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John William Tripe, M.D.
1821—1892.

It is with great regret that we have to announce the death of Dr. Tripe, the Council Secretary of the Royal Meteorological Society.

Although Dr. Tripe wrote several valuable papers upon climatic and meteorological questions, his claim to the respect and regret of meteorologists is chiefly due to his constant and watchful care for the welfare of the Royal Meteorological Society, which he joined in its youth as the British Meteorological Society, in 1856. He was elected on the Council in 1858, became Vice-President in 1859, and it was during his presidency that the Society first obtained rooms of its own, with an assistant secretary in daily attendance. On resigning the Presidency in 1873, he was appointed Council Secretary, and the present position of the Royal Meteorological Society is largely due to the services which he rendered during the twenty subsequent years.

DR. ANGOT'S "INSTRUCTIONS."

WE are sure that both Governments and individuals are spending too much money and too much time on the purchase of meteorological instruments and on the making of observations, and too little, both of money and of time, in discussing the records already obtained.

Still it is obvious that many observations must yet be made, and that new observers must be trained to take the place of those who fall out of the ranks, and evidently the clearer and better the teaching, the better will be the records. For this reason we cordially welcome Dr. Angot's new "Instructions."*

We may as well say at once that the book is excellent as regards matter, arrangement, engraving and printing †, and will afford pleasure and profit to every one who reads it.

* *Instructions Météorologiques*, par A. ANGOT, Docteur ès Sciences, &c., 3^e édition, entièrement refondue. Paris, Gauthier-Villars, 1891, 8vo, vi. 124 pages.

† We have noticed only one misprint : on page 11, second paragraph, 4th line 1^{re} should be 1°.

Having thus done justice, and no more than justice, to the work as a whole, we shall not be misunderstood if we criticize some portions.

We are glad to see (but it should have had a separate heading) at the close of the description of the *Baromètre à large cuvette* that our French friends have at last adopted the Kew plan of an arbitrary scale.

Dr. Angot is the first person (as far as our memory serves) who has had the courage to say, what we quite believe, that better results will be obtained from a thermometer divided only to each degree, than from one divided to fifths of a degree.

On page 32 Dr. Angot makes the excellent suggestion that the French thermometer stand should have only one lateral wing, so that reflection from the inside should be impossible; but his engraver has put two.

On page 36, Dr. Angot describes a form of thermometer stand for tropical countries which strikes us as new. We should like to see some comparisons of temperatures in such a stand with simultaneous readings of a *thermomètre fronde*. We are also doubtful whether it would be durable; it is supported by four posts and is virtually two half drums—very much like the German metal window screen—but to be made of tarpaulin or pitched cardboard, the inner one 3 ft. and the outer one $4\frac{1}{2}$ ft. in radius, so that the observer can go inside to read the instruments.

We are by no means sure that as a rule the French manner of mounting thermometers in a light brass frame is not better than the costly English slabs—but we do not like the dry and wet bulb represented by fig. 16—the dry bulb looks as if its readings must be affected by the proximity of the wet bulb.

It is probably the engraver who is responsible for the funnel of the rain gauge, fig. 19; it is much too flat; there is no room for snow, heavy rain would splash out, and scarcely half a dozen hailstones would remain after the heaviest shower.

We notice that although French observers are requested to state the number of days when the fall exceeds 0.02 in., they are told to count as days with rain even those on which nothing is found in the rain gauge, if they have seen any drops on the pavement. Therefore in comparing French and English records of rainy days, the French records should probably be reduced by a tenth or the English ones proportionately increased.

The woodcuts of clouds seem to us among the best of that class of which we are aware.

An important point arises with respect to fig. 25, the Campbell-Stokes sunshine recorder which our neighbours put under a glass shade. We think that the two plans, the English of having no cover, and the French with the shade, should be tried side by side. The English plan allows the lens to become dirty, and covered with rime, and the cards to be saturated by every shower, the French plan

avoids the last of these evils, transfers the other two to the protecting shade, but introduces the extra difficulty of misty condensation on the inside of the shade. One plan or the other ought to be abandoned ; which of the two we do not know.

With respect to vanes, Dr. Angot makes an excellent suggestion, viz., that a vane can be made quite sensitive to light winds and yet steady during squalls, by making it rest not on an agate point or on friction rollers, but upon a hollow cylinder floating on a liquid—glycerine or a solution of chloride of calcium.

As the definition of fog seems not generally agreed upon in England, we translate Dr. Angot's Instruction.

"Account should be kept of all the days upon which there is fog ; if the observer has a free horizon he should notice not merely the presence of fog but its density. This may be measured by recording the greatest distance at which an object (such as a house or wall) can be seen clearly.

"Thus, for example, a fog of 300 yards would be one which obscured all objects at a greater distance. In order to form a scale of reference, it is well to select before-hand a series of objects at known distances and in various azimuths."

This is excellent advice, but we should like to know what Dr. Angot considers is the distance at which the obscuration of a house entitles the observer to record fog. And if English observers would express their opinions as to this, the fog question would perhaps be put upon a firmer basis than it has at present.

We have reached page 86 without finding a single sentence to which we object, but we do not agree with Dr. Angot in thinking that rainbows, coronæ, twilights and mirages ought to be omitted from a book of Instructions ; half a page or a page would have been usefully employed, if only in preventing confusion between halos and coronæ ; and as nothing in this world is perfect, we express the hope that a fourth edition may soon be necessary, and that we shall see a few lines not merely on these subjects, but also on the following :—How to set a vane truly N. ; Dust haze ; Glazed frost ; Silver thaw ; How to record a great Hailstorm ; *Grésil*, and how it differs from *Grêle* ; and we might even have some instructions as to the Kobar, which has recently been discussed by the Soc. Mét. de France.

We are slightly in doubt as to the expediency of instructing observers as to the best mode of interpolation ; much depends on the distances between the observers, and on their arithmetical powers, but on the whole we think that such work is done best at the central office.

In conclusion, we have to thank Dr. Angot for the very pleasant and instructive three hours which we have spent over his book. It is full of useful hints, and characterized throughout by that which it not too frequent, though both in England and in France it has nearly the same name, common sense.

WHO FIRMINUS WAS.

WE have always been of opinion that such a person as Firmin had existed, and are glad to be able to transpose the word "was" in the above heading on the high authority of M. Delisle, Administrateur Général of the Bibliothèque Nationale of Paris, who has most kindly furnished the following information :—

The treatise "de mutatione aeris" is by Firmin de Belleval, a French author of the middle of the XIVth. century. The name of Firmin was, in the middle ages, rarely found except in the North of France, and especially in the Diocese of Amiens. The author of the *Repertorium* was probably a native of Beauval, now a commune in the arrondissement of Doullens, in the department of La Somme.

There was a copy of the work in the library of King Charles V., which is thus described in the old catalogue :—

"Summa Leupoldi de Austria ; compilatio Firmini de Bellevalle de mutatione aeris, et alia plura, en papier." (DELISLE, *Le Cabinet des manuscrits* t. III, p. 146, Art. 679.)

The following are notes upon treatises by Firminus preserved in the Bibliothèque Nationale.

LATIN MS. No. 15104.—(This when in the library of the Abbey of St. Victor was numbered FFF No. 24.) In the last part of the volume, on folio 48 there is a treatise in XIVth century writing, without any title, but beginning

"Tres principes de milicia superiorum ex nobilissimo genere procreati a remotis partibus per diversos anfractus et limites tortuosos festinant ad consilium generale anno 1345, ultima die mensis certissimi Latinorum, videlicet inicio ejus in quo condita fuit tota creacio mundanorum, super altissimis negociis tractaturi

Explicit prognosticatio magistri Firmini de Bellavalle super consilio Saturni, Jovis et Martis, Anno Domini 1345.

This is followed in the same volume on folio 50, by another contemporary MS.

"Incipit epistola super reformatione antiqui kalendarii directa domino pape Clementi VI per venerabiles et solemnes astrologos et magistros Johannem de Lineriis, Johannem de Muris, et Firminum de Bellavalle, Anno Domini 1345."

LATIN MS. No. 7378 A., Fol. 63.

Explicit pronosticacio magistri Johannis de Muris super conjunctione.

Incipit pronosticatio magistri Firmini de Bella valle super eodem.

"Tres principes" as in No. 15104.

LATIN MS. No. 7482, Fol. 34.—(This copy seems to have been made for Charles VIII, King of France).

“Incipit tractatus Firmini de mutacione aeris dictus Colliget astrologie, continens sex partes, aut capitula.

Quia in multis voluminibus sapientes antiqui de mutationibus aeris multa scripta fecerunt”

Finishes on fol. 155:

Explicit Colliget astrologie de mutatione aeris.

Explicit Firminus de pluviis et mutatione aeris.

It seems to us that the above amounts as nearly to demonstration as could be expected after the lapse of more than 600 years.

Let us sum up the fresh facts, first rectifying an error in Dr. Hellmann's letter on page 6 (near the middle), “for the year 1338” should have been “for the year 1312.”

As Dr. Hellmann originally stated, there were Firmins who wrote on Theology; to this M. Delisle adds that the name was rarely found except in the N. of France, and especially in the Diocese of Amiens. The Beauval which M. Delisle assumes to have been the residence of Firmin, is in Lat. $50^{\circ} 6' N.$, Lon. $2^{\circ} 20' E.$, about 4 miles S. of Doullens, and about 12 miles N. of Amiens, and on examining the *Carte d'état major* for the district, we find in the adjoining sheet, about 30 miles to the N.W., two localities named after a Firmin—we do not say after the meteorologist—but near the mouth of La Somme we have St. Firmin, a hamlet near Rue, and a little farther north we have the village of Nempont St. Firmin.

We therefore hold that M. Delisle has satisfactorily answered the question, “Who was Firminus?”

REVIEWS.

Berliner Zweigverein der Deutschen Meteorologischen Gesellschaft.
Neuntes Vereinsjahr, 1892. Berlin 1892, 8vo, 21 pages.

CHIEFLY we believe under the direction and care of Dr. Hellmann the German Meteorological Society has been making a series of comparisons of rain gauges in an experimental field, and also at about twenty stations in and around Berlin—with the usual result of having records ranging for 1890 from 23 inches to 28 inches—or about 25 per cent. We are sorry that no details are given either as to the sizes of the gauges, or their heights above ground and above sea. It is very little trouble to give this, and is always handy even if it has been given before. Dr. Hellmann has been observing three rain gauges on the roof of the Meteorological Office, and has found (as did Mr. Dines, and as Mr. Symons suggested as long since as *British Rainfall*, 1863, page 4) that near the centre of a large roof the fall is very similar to that at the level of the street. And as with the Rotherham experiments reported in *British Rainfall*, 1869, so at Berlin

Dr. Hellmann has satisfied himself that the predominating cause of differences in the amount of rain collected is wind.

In conclusion, he seems to think that the rain gauges should be protected from the influence of wind. We do not think so. What we require to know is what amount of rain falls upon the earth, not how much water can be collected from any given shower.



Observatoire Royal de Madagascar. Observations Météorologiques faites à Tananarive. Par le R. P. E. COLIN, S.J. II. Volume, 1890, Tananarive, Imprimerie de la Mission Catholique. 8vo.—278 pages.

ALTHOUGH we have not seen Vol I., we are very glad to welcome Vol. II. of the above work. It is evident that Father Colin spares no pains in the making, or care in the printing, of his observations.

There is a central observatory at Tananarivo, and there are altogether 16 subsidiary ones. The central one has been partly equipped by the Bureau Central of Paris, and has several standard barometers, Richard barograph and psychrometer, besides various thermometers, Robinson cup anemometer, &c. It has also an evaporator, designed by M. D'Abbadie, which, it seems to us, would give better results than the figures as printed by Father Colin. He tells us in the preface that he recognises the difficulties, and is trying to overcome them by making the instrument self-recording; but the readings if made as M. D'Abbadie suggested and *properly worked out*, would give all that is necessary and though not accurate values, would still give data of interest. We, therefore, describe the apparatus and the mode of publication.

The evaporator consists of a zinc cistern 40 in. by 40 in., and $2\frac{1}{2}$ inches deep [this is much too shallow], enclosed in a wooden box with bevelled edges, and mounted on a stone pillar, so that it is about 6 ft. above the ground. To one side is attached a thermometer to indicate the temperature of the water, and near it a divided glass tube, in which the height of the water can be read. To another side is a syphon to discharge part of the water [we presume into a vessel where its amount can be measured] in case of heavy rain rendering an overflow imminent, and on the third side there is a tap to empty the vessel when it is necessary to clean it.

There is a little complication in the mode of reading, which we either do not understand, or do not see the necessity for; but eventually values are obtained which, as Father Colin says, give the depth of the liquid evaporated, or of the rain. In the volume the black figures denote rain, the ordinary ones the amount evaporated.

The table for January, 1890, is not complete, so we take the next month—February, 1890—and reprint precisely the record for the first ten days, adding at the end the daily fall of the rain.

Fevrier, 1890.

Jours.	EVAPOROMETRE (<i>air libre</i>).						PLUVIOMETRE.	Total of Rain as per Evaporator
	7 h.	9 h.	13 h.	16 h.	18 h.	Total.		
1	2.24	0	0.61	...	7.14	2.85	mm. 1.8	mm. 7.1
2	0.20	0.40	0.20	7.34	1.83	9.77	11.4	0.2
3	3.26	0	1.02	1.83	0.81	6.11	...	0.8
4	49.57	0.20	1.02	11.01	0.40	12.63	51.0	49.6
5	1.02	0.40	1.02	1.02	1.22	4.28	1.1	0.4
6	2.24	0	0.20	...	9.58	2.44	2.2	9.6
7	0.20	0.20	0.40	3.67	1.22	5.29	13.5	0.4
8	3.26	1.02	0.0	1.02	0.40	1.02	14.2	4.7
9	6.52	0	0.40	3.06	3.06	12.64	9.7	0.4
10	7.14	0	0.81	1.63	1.22	3.66	16.5	7.1
Total {	R 60.37	0.60	0.40	1.02	17.93	...	121.4	80.3
	E 15.28	1.62	5.28	29.56	8.95	60.69	...	...

There are several things in this table which seem to us to need alteration. In the first place it is delusive to print the records of such an instrument to two places of decimals of a millimetre—one place of decimals is as much as, or more than, is justified. Secondly, the entry at 4 p.m., on Feb. 4th, 11.01, [*i.e.*, 0.44 inch] as having been evaporated in the previous three hours, is surely a mistake; the only figure approaching it is 6.52 [*i.e.*, 0.26 in.] in the thirteen hours preceding 7 a.m. on the 9th. We are not believers in the use of the Piche evaporator, but as there is one at work at Tananarivo, we turned to see whether it, or the hygrometer, showed any trace of extra dryness on the 4th, and they do not. That entry is therefore wrong, but that may be a clerical error, and we merely note it and pass on to the real difficulty. This is the entering of the excess of one reading above the previous one as the amount of rain. It is not so; the reading gives the increased depth, but that is the depth of the rain less the evaporation during the time. This comes out clearly from the last two columns, where, in spite of a want of agreement in the daily values, which we cannot understand, the final result is that the rain recorded as falling into the evaporator, is only two-thirds of that collected by the rain gauge.

Reducing the 4 p.m. reading on the 4th to its probable value of 1.01 mm., we have for the total, for the ten days evaporation, about 2 inches; but the difference between the sum of the black figures and of the rain as recorded by the rain gauge has to be added, and then we get about 3.6 inches as the evaporation for the ten days, or about 130 inches per annum. We see that in few months is the evaporation so great as in February; therefore probably it would average about 90 inches. When we remember how shallow is the vessel, this amount is not improbable, but we hope that Father Colin

will put a rain gauge within a metre or two of his evaporator, and at the same height above the ground, and will determine his evaporation when there has been rain by the simple process :—

Previous Reading	...	...	...	4·7
Rain since	...	...	...	3·2
				<hr/>
Total	...	...	...	7·9
Present Reading	...	...	...	6·6
				<hr/>
Evaporation since previous Reading				1·3

His tank would be better if ten times as deep, and if lowered nearly to the ground level ; but even as it is, the records may be rendered very useful.

Some idea of the thoroughness of the work at Tananarivo may be gathered from the fact that most of the instruments are read five times daily, and all the values are printed *in extenso*, even to the Black and Bright bulb Solar Max. The observatory has both a burning and a photographic sunshine recorder, a set of earth thermometers, &c.

We hope and expect to get very valuable work from future volumes, and that is the reason that we have devoted so much time to the present one, and why we seem perhaps hard upon a comparative beginner, whom we wish to help and not to repress. We are delighted to see prospects of useful information from Madagascar—a country of which we know so little ; but we wish the volumes to be not merely masses of figures, but figures upon which everybody can rely. At present Father Colin is but starting and he will, we hope, forgive us for trying to put him on the right track. The best observer is not he who enters 10,000 more figures than his brother, but the man of whom one is certain that 99 figures out of 100 are absolutely correct. It was, of course, tantalising that out of the eleven stations with rain gauges, quoted on p. 273, only one had a perfect record for every month, and could, therefore, properly have its total printed ; but when the author has had a little more experience, he will regret having printed totals for five stations, of which one had a record of only ten months, one of nine, and three of only eight months ; totals, moreover, which do not agree with the sums of the monthly values as printed.

PROFESSOR VANDER MENSBRUGGHE ON THE FORMATION OF FOG AND OF CLOUDS.

(Translated from *Ciel et Terre*, March 16th, 1892.)

IN the last number of *Ciel et Terre*, I see an interesting article by Dr. W. J. Russell on "Town Fogs and their effects," in which the author deals with the researches of Aitken on the condensation of vapour in the atmosphere. As I have recently been at work upon the same subject I hope that you will reprint two paragraphs from my note, (Bull. de l'Acad. Roy. de Belgique 3^e série, t. xix No. 2, 1890) "On the condensation of aqueous vapour in capillary spaces."

"Let us quote one of the most important facts in the economy of nature, the formation of fogs and of clouds. We know the excellent researches upon this subject by M. Aitken; this physicist has proved by varied and conclusive experiments that aqueous vapour condenses in the air only in the presence of solid particles around which the invisible vapour becomes a liquid : but if the researches of M. Aitken have fully established the mode and the conditions of the formation of fogs and of clouds, they throw little light on the cause of the phenomena. If I have rightly grasped the theory of the English savant, he attributes the condensation of the vapour to the nature of the surface of the particles, which he calls free, but in no way indicates the form of this surface. Now I think that it is precisely to form—irregular, indented, offering minute capillary spaces,—that the condensation so well shown by his experiments is due. In what substance would it be possible to find more minute capillary spaces, than in the myriads of motes of dust, germs, &c., floating everywhere and at all times in the lower strata of the atmosphere.

"If this is really so, the fact of the condensation of vapour around these corpuscles follows naturally from the very simple principle enunciated by Sir W. Thomson, and forms I think the most beautiful and the most important of all the applications in the vast laboratory of nature.

"The theory which I put forward two years ago in the above paper seems to me to offer a ready explanation for the 'high fog' of which Dr. Russell said that the cause was unknown. It must be admitted that the temperature of the air over great towns—especially northern ones—is probably lower than in the streets, hence condensation will begin sooner at a height, than at the level of the streets."

THE MUNICH CONFERENCE.

To the Editor of the Meteorological Magazine.

SIR,—Through your obligingly publishing my query (on p. 27) respecting the minimum daily rainfall to be recorded as satisfying the proposals of the Munich Conference on this point, I have received an unimpeachably authoritative letter containing the statement that the Conference recommended 0·1 mm., and 1 mm., as the sole measurements to be set out in the résumés; so that the presumed equivalence of the quantities 0·005 in and 0·1 millimetre (also 0·05 inch and 1 mm.), given p. 180 of last vol., is not at all warranted. In fact, though we may continue to record 0·005 inch as the minimum standard for British Rainfall, 0·004 inch should be recorded to satisfy the recommendations of the Conference.

Yours truly,

T. W. BACKHOUSE.

Sunderland, March 19th, 1892.

TOWN FOGS.

To the Editor of the Meteorological Magazine.

SIR,—The subject of "Fog" has been engaging much attention of late, and it seems as if the physical features of the phenomenon somewhat imported vagueness into the discussion. Nothing is so abhorrent to the scientific temper as want of precision; but surely it is possible to rescue the records of our observations from something of the vagueness that has hitherto characterized them. I have for years attempted to record the density of fogs—in this way. When I enter "fog" in my note-book, I generally put in small figures like the algebraic powers of quantities, the notation of the distance in yards at which objects are just visible, *e.g.*, In my record of December last I find: 15th, *fog*⁴⁰⁰; 21st, *fog*⁸⁰⁰; 22nd, *fog*⁶⁰; 23rd, *fog*⁸⁰; 24th, *fog*⁶⁰; 25th, *fog*¹⁰⁰. The density of the fog is of course in the inverse ratio. In the suburbs of a town it would be easy to be very exact, as it would not be difficult to lay down once and for all the distances of neighbouring buildings.

Next as to the origin of fogs. In the instance above, the cause was not far to seek. The mean temperature of the air from 21st to 25th December was below 24°F. That of the River Thames, which was very full but not in flood, was probably over 40°. The valley was a trough of vapour. On the hills at a height of, say 250 feet above it, there was sky without cloud and a blaze of sunshine from sunrise to sunset.

The river is doubtless the cause in the first instance of the London fogs—in most cases. We want the M.T. of the air and the M.T. of the river, and if these were placed before us, there could be, I think, no hesitation. Not that such is always or altogether the explanation. The last dense fog that I experienced in London, was so dense that near the Marble Arch when you could see the colour of the horse's head that was meeting you, you could not tell what vehicle it was drawing. However, at the bottom of Park Lane there was no fog, only a very gloomy condition of atmosphere. It certainly seemed that on that occasion it was independent of the river.

I remain, your obedient servant,

JOHN SLATTER.

Whitchurch Rectory, Oxon, 18th March, 1892.

ROYAL METEOROLOGICAL SOCIETY.

At the meeting of this Society on Wednesday evening, the 16th March, Dr. C. Theodore Williams, the President, delivered an address on the "Value of Meteorological Instruments in the selection of Health Resorts." He drew attention to thermometers, maximum and minimum as the foundation on which medical climatology rests, and instanced effects of extreme cold or of heat on the human organism. The direct rays of the sun are of the greatest importance, and in health resorts should be utilized to the full; in fact only climates where during the winter months even a

delicate person can lie or sit for several hours a day basking in the sunshine, are to be recommended for most complaints, and the various forms of sunshine recorders are used to aid the medical adviser in choice of such health stations. After referring to the value of rain-gauges, hygrometers, and barometers, Dr. Williams stated that many health resorts owe their reputation almost solely to their shelter from cold winds; for instance, the advantages in climate which Hyères and Mentone enjoy over Marseilles is chiefly due to their being more sheltered from the *mistral*, or north-west wind, the scourge of the lower valley of the Rhone from Valence to Avignon. He went on to describe the climate of the Riviera, illustrating it by lantern slides from recent photographs, including views of Hyères, Costebelle, Cannes, Nice, Mentone, San Remo, &c., and he showed the three principal causes of the warm winter of this region to be: (1) the Southern latitude; (2) the protection from cold winds by mountain ranges; and (3) the equalizing and warming influence of the Mediterranean Sea, which being practically tideless is always equally potent, not varying with hour and season. Dr. Williams mentioned the weak points of the South of France climate with its blustering *mistral*, its occasional cold *bise*, its moist *scirocco* wind, but summed up the Riviera winter climate as being, as a whole, clear, bright and dry, with fog and mist practically unknown, with a winter temperature of 8° to 10° higher than England though subject to considerable nocturnal radiation, with about half the number of rainy days, and four or five times the number of bright ones, which we can boast of; with cold winds and cold weather, without which it would lose its health-giving effect.

After the delivery of this address the meeting was adjourned, in order to allow the Fellows and their friends an opportunity to inspect the Exhibition of Instruments relating to Climatology, which had been arranged in the rooms of the Institution of Civil Engineers, 25, Great George Street. The Meteorological office showed a set of instruments necessary for the equipment of a climatological station, viz., Stevenson thermometer screen, fitted with dry bulb, wet bulb, maximum and minimum thermometers; and also a rain-gauge. Thermometers were also shown for ascertaining the temperature on the ground, under the ground, and at a distance, as well as for recording temperature continuously. Various forms of sunshine recorders were exhibited, as well as a number of actinometers and solar radiation instruments for ascertaining the heating effect of the solar rays. The exhibition included a large and interesting collection of hygrometers, also several rain-gauges and other instruments. Among the curiosities was a piece of plate glass which was "starred" during a thunderstorm on August 21st, 1879; this was not broken, but it has a number of wavy hair-like lines. The exhibition contained a large number of beautiful photographs of clouds, lightning, and snow scenes, as well as of the damage done by the destructive tornado at Lawrence, Mass., U.S.A.

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, SEPTEMBER, 1891.

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.	
	Temp.	Date.	Temp.	Date.									
	°		°		°	°	°	0-100	°	°	inches		
England, London	80·4	13	43·3	24	68·5	51·4	51·7	77	116·9	39·4	1·03	15	4·6
Malta.....	96·6	8	63·9	27	84·4	70·4	65·3	71	148·6	57·0	·65	4	2·6
Cape of Good Hope ...	81·1	3	38·9	14	62·9	48·0	...	...	...	...	3·20	10	4·8
Mauritius.....	78·4	30	63·2	2	75·5	66·0	61·1	74	131·6	53·3	2·50	18	5·6
Calcutta	91·1	15	74·0	21	86·9	77·6	78·0	88	156·2	73·1	9·25	19	6·7
Bombay.....	87·0	28	73·2	29	84·7	76·3	75·3	85	141·0	70·9	22·53	25	7·7
Ceylon, Colombo	87·9	27	72·8	6	85·9	77·3	71·5	75	146·0	70·0	4·42	21	5·5
Melbourne.....	77·1	30	35·9	26	63·2	45·7	45·8	73	127·6	29·4	1·14	14	5·4
Adelaide	80·6	3	42·4	15	67·4	49·8	45·0	60	144·2	32·2	·76	17	5·0
Tasmania, Hobart.....	79·5	30	35·2	7, 11	60·8	41·8	43·7	73	127·0	26·7	·40	14	5·6
Wellington .....	...	...	...	...	...	...	...	...	...	...	...	...	...
Auckland	90	20	43·5	4, 5	62·1	49·5	46·9	72	132·0	33·0	1·96	13	5·4
Jamaica, Kingston.....	91·7	25	70·5	7	89·4	74·4	72·4	75	...	...	1·54	...	...
Trinidad	92·0	1, 8a	68·0	6, 20	89·1	71·5	73·2	79	159·0	63·0	7·44	18	...
Toronto	87·5	25	41·9	30	...	...	56·5	80	...	37·0	1·71	8	3·6
New Brunswick, Fredericton	82·7	25	37·5	16	...	...	53·7	78	...	...	3·56	11	4·5
Manitoba, Winnipeg ...	84·8	19	31·1	8	...	...	50·5	78	...	...	2·02	18	5·1
British Columbia, Esquimalt	68·6	1	41·5	27	...	...	52·9	95	...	...	4·27	16	6·5

a And 20.

REMARKS.

MALTA.—Mean temp. 75°·8; mean hourly velocity of wind 7·3 miles. Sea temp fell from 81°·0 to 76°·0. TSS on 19th and 20th; L on 4 days. J. SCOLES.

Mauritius.—Mean temp. of air 0°·3 above, dew point 0·3 above, and R 1·03 in. above their respective averages. Mean hourly velocity of wind 12·1 miles, or 0·1 mile above average; extremes, 27·0 on 4th and 2·0 on 29th; prevailing direction E.S.E. $\frac{1}{2}$ S. C. MELDRUM, F.R.S.

CEYLON.—L only was seen on the 26th, 27th, 28th, 29th and 30th.

J. C. H. CLARKE, Lt.-Col., R.E.

Melbourne.—Mean temp. of air 1°·2, of dew point 2°·1, and humidity 2, above their respective averages; R 1·11 in., and cloud 0·7, below their averages. Prevailing winds S. and N., strong on 10 days. Heavy dew on 13 days. Dense fog on the morning of the 19th; L on 1st; T and L on the 2nd. R. L. J. ELLERY, F.R.S.

Adelaide.—Mean temp. 1°·5 above and R. 1·03 in. below the average of 34 years. The R for the first 9 months of the year is little more than half the average, and 1·68 in. below the previous lowest record. C. TODD, F.R.S.

Tasmania, Hobart.—Mean temp. of air 0°·6 above, dew point 0°·8 below, and humidity 4 below the averages of 7 years. Prevailing winds N.W. and S. R very slight. J. SHORTT, CAPT. R.N.

Auckland.—An unusually fine and dry month, the mean temp being 1° above the average, and the R 1·5 in. below the average. T. F. CHEESEMAN.

SUPPLEMENTARY TABLE OF RAINFALL,
MARCH, 1892.

[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.	1·54	XI.	Builth, Abergwessin Vic.	1·86
"	Birchington, Thor	1·85	"	Rhayader, Nantgwillt..	1·59
"	Brighton Prestonville Rd	1·00	"	Corwen, Rhug	1·56
"	Hailsham	1·45	"	Carnarvon, Cocksidia ...	1·60
"	Ryde, Thornbrough	1·03	"	I. of Man, Douglas	·98
"	Alton, Ashdell	1·22	XII.	Stoneykirk, Ardwell Ho.	·53
III.	Oxford, Magdalen Col...	·37	"	New Galloway, Glenlee	1·29
"	Banbury, Bloxham	·71	"	Melrose, Abbey Gate ...	1·72
"	Northampton, Sedgebrook	·74	XIII.	N. Esk Res. [Penicuick]	2·15
"	Cambridge, Fulbourne..	1·43	"	Edinburgh, Blacket Pl.	1·37
"	Wisbech, Bank House..	·75	XIV.	Glasgow, Queen's Park.	·58
IV.	Southend	1·49	XV.	Islay, Gruinart School..	1·33
"	Harlow, Sheering ...	1·27	XVI.	Dollar	·88
"	Rendlesham Hall	1·75	"	Balquhider, Stronvar..	2·27
"	Diss	2·18	"	Coupar Angus Station..	·59
"	Swaffham	·79	"	Dunkeld, Inver Braan..	1·00
V.	Salisbury, Alderbury ...	·80	"	Dalnaspidal H.R.S. ...	1·33
"	Bishop's Cannings	·68	XVII.	Keith H.R.S.	·23
"	Blandford, Whatcombe .	·79	"	Forres H.R.S.	1·29
"	Ashburton, Holne Vic...	2·24	XVIII.	Fearn, Lower Pitkerrie.	1·02
"	Okehampton, Oaklands.	1·35	"	Loch Shiel, Glenaladale	2·40
"	Hartland Abbey	1·24	"	N. Uist. Loch Maddy ...	1·98
"	Lynmouth, Glenthorne.	1·02	"	Invergarry	1·74
"	Probus, Lamellyn	1·16	"	Aviemore H.R.S.	1·54
"	Wincanton, Stowell Rec.	·74	"	Loch Ness, Drumnadrochit	2·03
"	Clevedon, Charleville ...	...	XIX.	Lairg H.R.S. ....	...
VI.	Bristol, Clifton .....	...	"	Scourie	2·53
"	Ross, The Graig	·89	"	Watten H.R.S.	·83
"	Wem, Clive Vicarage ...	·85	XX.	Dunmanway, Coolkelure	2·98
"	Cheadle, The Heath Ho.	·90	"	Fermoy, Gas Works ...	1·01
"	Worcester, Diglis Lock	·70	"	Killarney, Woodlawn ...	2·03
"	Coventry, Coundon	·94	"	Tipperary, Henry Street	·97
VII.	Ketton Hall [Stamford]	1·19	"	Limerick, Kilcornan ...	·68
"	Grantham, Stainby	1·25	"	Ennis	·56
"	Horncastle, Bucknall ...	1·18	"	Miltown Malbay	·74
"	Worksop, Hodsck Priory	·97	XXI.	Gorey, Courtown House	1·17
VIII.	Neston, Hinderton	1·18	"	Mullingar, Belvedere ...	·69
"	Knutsford, Heathside...	1·14	"	Athlone, Twyford	·71
"	Lancaster	·57	"	Longford, Currygrane...	·96
"	Broughton-in-Furness..	2·04	XXII.	Galway, Queen's Coll...	·90
IX.	Ripon, Mickley	1·02	"	Crossmolina, Enniscoe..	1·94
"	Scarborough, West Bank	1·14	"	Collooney, Markree Obs.	·80
"	East Layton [Darlington]	·89	"	Ballinamore, Lawderdale	1·13
"	Middleton, Mickleton..	·50	XXIII.	Lough Sheelin, Arley ..	·84
X.	Haltwhistle, Unthank..	1·25	"	Warrenpoint	·47
"	Bamburgh	1·05	"	Seaforde	·71
"	Newton Reigny	·82	"	Belfast, New Barnsley..	·86
XI.	Llanfrechfa Grange	1·10	"	Bushmills, Dundarave...	·98
"	Llandovery	1·35	"	Stewartstown	1·01
"	Castle Malgwyn	·92	"	Buncrana	·87

MARCH, 1892.

Div.	STATIONS. [The Roman numerals denote the division of the Annual Tables to which each station belongs.]	RAINFALL.						Days on which -0.1 or more fell.	TEMPERATURE.				No. of Night below 32°	
		Total Fall.	Differ- ence from average. 1880-9.	Greatest Fall in 24 hours		Dpth	Date		Max.		Min.		In shade.	On grass.
				inches.	in.				Deg.	Date	Deg.	Date.		
I.	London (Camden Square) ...	1.04	— .57	.20	15	9	59.8	18	22.3	9	19	25		
II.	Maidstone (Hunton Court)...	1.94	+ .44	.55	15	10	...	...	...	...	...	...
III.	Strathfield Turgiss	1.04	— .55	.34	15	11	57.1	31	20.1	9	21	28		
	Hitchin	1.03	— .31	.34	15	12	58.0	18 ^b	22.0	7, 9	24	...		
IV.	Winslow (Addington) .....	.55	— 1.17	.18	27	8	60.0	18 ^c	19.0	9, 14	23	26	
V.	Bury St. Edmunds (Westley)	1.35	— .20	.32	21	10	54.0	17	12.0	10 ^e	...	...
	Norwich (Cossey) .....	.96	— .46	.24	15	9	58.0	18	15.0	10	10	15	
VI.	Weymouth (Langton Herring)	.77	— 1.13	.39	15	7	57.0	31	24.0	9	18	...		
	Torquay, Babbacombe	1.15	— 1.80	.59	15	7	53.3	27	25.7	10	14	21		
VII.	Bodmin (Fore Street)	1.25	— 2.53	.53	15	7	...	...	...	...	...	...
	Stroud (Upfield) .....	.95	— 1.24	.44	15	11	61.0	18	24.0	8, 12	24	...	
VIII.	Church Stretton (Woolstaston)	.95	— 1.18	.24	8, 15	11	60.0	18	21.0	10	23	26		
	Tenbury (Orleton) .....	.82	— 1.26	.30	15	10	63.0	31	20.0	13	21	26	
IX.	Leicester (Barkby)	1.00	— .71	.32	15	14	62.0	18	14.0	9	25	29		
	Boston .....	.85	— .69	.22	15	7	66.0	31	21.0	10	21	...	
X.	Hesley Hall [Tickhill] .....	.73	— 1.17	.29	15	9	65.0	31	19.0	14	25	...	
	Manchester (Plymouth Grove)	.93	— 1.29	.48	15	5	64.0	18	15.0	11	24	26		
XI.	Wetherby (Ribston Hall) ...	1.19	— .87	.48	10	7	...	...	...	...	...	...
	Skipton (Arncliffe)	1.00	— 4.10	.26	8	10	...	...	...	...	...	...
XII.	Hull (Pearson Park)	1.26	— .79	.21	9 ^a	17	64.0	31	19.0	12	23	28		
	Newcastle (Town Moor)	1.73	— .90	.50	26	14	...	...	...	...	...	...
XIII.	Borrowdale (Seathwaite)	3.29	— 7.21	1.60	17	9	...	...	...	...	...	...
	Cardiff (Ely) .....	.96	— 2.02	.54	15	7	...	...	...	...	...	...
XIV.	Haverfordwest	1.42	— 1.82	.43	16	12	56.4	19	19.0	13	24	29		
	Aberystwith, Gogerddan .....	.91	— 2.07	.35	14	6	63.0	18	16.0	12	26	...	
XV.	Llandudno	1.13	— .95	.24	15	11	...	...	...	...	...	...
	Cargen [Dumfries]	1.03	— 2.27	.30	9, 26	7	61.4	18	17.6	28	21	...		
XVI.	Jedburgh (Sunnyside) .....	...	...	...	...	...	...	...	...	...	...	...
	Old Cumnock	1.31	— 1.82	.40	26	9	...	...	...	...	...	...
XVII.	Lochgilphed (Kilmory)	1.12	— 3.34	.59	9	6	...	...	18.0	11	24	...
	Oban (Craigvarren) .....	.66	...	.31	16	7	59.2	19	22.2	29	14	...
XVIII.	Mull (Quinish)	1.58	— 2.26	.76	16	11	...	...	...	...	...	...
	Loch Leven Sluices .....	.60	— 2.37	.20	13 ^f	4	...	...	...	...	...	...
XIX.	Dundee (Eastern Necropolis)	.90	— 1.50	.45	10	6	59.0	31	20.1	10	22	...		
	Braemar .....	.37	— 2.27	.13	16	9	51.3	18	3.3	16	23	28	
XX.	Aberdeen (Cranford)	1.06	...	.31	12	15	66.0	31	16.0	15	23	...
	Strome Ferry	2.40	— 2.23	.60	16	16	...	...	...	...	...	...
XXI.	Cawdor [Nairn]	1.64	— .40	.40	14	13	...	...	...	...	...	...
	Dunrobin	1.03	— 1.22	.38	11	7	55.0	31	22.0	27	20	...		
XXII.	S. Ronaldsay (Roeberry)	1.37	— 1.17	.30	16	18	49.0	17 ^d	20.0	26	17	...		
	Darrynane Abbey	2.75	...	.93	14	10	...	...	...	...	...	...
XXIII.	Waterford (Brook Lodge) ...	1.12	— 1.78	.44	15	9	62.0	31	23.0	13	18	...		
	O'Briensbridge (Ross) .....	.53	...	.22	15	6	56.0	31	23.0	11	25	...
XXIV.	Carlow (Browne's Hill)	1.04	— 1.33	.45	15	9	...	...	...	...	...	...
	Dublin (Fitz William Square)	.99	— 1.02	.40	14	9	59.2	17	23.8	11	16	25		
XXV.	Ballinasloe .....	.68	— 1.95	.24	10	8	...	...	...	...	...	...
	Clifden (Kylemore)	2.52	...	.62	14	9	...	...	...	...	...	...
XXVI.	Waringstown .....	.90	— 1.45	.26	9	10	65.0	31	16.0	11	25	26	
	Londonderry (Creggan Res.) ..	1.43	— 1.30	.48	26	14	...	...	...	...	...	...
XXVII.	Omagh (Edenfel) .....	.76	— 1.75	.20	9	13	58.0	18	18.0	10	20	23	

^a And 11, 15. ^b And 31. ^c And 19, 31. ^d And 18, 21, 25, 30, 31. ^e And 11. ^f And 27.

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

METEOROLOGICAL NOTES ON MARCH, 1892.

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

ENGLAND.

STRATHFIELD TURGISS.—March was cold throughout, only three nights being without frost upon the ground, while on the 5th, 9th and 13th, the cold was intense for the time of year. All agricultural development was consequently retarded. S on 9th and 10th.

ADDINGTON.—By far the smallest rainfall recorded in March at this station during 22 years. Frost in shade every night from 2nd to 15th, at which date ice was two inches thick on the lake. Min. in shade on 9th and 10th, 19° and 21°, and on 13th and 14th, 21° and 19°. From the 16th to the 21st the max. temp. was rather higher, but it fell off again until the last day, when it rose to 60°. The last three days were almost cloudless and the nights very cold. Dense fog in the morning on 26th.

BURY ST. EDMUNDS, WESTLEY.—Cold and winterly, with snow on the ground most of the month; very cold on 10th and 11th. Very little wind for March. Vegetation very backward. S on six days.

LANGTON HERRING.—With the exception of March, 1879, when only .42 in. of R fell, this was the driest March for 18 years, making the deficit for the three months of this year 2.82 in. or 41 per cent. The mean temp. at 9 a.m. 36°.4 is as much as 5°.2 below the average of 20 years, and only in 1886 was there a colder March during that period; while in only seven months in 20 years has the mean min. been lower. Fogs on 16th and 26th. Solar halos on 8th, 12th, 13th and 20th; fine lunar halo on 7th.

TORQUAY, BABBACOMBE.—A fine, very dry and cold month, with great excess of N.E. wind and a rather high bar. No R was measured in the 11 days, February 26th to March 7th, and only .01 in. on the 26th, in the last 15 days; S showers were frequent from 2nd to 10th, and on the 14th; R fell on the 15th and 16th. It was dull on 2nd, 3rd, 4th, 7th, 25th and 26th; fine and sunny on 11th, 12th, 18th, 19th, 23rd, 29th, 30th and 31st; cold from 1st to 14th (especially on 3rd, 4th and 8th,) and on 25th, 26th, 28th and 29th; warm on 16th, 17th, 18th, 21st, 27th and 31st. Max. shade temp. rose to or above 50° on 6 days, but only to 31°.5 on 3rd and 32°.0 on 4th. Frost in air on 13 consecutive nights (2nd to 14th). It was the coldest March (mean of 9 a.m., 9 p.m., max. and min. temp. 38°.7) registered except in 1883 when it was 38°.4. The number of days of N.E. wind (10) was more, and of wet days (7) was less than in any of the preceding 15 Marches. The total R of the 3 months from January 1st (4.85 in.) was the least registered in the first quarter of any year. N.E. winds on 13 days, E. on 8, N.W. and S.W. and variable 3 days each, W. on 1 day. Gales on 3rd and 15th; soft H on 9th, 10th and 14th; S on nine days, covering the ground from 9th to 15th, max. depth 2 inches on 10th. Solar halos on 8th, 12th, 13th, 20th, 21st, 27th and 31st; Lunar halos on 7th, 12th, 13th and 14th. (*Erratum*).—In February the min. occurred on the 17th, not on the 18th.

BODMIN.—The coldest March known, and the driest during the 29 years recorded. Cold and dry with frost at night, to the 7th, and from the 10th to the 13th. S H and R on the 14th, 15th, 16th and 17th, and then dry and bright sunny days and frost nearly every night, to the end of the month. Gales of wind on 9th, 15th, 16th and 22nd. Splendid weather for tilling.

STROUD, UPFIELD.—East winds on 8 days, N.E. on 10. Very cold from 1st to 5th. S showers on the 9th and 27th, heavy S on the 10th.

WOOLSTASTON.—The first fortnight was intensely cold and S fell on several days, heavily on 8th; a thaw set in on the 16th, but the latter part of the month was again very cold and S fell heavily on the 27th. Mean temp. 36°.4.

TENBURY, ORLETON.—A very dry, cold month, being the driest March but one, and the coldest but two since 1860. On 10 days during the first 15 the ther. never reached 40°. Severe frost most of the month, and S on the 2nd.

8th, 9th, 11th, 13th 14th and 27th. Fog on 20th, 24th and 25th. Lunar halo on 7th.

LEICESTER, BARKBY.—A very cold month; mean temp. $36^{\circ}0$. A very late spring.

MANCHESTER, PLYMOUTH GROVE.—The driest March for 25 years' excepting March, 1875, and the coldest for 25 years except March, 1882, when the mean temp. was 36° . Slight S fell on 1st, 2nd, 3rd and 27th, a heavier fall on 9th and a fall of 7 to 8 inches on the 10th. Dense fog occurred on 12th but cleared away about noon, and thick fog on the mornings of the 30th and 31st. A complete thaw set in on the 15th. It was very fine on 18th, 19th and 20th; fair with cold wind from 21st to 26th. Mean temp. $37^{\circ}3$.

WALES.

HAVERFORDWEST.—A very severe March. S with violent wind prevailed from the 9th to the 12th, which was difficult to measure, as it was so dry, that the wind blew it away. The temp. was uniformly low, the mean day reading of the 12 days, from the 2nd to the 14th, not being higher than 36° , and the night readings as low as 25° . Damp weather with thaw occurred about the 17th and 19th, followed to the end by brilliant days and cold frosty nights. Some S fell on the 28th, and the ther. in shade fell to $22^{\circ}3$ on the morning of the 29th.

SCOTLAND.

CARGEN.—The mean temp. of the month $36^{\circ}6$ (4° below the average), is the lowest recorded in March during 33 years, with the exception of 1883, when the mean was $35^{\circ}5$, and 1888, when it was $36^{\circ}4$. The first 16 days were very cold, the mean for the period being only $33^{\circ}4$. An interval of comparatively mild weather occurred from 17th to 20th, when the mean temp. was $47^{\circ}4$, but the latter part of the month was again very cold. Easterly winds prevailed for 23 days; S fell on 5 days. The R for the first quarter of the year has been 5.85 inches below the average.

OBAN.—A very fine and dry month, with much sunshine, but occasional cold winds and S showers.

S. RONALDSAY, ROEBERRY.—Upon the whole a fine month, but cold.

IRELAND.

DARRYNANE ABBEY.—The first half of the month was very cold with strong N.E. wind; from 15th to 20th it was foggy, and the last 11 days were very fine, with sharp frost at night from 27th to 30th. Vegetation very backward. S and H showers on the 8th, 9th and 10th. S on 13th.

WATERFORD, BROOK LODGE.—Prevailing winds, N.E. to S.E.; mean temp. $38^{\circ}5$; the driest March since 1878; S on the 8th; fog on 24th.

O'BRIENSBRIDGE, ROSS.—The driest March on record; many bright days, but temp. very low.

DUBLIN.—A remarkably cold, dry month, with scanty R, and a great prevalence of searching polar winds. The week ending Saturday the 12th was the coldest experienced in Dublin during the winter of 1891-2, and had it not been for a temporary rise of the ther. to $55^{\circ}7$ on the 31st, the month would have proved the coldest March on record within the past 30 years. The mean temp. $39^{\circ}1$, was $2^{\circ}2$ below that of February, and $4^{\circ}0$ below the average. The atmosphere was thick with dry smoke fog on the 4th, 6th, 7th, 12th, 20th, 21st, 24th, 29th, 30th and 31st. High winds were noted on 4 days, reaching the force of a gale on the 18th. S or sleet occurred on 7 days; H fell on 9 days. The temp. exceeded $50^{\circ}0$ in the screen on only 6 days, compared with 9 days in March, 1891, and 19 days in March, 1890, while it fell to or below 32° in the screen on as many as 16 days, compared with 10 days in March, 1891, and only 4 days, in March, 1890.

EDENFEL.—The weather was dry and cold to the 8th, when it gave place to excessive frost, with considerable S. The third week was milder with some R, thence to the 28th was very cold, with occasional slight S and sharp night frosts. The month ended in brilliant and milder weather. S on 9 days; H on 21st. The R for the three months to March 31st (chiefly made up of melted S) 4.76 in., is little more than half the average, and the smallest for the same period for at least 28 years. The springs are already failing.