.m., it was of unusual violence, but only one house was struck in this neighbourhood.—*Beaminster*. Heavy T S about 1 a.m.—*Bridport*. A heavy T S began about 8 p.m., lasting to 2 a.m.; the L was bluish, and the flashes were more frequent than I have seen before, mostly sheet but some forked. Within six miles there was much damage done, and some gentlemen in a yacht, trying to make for Lyme Regis, were caught in the centre of the storm, wind blowing in gusts from N.W. to S.W., and so dark they could not see their hands when close to their faces; the L was fearful, and the rain so heavy that they were as wet in two minutes as if they had plunged into the water. The boatman said he had never seen anything to equal it.

DEVON.—*Tavistock*.—T S.

SOMERSET.—*Weston-super-Mare*. From 10 p.m. until towards midnight distant L in S.W. and W. rather frequent; about midnight distant L in S., continuing with great frequency and increasing brilliancy, T S came up about 3 a.m., but had become diminished in intensity. Several flashes within three or four miles. T moderately loud. Smart shower of R, with strong wind, S. or S.W. Storm appeared to move in a S. current. My view commanded the western half of horizon, and I suspect there were other centres of storm passing in the E., besides that which seemed to come up straight from the S. *G. F. Burder, M.D.*—*Bath*. About 9 p.m. on 22nd there were a few light clouds in W., but I did not apprehend any tempest at that hour. On going to bed about 11.40 I observed very faint L in S.S.E., but so distant that it might have been easily overlooked. At this time the temperature was 74°. Being unable to sleep from the oppressive heat, I got up at 1.15 a.m., and upon looking out of window found the L much brighter and very frequent flashes, every three or four seconds, sometimes oftener. There were heavy clouds in S.S.E. and S. round to S.W., from which the flashes proceeded. Wind very light or *nil*. Bar. 29.930 had been steadily falling from 30.136 on evening of 20th. The L became brighter, and about 1.35 I heard distant T, and feeling sure a storm was at hand, went down stairs and shut some windows left open for coolness. At 1.50 the storm was much nearer, the T loud, and the L of a blinding brightness. I noticed a few pale blue and violet flashes, but most of them were bright yellow. About 2.5 R commenced, and in a few minutes fell heavily. At 2.12 there was a very vivid flash accompanied by the most crashing peal of T I ever heard in England. I thought my house was struck, and after daylight found that a sycamore tree in the garden of my neighbour's house, and not 40 yards from my dining-room window, was struck and much injured. Between 2.12 and 2.16 there were three other very vivid flashes, accompanied by T, but scarcely so loud as that at 2.12. H and R now descended in torrents, and lasted till about 2.24. The storm was directly over the city, but soon passed away to the N.E.,

the L however continued with the same frequency, but the T gradually became less and less audible till 3 o'clock, when it ceased. The sun rose soon after 4 and the L had then disappeared. There was, however, about sunrise, another storm eight or ten miles away in N.W. direction, the T being audible here.—*C. S. Barter*. The accidents in this city were unimportant; in addition to the tree above mentioned, a house was struck in Bathwick Street, a small portion of the N.W. pinnacle of the Abbey was knocked off, two trees were barked, and 12 sheep killed at *Wellow*.—*Shepton Mallet*. Violent T S between .0 and 2 a.m., part of the town flooded.

GLOUCESTER.—*Stroud*. T S at its height here from 3 till 4 a.m., coming up from the S.S.W. and taking an easterly direction. The L was peculiar, like liquid streams pouring from the sky for *more than an instant* of time, besides most fantastic ribbon-shapes in the sky. There was no breeze or wind, and only a few drops of R. At 5 a.m. a sharp thunder shower occurred, with L. Rainfall only .11. The storms were very partial. *Rose E. Stanton*.

SHROPSHIRE.—*Shifnal*. Distant T in S. at 7 p.m. with slight R.

WORCESTER.—*Orleton*. After 3 p.m. great piles of thunder clouds passed over from S. to N., forming at 6.30 p.m. grand masses in the N., with several peals of distant T. On the morning of the 23rd distant T and L passed across to the E. between 3 and 4 a.m., with a very slight fall of R, followed by a bright day and brisk wind.

LEICESTER.—*Leicester*. Distant L in N.W. in evening; no T S here.

LINCOLN.—*Boston*. No T S.—*Grimby*. Distant T in S. at 10 a.m.

NOTTINGHAM.—*Mansfield*. No T S here though so prevalent elsewhere.

DERBYSHIRE.—*Buxton*. Heavy T S with R = 0.61 in.

LANCASHIRE.—*Liverpool*. Violent T S between 7 and 8 p.m. with heavy R.—*Heaton Chapel*. T from 8 p.m., and heavy T S from S., W. and N. with intervals till 5 a.m.—*Bolton*. T S began at 7.10 p.m., and almost by the first flash four boys in a field were struck, two were killed, their clothes being partially burned and their hair singed. Heavy R followed, and the river Croal rose 3 feet in half-an-hour.—*Dzubbill*. House struck.—*Willows Lane*. Chimney struck.—*Blackburn*. The most violent T S for 43 years. House struck, also a man.—*Preston*. The greatest T S for many years, lasting off and on from 7.30 p.m. to 9.30 a.m., and passing from S.W. to N.E.—*Hutton*. One man and two horses killed.—*Grimstargh*. Three men killed in a cart.—*Fulwood*. One man killed.

YORKSHIRE (W. Riding).—*Stanley Vicarage, Wakefield*. T S and 0.75 in. of R.—*Pontefract*. T S at 6 a.m., but only lasted half-an-hour.—*Leeds*. Heavy T S between 5 and 6 a.m.; several persons struck.—*Bramhope*. Man killed.—*Woodhouse*. Girl killed.—*Hunslet*. Chemical works struck.—*Bradford*. Violent T S 6 to 7 a.m.—*Fairweather Green*. Two cows killed.—*Pudsey*. House struck.—*Great Horton*. Chimney struck.—*Halifax*. T S and 0.58 in. of R. in less than half-an-hour.—*York*. No T S.—*Arnccliffe*. Violent T S at 8.30 a.m.

YORKSHIRE (E. Riding).—*Hull*. T S, but no damage reported.

YORKSHIRE (N. Riding).—*Leyburn*. Seven sheep killed.—*Spennithorne*. One beast killed.—*Jervaulx*. Two horses and two beasts killed.—*Ulshaw Bridge*. House struck.—*Raysgill*. Ten sheep killed.—*Northallerton*. T S 6.30 to 8 a.m.—*Brompton*. House struck and woman killed.—*Great Smeaton*. Two beasts killed.—*Pickhill*. Two beasts killed.—*Appleton Wiske*. Tree struck.—*Richmond*. T S 5 to 7 a.m., heavy R, paving stones all washed up, and the sand laid so thick that during the day men were engaged leading it for building purposes. House struck, man also struck at 7 a.m., and his watch smashed in his pocket, yet he was not killed.—*Aske*. Two lambs killed.

DURHAM.—*Seaham*. T S, haystack fired by L.

NORTHUMBERLAND.—*N. Shields*. T S. A fleet of herring boats 15 miles from land were visited by a very heavy storm, and one boat was struck, one man killed, and all the crew but one knocked down.—*Wallsend*. Tannery struck and boy killed.—*Newcastle*. T S at 8 a.m.

WESTMORELAND.—*Elterwater*. Heavy T S and 2.45 in. of R.

MONMOUTH AND WALES.

MONMOUTH.—*Llanfrechfa, Monmouth*. Sharp T S at 4 a.m.—*Llan-dudno, Carnarvon*. Very heavy T S 4 to 5.30 p.m., and another about 2 a.m.

SCOTLAND.

DUMFRIES.—*Dumfries*. Extraordinary T S in evening and early morning.

ROXBURGH.—*Hawick*. Terrific T S at night, nothing like it ever known here.—*Melrose*. Violent T S 6 p.m. to 6 a.m., L white, red, and violet.

PEEBLES.—*Peebles*. T S, one man killed and one stunned.

BERWICK.—*Coldstream*. Monument struck and the statue thrown from the top. Several houses and trees also struck.—*Berwick*. The most violent T S for many years, lasting from evening till 10 a.m.—*Old Moneylaws*. Woman killed.

LANARK.—*Glasgow*. The most violent T S for at least 50 years, 10 to 12 p.m. and 4 to 5 a.m. Mill and houses struck at *Glasgow, Blantyre, and Kirkintulloch*.—*Lenzie*. Five cows killed.

AYR.—*Kilmarnock*. Severe T S in S. at 10 p.m., and again at 4 a.m.

FIFE. *St. Andrew's*. Heavy T S, more L than for many years; max. about 11.30 p.m. Two cows killed.

PERTH.—*Logierait*. Severe T S commenced about 9 p.m. in S., towards midnight it travelled westward, and raged with great violence from 11.30 to 1 a.m., flashes very frequent, and at times the sky presented the appearance of a brilliant aurora; about 5 a.m. the storm began anew, and lasted for more than an hour and a half, at this time being much nearer; heavy R from 6 to 7 a.m.

FORFAR.—*Dundee*. The most fearful T S which has occurred here

for many years between 9 p.m. and 3 a.m.—*Montrose*. T S passed from S.W. to N.E. between 10 p.m. and 4 a.m.

KINCARDINE.—*Lawrencekirk*. The most violent T S for 40 years, between 11 p.m. and 6 a.m.—*Fordoun*. Granary struck.

ABERDEEN.—*Braemar*. T and very vivid L, 4 p.m. to 2 a.m.—*Aberdeen*. Remarkable T S S, 11 p.m. to 1.30 a.m., 2 to 4 a.m., and 6.30 to 9 a.m., with distant T and L during the intervals.—*Cairnburno*, *New Deer*. House struck.—*Allathan*. Four oxen killed.—*Drum*. Horse killed.—*Huntley*. 11 p.m. L in S., and thence to 2 a.m. such a T S as has never before been known passed to N., between 6 and 7 it returned from N. to S.W. Two horses value £100, killed at *Huddoch*, another at *Gartly*, and “A water-cask at *Connycluck* was destroyed, a large round hole being made in the side of it by the L.” One horse and two oxen killed at *Drumblade* at 8 a.m.—*Alford*. T S passed from W. to E., max. 12 p.m. to 2 a.m.—*Tough*. No such T S remembered. Three oxen killed at *Mains*.—*Leochel-Cushine*. T heard from 5 p.m., max. 11.30 to 3 a.m.—*Portstown*. Barn struck.—*Whitehouse*. Three oxen killed.—*Monymusk*. One ox killed.—*Kintore*. Cow killed.—*Crichie*. Horse killed, two oxen killed at *Daviot*, and two near *Rayne*.—*Inverury*. At the postal telegraph office the L melted a gas pipe and lighted the gas.—*Fyvie*. T 8 p.m. in S., heavy T S at 2 a.m.—*Greenmire*. House struck.—*Ardlogie*. Mill struck.—*Tifty*. Horse killed.—*Woodhead*. Calf killed.—*Springsley*. Two cows killed.—*Netherton*. House struck.—*Turriff*. The telegraph wires at the post-office were snapped asunder, and the window-blinds set fire to from the electric current having entered the window at the aperture for the wires. At *Sunnyhill* the L entered Mr. Ingram's house and did considerable damage to the walls and roof. At *Auchinhamper Inverkeithney* a cow was killed. At *Strocherie* near *Plaidy* two sheep killed.—*Peterhead*. T S 10 p.m. to 8 a.m.; no damage reported.—*Fraserburgh*. 10 p.m. to 10 a.m. T almost incessant, and from 10 p.m. to 1 a.m. L one continued blaze, but mostly horizontal.—*Macduff*. Most violent T S ever remembered, especially from 0 to 2 a.m.

BANFF.—*Tillynaught*. T S, two horses killed.—*Grange*. T S, two haystacks fired.

ELGIN.—*Forres*. The most violent T S ever experienced in this part of the country, continuing two hours and a half during the night.

NAIRN.—*Nairn*. Severe T S.

ROSS.—*Strathconan*. Great T S between 1 and 2 a.m.—*Lochbroom*. About midnight the most severe T S remembered; it lasted three hours, and though no damage was done here, a man and horse were killed not far off.—*Tain Springfield*. Very violent T S between 2 and 3 a.m.

INVERNESS.—*Portree*. The T S did not reach *Skye*.—*Dalwhinnie*. T S at midnight.—*Aviemore*. During the T S there was the grandest display of L we ever saw.

SUTHERLAND.—*Golspie*. T S, man killed in the W. of the county.

CAITHNESS.—*Wick*. A fishing-boat at sea struck and the crew stunned.—*Lybster*. House struck.

ORKNEY.—*Sandwick*. Severe T S, sheet and forked L from 7 to 9 p.m., and till 10 a.m.

IRELAND.

DUBLIN.—*Rockville, Blackrock*. We have had here at an early hour, a very violent T S, with an extraordinary amount of R. It commenced at about 2 a.m., with almost continuous vivid L and immediate R; no H. In two hours I registered 2.02 in., but more remarkable still, in about 30 minutes there fell 1.50 in. I have kept a registry for 34 years, but I never recorded anything like this. The storm came from S., veered to the E., and then again rapidly to N.W. *Thomas Bewley*.—*Monkstown*. Severe T S from 1.30 to 3 a.m., accompanied by very heavy R; 1.95 in. fell in four hours.—*Balbriggan*. About 2 a.m. I was awoke by a loud peal of distant T and vivid flashes of L of intense brilliancy. For a considerable time the T was very distant, 30 or 40 seconds intervening between the flash and the report. About 3.30 it became nearer, and passed out towards sea. I have heard that at *Rush*, about seven miles distant, it was very close. The storm lasted till near 5 o'clock, and at 3 o'clock there was very heavy R, the amount in my gauge at 9 next morning was 0.70 in. *Samuel P. Warren*.

REVIEWS.

Quarterly Weather Report. Published by authority of the Meteorological Committee. Part I., January–March, 1871. Part III., July–September, 1872. Stanford, 4to, 1873.

SOMETHING like an enigma attaching to the appendices to these parts, and several persons having declared that they could not understand them, we think a few words devoted to the subject may not be inappropriate. It will tend to clear comprehension, and probably in the end save time if we begin our narrative at the beginning, sixteen years ago. At the British Association Meeting, in 1857, a wish was expressed that self-recording anemometers should be established on some of the Islands in the Atlantic Ocean. Two such instruments were constructed during 1858, at the expense of the Board of Trade and Admiralty, and after being verified at Kew they were, early in 1859, erected, one at Halifax and one at Bermuda. The records from Bermuda, April 1859 to September 1860, were tabulated on the plan adopted by Lord Wrottesley, and published in 1861, as the eighth number of Admiral FitzRoy's Meteorological Papers. The records of the Halifax instrument, July 1859 to June 1861, were reduced on exactly the same plan, and published in 1865. Early in the year 1862, it was found impossible to continue observations at Halifax, and the instrument after repair was erected at Sandwick Manse, Orkney,

in the autumn of that year. In the Quarterly Weather Report, Part I., January–March, 1871, the Orkney records, 1863–1868, are reduced and discussed on the method of components. In the Quarterly Weather Report, Part III., July–September, 1872, is printed a discussion of the whole of the Bermuda records upon the same system.

Considering how severely Lambert's formula was handled, and by what a majority it was condemned, at Leipzig, we are surprised that the Meteorological Committee (who are all but pledged to adopt the resolutions of the Congress), should have published observations discussed on a plan so closely resembling that which has been condemned. It is needless to add anything to the condemnation, or to add our feeble criticism to that of far abler men, and we but follow the precedent of the Committee in condemning without explaining, for they dismiss the method devised by Admiral FitzRoy, after much conference with the late Lord Wrottesley, with the following brief notice:—

“As the treatment of the materials was entirely different from that now adopted, not being on the principle of components, no use could be made of this publication.”

We are very glad that the previous publications were “not on the principle of components,” for had they been, Dove could not have obtained the data he has quoted, and 99 persons out of a 100 would have been unable to ascertain what was observed and recorded. While by the old method—

“The fourth and last table for each month was formed from the original traces, to supply such additional information respecting the veering of the wind as could not be given in the first table. By careful use of the first and last table of each month conjointly, almost every variation indicated by the instrument may be determined, for the registers may be reproduced from the above tables with a very near approach to identity.”

Perhaps, it may be as well to state that the general principle of the method of components is this,—a wind, say from N.N.E., is classed partly under N. and partly under E., of course more to the former than the latter. Secondly, the sum of all S. winds is taken from that of all N. winds, and the W. from the E., and the residue is set down as the wind's motion. Therefore, suppose we have a S.W. wind blowing for four hours, with a velocity of thirty miles per hour, and afterwards a N.E. of the same duration and force, the entry would be O.

Annalen des Physikalischen Central Observatoriums, Herausgegeben von H. WILD, Director.—Jahrgang, 1870; St. Petersburg, 1872; 4to, 723 pages.—Jahrgang, 1871; St. Petersburg, 1873; 4to, 777 pages.

IF one wanted an illustration of the cosmopolitanity of science, or its independence of nationality, of custom, of dynasties, and of political systems, the two bulky volumes now before us would afford an excellent

text. Just as in America, through the joint action of the authorities of the great Republic and those of our own Canadian Dominions, the network of telegraphic meteorological stations now reaches from the sunny shores of the Mexican Gulf to Nova Scotia, and from the Atlantic to the Pacific, so the autocratic Russians have their system, not wholly telegraphic, however, reaching from the Baltic to the Uralian Mountains, and across Siberia to the far east at Peking, and from the shores of the Caspian to Archangel. Before passing on to notice these bulky volumes, we feel bound to call attention to the unequal geographical distribution of the stations. In 1870 there were altogether 47, distributed as shown in the following diagram :—

	20°	30°	40°	50°	60°	70°	80°	90°	100°	110°	120°
N. Lat. 70°	1	1	1	...	...	...	...	..	..	...
60°	10	4	2	4	2	...	1	...	...	1	
50°	1	6	9	...	2	...	...	...	1	...	
40°	...	...	...	...	...	...	..	...	...		1
30°											

From this it will be seen that out of the 40 squares 6 adjoining ones have 35 out of the 47 stations, in short—that *less* than one sixth of the area has *more* than two-thirds of the stations. Such a disproportion might easily be accounted for were the system a voluntary, and not an official one, for it will be readily understood that in the former case the directors can only obtain that which is offered to them, while a Government department has but to give the order, and to see that it is obeyed. The only other reasons which occur to us for such an unequal disposal of observing strength are the existence of special features in the physical geography of certain districts. We may illustrate this argument by reference to a case familiar to all our readers. Would anyone contend that as many rain gauge stations per 100 square miles are required in the flat counties of Huntingdon or Bedford, as in the hilly parts of Cumberland? So we could readily have understood an excessive proportion of Russian stations along the Urals, or, as we are glad to see is the case, in the Caucasus; or chains of stations along or across given meridians, in order to watch the progress of storms and meteorological phenomena across the vast territory over which Russian influence is supreme. Or we thought it possible that the excess of stations in European over Asiatic Russia, which is about 7 to 1, might arise from a desire to provide statistics bearing on agricultural pursuits, but the absence or paucity of stations in the water sheds of the Don and the Volga, and the way in which they are crowded round the Baltic, hardly seem to accord with this view. We are glad to notice that in 1871 returns are published from two or three additional Asiatic stations, among which the two following are very important :—

Nikolajewsk (on the Amoor), Lat. 53° 8' N., Lon. 140° 45' E.
 Jenisseisk ,, 58° 27' ,, ,, 92° 8' ,,

Having pointed out a feature which (so far as our present knowledge extends) seems to require attention, we have the much more agreeable duty of noting the many excellencies of the works before us. In the first place, there is the question of language, which the Director has solved by the happy expedient of printing the letterpress in double columns, one Russian and one German. (By the bye, it would tend to ensure a wider circulation, or, at any rate, more general perusal of the meteorological publications of all countries if the Vienna Congress or other body could decide on *some one language* which, jointly with the national one, should be used in all publications intended for international use. Considering the very large body of English speaking observers on both sides of the Atlantic, in Australia, and in India, we think that a strong case might be made out for its adoption as the general language of the science; but if that proposal is rejected, we should strongly recommend Latin, the cessation of the use of which, for scientific purposes has always seemed to us a matter of regret.) As a record of observations, the above works are singularly complete. They commence with a reference to the instructions issued to the observers, then proceed to explain the various symbols used (many of which are extremely appropriate), the scales used for wind force, and amount of cloud, the hours of observation, and mode of computing the various means. Then follow brief notes upon each station, stating its position, by whom the observations were made, the height of the various instruments above the ground and above sea level, with details as to the mode by which the latter has been determined.

In the *Annalen* for 1870 this is followed by a note from Director Moritz, of Tiflis, calling attention to the want of uniformity in hours of observation, modes of reduction, wind scales, &c., which would be amusing if the results of the present anarchy were not so excessively troublesome.

The observations are taken at 7 a.m., 1 and 9 p.m., and are printed in extenso, and give (1) Temperature, (2) Absolute and (3) Relative Humidity, (4) Pressure, (5) Direction and Force of Wind, (6) Amount and character (Howard's) of cloud, (7) Remarks. At 1 p.m., observations are made of the total fall of rain, and of the direction of the clouds.

At the end of the volume the records of the self-recording instruments at St. Petersburg are tabulated for each hour. Our readers may remember that the pressure at St. Petersburg was remarkably high on February 6th, 1870; we therefore think it may be interesting and useful to give (converted) the hourly record for that day as indicated by the barograph, and as observed in the regular daily observations. The altitude correction of 0.020 in. (for 16 ft.) being applied in both cases. We are glad to find that the agreement reflects equal credit upon the observers and the instruments.

Mean pressure at St. Petersburg reduced to 32° sea level.

1870.	Barograph.	Eye Obsrvn.	Feb. 6th, 1 p.m.	Barograph.	Eye Obsrvn.
Feb. 6th, 1 a.m.	31·095	...	...	31·135	31·139
" 2 "	·099	...	" 2 "	·131	...
" 3 "	·099	...	" 3 "	·131	...
" 4 "	·103	...	" 4 "	·135	...
" 5 "	·107	...	" 5 "	·131	...
" 6 "	·119	...	" 6 "	·127	...
" 7 "	·127	31·135	" 7 "	·127	...
" 8 "	·127	...	" 8 "	·127	...
" 9 "	·131	...	" 9 "	·119	31·115
" 10 "	·135	...	" 10 "	·119	...
" 11 "	·135	...	" 11 "	·119	...
" noon	·135	...	" midnight	31·115	...
Mean pressure for the day			31·122 in.		
,, temperature ,,			(Fahr.)	—11°·7	

Our remarks upon the 1870 volume have occupied so much space, that we can only say, that that for 1871 is a worthy successor to that for 1870.

A LOCAL DOWNFALL.

To the Editor of the Meteorological Magazine.

SIR,—A fall of rain which took place here last Wednesday is worth recording.

The day was showery, but probably not more than a few hundredths of an inch had fallen before 9 p.m. At that time heavy rain commenced, and lasted until about 3 a.m. on Thursday (September 4th). The amount in the gauge at 8 a.m. was 1·85 in.

This fall of rain seems to have been confined to a very small area. At Holyhead only 0·01 in. was recorded, and my friend, Mr. Ewart, at Hoole Bank, Chester, 11 miles S.S.E. of this place, recorded only 0·40 in. At Bidston Observatory, nine miles N. from here, Mr. Hartnup noted 1·39 in., but the authorities seem to doubt his accuracy, as they place a query against his return in the weather report. During the whole of last week thunder and lightning were frequent.

Yours faithfully, REGINALD BUSHELL.

Hinderton, Neston, Cheshire, Sept. 9th, 1873.

BOOKS RECEIVED.

FRANCE.

SOCIÉTÉ MÉTÉOROLOGIQUE DE FRANCE.—“Annuaire; Tome Dix Septième, Tableaux, Feuilles 5—10.”

“Tome Huitième Bulletin des Séances, Feuilles 15—21.”

“Tome Dix Neuvième ,, ,, ,, Feuilles 10—17.”

MAURITIUS.

METEOROLOGICAL SOCIETY.—“Monthly Notices—January, 1873.” Fcap. folio.

NETHERLANDS.

KONINKLIJK NEDERLANDSCH METEOROLOGISCH INSTITUUT.—“Temperatuur van het Zeewater aan de Oppervlakte van het gedeelte van den Noorder Atlantischen Oceaan.” Manssen, Utrecht, 1872. Oblong folio.

RUSSIA.

WILD, H.—“Annalen des Physikalischen Centralobservatoriums.” Jahrgang.

1870. St Petersburg, 1872. 4to.

Ditto, 1871. ,, 1873. ,,

AUGUST, 1873.

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.	In shade	On grass.
I.	Camden Town	inches 2·87	inches + ·23	in. ·87	24	16	86·4	8	47·7	29	0	0
II.	Maidstone (Linton Park).....	2·13	— ·58	·48	19	15	92·0	8	46·0	29†	0	0
„	Selborne (The Wakes).....	2·36	— ·82	·47	23	18	83·0	8	46·5	29	0	0
III.	Hitchen	2·17	— ·18	·46	24	19	77·0	8, 16	45·0	28	0	0
„	Banbury	2·61	+ ·48	·37	24	19	80·0	7	42·5	4	0	0
IV.	Bury St. Edmunds (Culford).....	2·19	— ·25	·32	24	12	84·0	8	43·0	3	0	0
V.	Bridport	3·46	+ ·87	·72	24	17	81·0	8	47·5	2	0	0
„	Barnstaple.....	7·19	+ 3·00	1·74	24	19	77·5	8	51·0	19	0	0
„	Bodmin	6·54	+ 2·68	·99	18	27	75·0	7	49·0	20	0	0
VI.	Cirencester	2·61	— ·23	·48	24	17	...	...	...	...	...	...
„	Shifnal (Haughton Hall)	3·17	+ ·30	·39	28	23	78·0	7	47·0	23‡	0	0
„	Tenbury (Orleton)	3·63	+ ·75	1·46	24	22	81·7	7	44·0	4	0	0
VII.	Leicester (Wigston).....	2·68	+ ·49	·48	18	19	82·0	7, 25	45·0	16	0	0
„	Boston	2·91	+ ·62	1·10	24	13	82·0	7	43·0	29	0	0
„	Grimsby (Killingholme).....	2·69	...	1·37	18	15	76·0	7, 8	45·0	11	0	0
„	Derby.....	2·92	+ ·32	·57	19	23	78·0	7	47·0	29	0	0
VIII.	Manchester	4·20	+ ·70	·53	4	27	79·0	7	48·0	4	0	0
IX.	York	2·15	— ·56	·34	24	19	71·5	7	46·0	11	0	0
„	Skipton (Arneliffe)	6·68	+ ·74	·57	20*	30	72·0	15	39·0	14	0	0
X.	North Shields	3·47	+ ·62	·48	28	20	72·0	7	45·0	11	0	0
„	Borrowdale (Seathwaite).....	18·73	+ 4·65	1·66	17	29	...	...	...	...	...	...
XI.	Cardiff (Ely) .....	...	...	...	...	...	...	...	...	...	...	...
„	Haverfordwest	6·05	+ 1·17	1·34	24	23	75·0	7	48·0	29	...	...
„	Rhayader (Cefnfaes).....	5·77	+ 1·11	2·05	28	27	74·0	...	44·0	...	...	...
„	Llandudno.....	2·44	+ 1·38	·47	24	18	76·6	7	49·6	29	...	...
XII.	Dumfries	5·80	+ 1·93	1·13	20	27	71·0	7	43·0	11	...	...
„	Hawick (Silverbut Hall).....	4·09	...	·73	24	24	...	...	...	...	...	...
XIV.	Kilmarnock (Annanhill).....	5·12	...	·87	15	26	69·1	27	41·1	11	...	...
XV.	Castle Toward	4·89	— 1·41	1·15	13	22	70·0	7	...	...	...	...
XVI.	Leven (Nookton)	3·43	+ ·44	·80	19	22	72·0	7	39·0	11||	0	0
„	Stirling (Deanston)	4·82	+ ·20	·84	15	25	69·0	26	35·8	11	0	0
„	Logierait	2·67	...	·35	12	16	72·0	7	33·0	19	...	...
XVII.	Braemar	2·64	— 1·20	·38	21	21	66·1	7	30·0	20	2	3
„	Aberdeen	4·08	...	·67	21	23	73·0	6	36·1	11	0	1
XVIII.	Inverness (Culloden)	1·98	— 1·27	·27	11	14	66·9	26	44·1	21	0	1
„	Portree	7·41	— ·04	1·29	13	27	...	...	...	...	...	...
„	Loch Broom	5·75	...	·58	16	27	...	...	...	...	...	...
XIX.	Helmsdale	3·29	...	·76	13	21	...	...	...	...	...	...
„	Sandwick	4·06	+ ·35	·90	12	22	64·0	27	38·0	11	0	1
XX.	Caherciveen Darrynane Abbey.....	5·95	...	·66	3	27	...	...	...	...	...	...
„	Cork	3·24	...	·81	17	13	...	...	...	...	...	...
„	Waterford	6·00	+ 2·05	1·46	23	20	75·0	7	45·0	17	...	...
„	Killaloe	8·61	+ 3·68	1·32	26	30	...	...	...	...	...	...
XXI.	Portarlinton	4·33	— ·17	·53	16	28	76·0	7	45·0	29	...	...
„	Monkstown	3·35	+ ·14	·90	24	20	...	...	...	...	...	...
XXII.	Galway	6·28	...	1·13	23	25	69·0	13	44·0	27	0	...
„	Bunninadden (Doo Castle)	5·35	...	...	...	...	...	...	...	...	...	...
XXIII.	Waringstown	5·11	...	·80	15	26	75·0	7	45·0	4	...	...
„	Edenfell (Omagh).....	6·15	...	·82	12	28	70·0	7	40·0	16	...	...

*And 26. †And 30. ‡And 29. ||And 31.

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

METEOROLOGICAL NOTES ON AUGUST.

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

ENGLAND.

LINTON.—A fine warm month, with just sufficient R to meet the wants of growing and ripening vegetation, winds (never high) mostly from S. and S.W. T on 1st, 19th, and 26th. Bar. more steady than usual, highest on 2nd, lowest on 19th, and hottest days the 7th, 8th, and 9th.

SELBORNE.—Harvest generally begun on 11th. First half of the month very dry, the remainder wet, R every day but two after the 16th. In the last fortnight of July and first fortnight in August little more than half an inch of R fell.

BANBURY.—T S at 7 p.m. on 24th, and a more severe one at 9 p.m. on 25th. Wind high on 8th and 12th.

CULFORD.—The max. temp. of August was 84°, min. 43°, and mean of month 61°·8. Westerly winds on 24 days. A terrific T S on the night of the 24th, T also on 19th, 26th and 28th. Although the rainfall has been rather considerable (2·19 in.), the weather throughout the month has been favourable for harvest operations, which in most instances (in this locality) are nearly finished, and the grain generally speaking in good condition.

BRIDPORT.—23rd, 70 in. fell from 7:15 to 8 a.m.; much L in the evening. 24th, storm at intervals during the day, much L with heavy showers in the evening.

BODMIN.—Rainfall 3·27 in. above the average of 24 years; the wettest August ever recorded in Bodmin, and most disastrous for the farmers. Terrific T and L from 8 to 10 p.m. on 24th.

SHIFNAL.—A most trying month for the farmers, for although the crops of grain, especially on light soils were good, little has been got in in good order, and the greater part, although cut, left out to the close of the month and beginning of September. R daily from 15th, but the temp. being low less damage ensued than might have been expected. The winds were chiefly from W. and N.W. to the 16th, when they changed to S.W. and S.E. Only once, viz., on night of 25th, when it was distant with continuous L. Swedes and mangolds flourishing, apples an average crop, few pears, scarcely an apricot or damson, few plums of any sort, few mushrooms. Only one peacock and one tortoiseshell butterfly seen, and but few white ones. Swifts all here in great numbers on 10th, and all gone on the 12th.

ORLETON.—Cloudy, very few bright days, and frequent light falls of R till the 24th, when the day was cloudy and sultry, towards 5 p.m., a dark mass of stormy clouds collected in the sky to the S.E., at 7 p.m. R began to fall, suddenly followed by a bright flash of L, and T in the S., and great R till 9 p.m., with a few more flashes of L and distant peals of T; the R then ceased, but the L was seen in the N.E. till midnight, and there were a few sharp showers; between 7 p.m. and 9 p.m. nearly 1·40 in. of R fell; much T and L on the following day between 7 p.m. and midnight, but very little R; the remainder of the month was very stormy and bad for the harvest; R every day after the 15th.

WIGSON.—Very unsettled weather throughout the month, the corn in this neighbourhood is generally cut, but very little of it is carried, the weather being so showery.

BOSTON.—Wheat cutting generally begun by 11th. 24th, wind N.E. in the morning. S.E. at 9 p.m. Very severe T S; fall of rain 1·10 in. 25th, hot and very moist, like a vapour bath.

GRIMSBY.—A very fine month, and the corn crops better than could have been anticipated from their condition in the spring. Root crops of all kinds abundant, and potatoes more sound than for many years past. First wheat cut on 7th, harvest general on 13th. T at 10.10 a.m. on 9th. T S and heavy R at 11 p.m. on 18th and early morning of 19th, with a fall of 1·37 in. 24th, L at 9.45 p.m. 25th, T and R from very early till 7.30 a.m., T at 7.30 p.m., and L 10 to 11 p.m. 28th, T S at 3 p.m., L at 9.30 p.m., high wind at night.

DERBY.—A very damp and disagreeable month, only eight days without R ; notwithstanding the number of days on which R fell, the total fall was very little above the average for August.

MANCHESTER.—Aurora on 8th, T and L on 9th, 25th, and 28th.

ARNcliffe.—The whole month dark and dreary. "Hay time" not all finished yet (September 1st).

NORTH SHIELDS.—T S on 9th and 25th.

SEATHWAITE.—1 in. or more fell on nine separate days ; T on 8th, 16th, 19th, and 25th.

W A L E S .

HAVERFORDWEST.—A chilly wet month, scarcely a dry day ; very bad harvest weather—thus ends the last of the summer months ; truly this year it may be said in this country, "We have waited for summer which never came." An enormous rainfall on the 23rd and 24th, 1·84 in. fell in 23 hours ; temp. reached 70° only on six days.

CEFNFAES.—A wet ungenial month. 24th, T S in the afternoon, with heavy R at 5 and 8 p.m. ; 28th, continued downpour in the evening for some hours, from 3 p.m. to 8 p.m. ; total fall 2·05 in.

LLANDUDNO.—L on the evening of the 18th ; 24th, at 10 p.m., R with T, peals of T during the night ; 25th, sheet L in the evening.

S C O T L A N D .

DUMFRIES.—This has been another wet month, only four days on which no R was recorded. The heaviest rains were generally during the night, and the weather during the day was often dry and fine. Harvest commenced on the 5th, but much interrupted by wet weather, especially the leading of grain. Wheat about an average, oats above it, potatoes good but much diseased, turnips heavy crop, fruit generally deficient.

HAWICK.—The month on the whole has been rather a wet one, but the crops all looking well. Potatoes a little diseased, but are a beautiful crop. We had a severe T S on the night of the 24th and on the 25th.

ANNANHILL.—On 12th, strong S.S.W. wind in evening, 55 miles per hour ; another gale on 16th, with T and brilliant flashes of forked L and heavy R, T S also on 25th, the rest of the month calm. Ozone well developed. Harvest operations in full vigour, most of the oats in this district cut, but the wheat is late, and the wet weather has still kept some of the hay out ; potatoes a good crop, but much diseased. *Lime* trees beginning to drop their leaves, but foliage, as a rule, still good. Death-rate here 57, or equal to 28 per thousand, consumption heading the list, then heart disease ; no epidemic. The county still free from cattle disease.

CASTLE TOWARD.—A wet, cloudy, overcast month, little or no sunshine, prevailing winds W., S., and S.W. 10th, heavy T S at 10 p.m., followed by heavy R. Another storm on 26th, followed by very heavy R at 11.40 a.m., doing much damage to the outstanding crops, which were laid flat ; the following days being dry the harvest operations went on rapidly. Turnips never looked better ; potatoes suffering very much from disease, fruit of all kinds plentiful, grass in abundance, and cattle healthy.

LOGIERAIT.—Rather unsettled weather for the harvest operations ; crops on the whole a full average. T on 26th.

BRAFMAR.—Shower of H with T on 16th, frost on 20th, very injurious to the potato crop ; weather in general dark and dull ; L on 25th and 26th.

ABERDEEN.—A month of dull wet weather, especially the latter part, and by no means favourable for harvest ; potatoes blackened by the frost on the 11th, and disease became very apparent about the 25th. Frequent L, especially during the last ten days.

PORTREE.—Wet squally month, more than an inch of R fell on the 13th ; the greatest part of the hay crop is still unsecured, owing to the constant wet weather there cannot be now any general shearing of corn before the 20th of September, and not even then unless the weather gets finer. Cattle and sheep healthy, and

selling at high prices. Gale from W. to S.W. on 7th, and from S.W. on 16th, heavy H showers on 3rd and 8th, on the latter date the hailstones covered the ground about half an inch thick for upwards of two hours.

LOCHBROOM.—A month of almost constant B, only four days on which it is not recorded. The hay crop has been much damaged, and securing it much delayed, by the B; the other crops are over-ripe, but can neither be cut nor carried. Potatoes are still sound in this locality.

SANDWICK.—August has been wetter and rather colder than the mean, but the weather has not been unfavourable to vegetation. A bright meteor shot from S. to N. of zenith about 11 p.m. on 22nd.

I R E L A N D.

DARRYNANE.—Wind constantly W. or N.W., and weather showery throughout the month, harvest consequently very backward.

WATERFORD.—The latter part of the month cold, wet, and stormy, more like what we should expect at the end of September. L is a very rare phenomenon here, but some of the flashes on the 24th, about 7 p.m., were very vivid; they were not numerous and soon ceased, though the B was heavy.

MONKSTOWN.—L on 24th, and very vivid, with loud T about 9 p.m. on the following day.

DOO CASTLE.—Hay crop beyond recovery, having been cut more than three weeks and exposed to continued downpour. The potato crop much affected by disease.

WARINGSTOWN.—Very wet but not cold, harvest late, only commencing at the end of the month. Very heavy TS on the night of the 25th.

EDENFELL, OMAGH.—The wettest and most unfavourable August for harvest purposes on record here; an abundant cereal harvest in much danger, grass and green crops rather benefited by it.

STEVENSON'S THERMOMETER STAND.

To the Editor of the Meteorological Magazine.

SIR,—I should like to be permitted to ask a question or two. Does Mr. Buchan recommend that the Stevenson screen should be placed on the north side of a house, as it was at Strathfield Turgiss last year? If it had been in the open, would not the difference of $7\frac{1}{2}^{\circ}$ on the days selected have been reduced to 2° or 3° ? If there were absolutely no wind, would the temperature on the north side of a large building change at all, and if so, why, and how much? Since it does actually change, must not the change depend upon (1) the force of wind, (2) the length of the shadow of the house, *i.e.* the distance from which air warmed by the sun shining on the ground has to be brought, (3) the rapidity of the change taking place in the temperature of the air in the open? And lastly, if this be the case, ought not those who place instruments in such positions to discover the necessary corrections for the temperatures observed?—I am, Sir, your obedient servant,

F. W. STOW.

Harpden, August 29th.

[We are not aware that Mr. Stow expects to elicit from the unfortunate individual who is working gradually through the collected data on this subject any expression of opinion, or decision; but if he does, and is disappointed, we trust he will not for a moment attribute it to any failure of courtesy or appreciation of the many excellent hints which Mr. Stow has from time to time offered, but to the steady maintenance of a fixed resolution.—ED.]