

SYMONS'S METEOROLOGICAL MAGAZINE.

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Admiral de Brito Capello.

VICE-ADMIRAL JOÃO CARLOS DE BRITO CAPELLO, who had been Director of the Infante D. Luiz Observatory at Lisbon for twenty six years, died on May 2nd, very shortly after his retirement from active scientific work. He had represented Portuguese Meteorology at International Conferences for many years, and had contributed several important memoirs to the literature of his subject. Amongst these we may mention his maps of the winds and currents of the Gulf of Guinea, which were translated and re-issued by the French Government, and the three first sheets of a series of charts of the winds and currents of the Atlantic; a work which he did not live to complete. He was also the author of a treatise on the variation of the compass.

Admiral Capello was an honorary member of the Meteorological Societies of London and Berlin, and he had been rewarded for the naval and scientific services which he rendered to his own Government by a shower of Orders.

THE LONDON THUNDERSTORM OF JULY 25TH.

MR. SYMONS probably "touched the spot" of the St. Swithin myth when, in this magazine for August, 1892 (Vol. 27, p. 102) he suggested that the old belief might with some appearance of truth be put in the form "that somewhere in the British Isles there would be within a week of St. Swithin's Day a fall of from two to five inches of rain." Perhaps it might be put in a simpler form still by merely stating that severe thunderstorms are fairly common in the second half of July.

After an absolute drought of nineteen days a thunderstorm of unusual intensity, accompanied by extremely heavy rain, broke over London on Thursday, July 25th. It was interesting for many reasons, amongst others for its restricted locality, and for the slowness with which its influence extended from the centre of greatest activity. So far as we can ascertain that centre was situated somewhere in the vicinity of King's Cross, and certainly not very far

from Camden Square. The following account, of the phenomenon, as observed there, appeared in the *Times* of July 27th :—

The storm of to-day recalls that of July 27th last year, which also terminated a long period of drought and heat. On the present occasion the heat has been less intense, and the absolute drought lasted only 19 days, whereas in July, 1900, it prevailed for 20 days. Thunder was first heard at 11.45 this forenoon, when the sky had assumed a very lurid appearance, especially in the east; large drops of rain began to fall at 0.10 p.m., and the first lightning was almost simultaneous with the commencement of heavy rain at 0.14 p.m. Hail soon mingled with the rain, and continued with frequent lightning and thunder till 0.35 p.m., when the storm, which had commenced in the east, appeared to be working off to the west. The hail was heaviest about 0.18 p.m., when the ground was almost covered. The hailstones were of two forms; irregular shaped pieces of clear ice, the largest seen being 0.45 in. in greatest diameter, and roughly conical stones of opaque, but hard, ice, many 0.5 in. in greatest diameter, and several just over 0.6 in.

There was a decided lull in the storm between 0.35 p.m. and 0.45 p.m., the hail ceasing, and the rain, thunder, and lightning diminishing in intensity, but at 0.47 p.m. it broke again with two vivid and intensely blue flashes of lightning extremely near, and again heavy hail which whitened the ground, but was smaller and softer than in the previous fall. The storm continued with severity till 1.15 p.m., and then gradually passed away to the west, the rain continuing with somewhat frequent lightning and thunder till nearly 4 p.m.

The barometric trace shows distinct disturbance at the two periods of greatest intensity, but there is a marked absence of the typical thunderstorm curve. The lightning and thunder, though at times near, were in no way remarkable. The hail was unusually large, but the main feature of the storm was the rainfall.

Between 0.15 p.m. and 4.30 p.m., when the rain had ceased, 2.85 in. fell, and this amount has been exceeded on only one day in the 44 years since the late G. J. Symons commenced the record here—namely, in the great thunderstorm of June 23rd, 1878, when 3.28 in. of rain fell in an hour-and-a-half, the actual duration of the rain being only 56 minutes. The following are the periods of heaviest rain in to-day's storm :—

Time.	Period.	Amount of rain.	Rate per hour.
0.48 p.m. to 0.50 p.m. ...	2 min. ...	.23 in. ...	6.90 in.
0.48 p.m. to 0.54 p.m. ...	6 min. ...	.45 in. ...	4.50 in.
0.20 p.m. to 0.35 p.m. ...	15 min. ...	.71 in. ...	2.84 in.
0.20 p.m. to 0.40 p.m. ...	20 min. ...	.83 in. ...	2.49 in.
0.47 p.m. to 1.15 p.m. ...	28 min. ...	1.34 in. ...	2.88 in.
0.20 p.m. to 1.15 p.m. ...	55 min. ...	2.20 in. ...	2.40 in.

In an hour-and-a-half from the commencement of the storm 2.66 in. of rain fell, or about 80 per cent. of the fall in the same time in the great storm of June 23rd, 1878.

With regard to the nature of the storm in other parts of London we have been favoured with notes from several correspondents. Mr. J. E. CLARK, writing from the Wool Exchange, E.C. while the storm was in progress at 3 p.m., states that it began at about 11.45 a.m. and was well at work by noon, being practically synchronous with Camden Square, and he also observes that there was no sign of the characteristic barometer curve.

Many observers have remarked on the fact that long after the storm was raging fiercely over central London it remained dry and even sunny in the west. Mr. G. VON U. SEARLE states that at West Kensington the rain did not begin until 1 p.m. and was not exceptionally heavy, the total for the day being .57 in. At Addison Gardens, Kensington, where the rain also began about 1 p.m., Mr. G. H. M. WHISH reports a fall of .68 in., and at Willesden Green the total fall for the twenty-four hours was .35 in.

Mr. D. W. HORNER writes from Clapham Park, S. W., on the 31st :—
“The storm, which appears to have been fairly general throughout the metropolitan area, commenced in this locality at about noon, with distant T to the N.E. and S.W. simultaneously, and large drops of R. There seemed, in fact, to be two storms, the one lying over London, and the second over the Surrey Hills.

By 0.15 p.m. R was falling steadily, but L was not observed till 0.35, when R had practically ceased. A sharp display of L then ensued, the thunder following at an average interval of 5 secs., R by this time (0.42) having ceased altogether. At 0.45 R recommenced, and two minutes later was descending very heavily, to the accompaniment of long and loud peals of T. No L was observed, however, till 0.51, when a series of vivid flashes occurred, with a time interval of about two seconds, R meanwhile coming down heavily. At 0.57 H began, and a few violent electrical discharges between 0.58 and 1.2 (time interval only one second) brought down a heavy precipitation of H and R. T and L, with heavy R, continued till 1.30, the sharpest L being at 1.1.8 and 1.2.2, when T and L were simultaneous. On measuring R at 2 p.m., 0.57 in. was found in the gauge. At 3 p.m. a second storm came on, and lasted till 4.30, when 0.33 in. more was measured, making a total of 0.90 in. in four-and-a-half hours.

The wind varied between S.E. and S.W., temperature stood perfectly steady at 60°, and the barometer fell one-twentieth of an inch up to 3 p.m., and rose a similar distance later.”

It is remarkable, considering the vividness of the lightning and its great frequency, that so little damage was done. A cab-horse was said to have been struck in Charing Cross Road and a number of flag-staffs were shattered, but nothing serious is reported. With the rain, however, it was different. The drains and sewers in the neighbourhood of King's Cross were insufficient to carry off the flood water, which rushed in great volume into the tunnels of the Underground Railway, bringing the train service to a standstill, and in one

case at least partially drowning out the fire of an engine. So large a number of houses were flooded that several of the Board Schools near King's Cross were thrown open to accommodate about 300 people who had been flooded out.

This is merely a summary of raw facts regarding a particular thunderstorm rain ; but we hope in an early issue to publish an article of a more general nature on the same subject.

RAINFALL TRADITIONS.

No traditions are more interesting or more tenacious in their hold on the human mind than those which associate the fall of rain with the intercession of some particular saint. St. Swithin occurs to all minds, and we have seen in several newspapers about the end of July, remarks almost suggestive of surprise that although the 15th of July this year was dry in London, rains of unusual severity fell long before the traditional forty days had elapsed. We progress slowly, for it appears from the interesting reprints of selected news of the corresponding day's issue of 1801, now appearing daily in *The Times*, that a paragraph was published in that paper a century ago, intimating that the spell of fine weather following a wet St. Swithin's day would surely, at last, dissipate public belief in the superstition.

We have received a letter from an American friend who has travelled in all countries and lived amongst many peoples, and although it is in no sense scientific, it has a meteorological flavour which may perhaps justify its insertion. We trust that the majority of our readers will peruse this number of the magazine while enjoying a holiday, for the unclouded serenity of which they have our heartiest wishes. At such a time it is refreshing to glance at one of the curious mediæval survivals in the New World, of simple faith in the power of good men long departed to control the powers of the air. The letter runs :—

“ Fortunately you are not living in the days of Giordano Bruno, or your idea that there is a scientific reason for every rainfall might cause you to become the central figure of an *auto da fé*, for be it known to you that some parts of this earth are, at least as regards rainfall, under the protecting care of San Benito, a pious meteorologist of the first water. Many years ago I met his representative at Colonia del Sacramento, a little port of Uruguay, opposite the city of Buenos Aires. I had occasion to live there for three months or more. The weather was dry, the little town was sleepy, the sun beat upon the sandy shore and bluffs with a metallic quiver in every ray ; the ruins of a brick bastion, which, in Colonial days, protected an enormous contraband trade, seemed to look tired of being baked ; every blade of grass was bowing its head in prayer for water ; sheep and cattle in the camps were dying by thousands ; famishing dogs

lay panting in the streets. It was the great cholera season which so scourged the Plata district in 1868, the atmosphere was charged with strange influences, and frequently during the day my muscles and nerves would twitch and jerk as if subjected to electric shocks. If ever the services of some generous saint were required it was then, and so thought all of the woe-stricken inhabitants of the town.

Opposite to my house in the plaza was a little whitewashed church, and looking out of my window one morning I saw a large and solemn crowd of men and women entering the Church. Crossing the plaza, I learned that an appeal was to be made to San Benito to produce rain, but to properly propitiate him and put him in a humour to confer the desired blessing it was thought well to take him from his niche, put him on a little platform, and escort him to a small chapel about a mile distant to visit another saint whose particular name I forget, but believe it was Saint Joseph. So San Benito was taken to the plaza. When I saw that he was a black saint, and appeared to enjoy the sunshine, I began to doubt if he were the right man to perform the desired miracle. However, I determined to do all in my power to help him, and therefore joined in the long procession, in the midst of which San Benito on the platform carried by four men wended his way to pay the pious visit. After a religious ceremony at the chapel, we returned to Colonia, replaced the saint in his niche, dispersed to our respective homes and waited for it to rain. Not a drop fell! and the next day the same relentless sunshine seemed to indicate that the morals of the town were undeserving of San Benito's generous tears. At this the inhabitants got angry, and the following day they again took San Benito into the plaza, but this time, instead of an excursion, they gave him a sound thrashing with sticks. The next day it rained copiously!—G. E. C."

REVIEWS.

Meteorologische Beobachtungen vom XIV. bis XVII. Jahrhundert. Mit einer Einleitung. (Neudrucke von Schriften und Karten über Meteorologie und Erdmagnetismus, herausgegeben von PROFESSOR DR. G. HELLMANN. No. 13). Berlin, A. Asher & Co. Size 10 × 8½. Pp. 78 + 128. Plates.

THIS is the thirteenth number of Professor Hellmann's beautiful series of reprints, and it is one specially interesting to the English reader on account of the large part taken by Englishmen in the earliest centuries of observational meteorology. Readers of this Magazine will remember Professor Hellmann's letter to Mr. Symons in 1890, which led to the discovery of the MS. of William Merle's observations made at Driby, Lincolnshire, between 1337 and 1344, in the Bodleian Library at Oxford; and to the reproduction of the work itself in facsimile and in English translation ten years ago.

Two pages of the facsimile are reproduced here, and the latin text is transcribed. An anonymous set of notes for October to December, 1439, made somewhere in England, is also reproduced. The observer records several dates in November as "Dies serena et splendidissima," but his latin breaks down occasionally, and a word or two of the mother tongue creeps in, as on November 29th :—"Misty usque ad noctem cum gelu magno et cecidit in nocte ryme." The oldest continental record reproduced dates from 1502, the oldest from South America from 1640, and from North America, 1644. The earliest instrumental observations in England that are reproduced, possibly the earliest that were made, were those by Mr. Locke, in Oxford, in 1666, for three summer months. The thermometer employed was quite an experimental form, the defects of which are naively set forth in an accompanying "explication." A diagram of the rise and fall of the barometer for each month of the year 1684 is reprinted from the *Philosophical Transactions*, probably the first example of the graphic method. The reprints conclude with a number of records of observations at sea between 1492 and 1700.

Professor Hellmann's introduction gives a sketch of the history of meteorological observations, and a critical analysis of each of the examples he has published. The work as a whole is of the greatest historical value, and shows in a very interesting way how similar the weather of recent centuries has been, supplying a link of almost personal experience with the past.

The Weather at Clifton from 1890 to 1900. Being a Sequel to "Thirty Years' Weather at Bristol from 1860 to 1889. By ROBERT F. STURGE, F.R.Met.Soc. Bristol: Printed for Private Circulation. 1901. Size, $7\frac{1}{2} \times 5$. Pp. 98.

A SERIES of notes on the weather of the individual months, with yearly summaries and occasional short descriptions of remarkable phenomena, and general remarks on the decade. A short account of the position in which the observations were made and some account of the instruments employed would have been useful additions. During the eleven years under consideration the highest maximum temperature was 87° in 1893, the lowest minimum 14° in 1891. The wettest year was 1891, with a total fall of 42.98 in.; the driest 1892, with 26.35 in.; the greatest number of rainy days was 200 in 1894, and the smallest number 155 in 1899. A table is given showing the mean, maximum and minimum monthly rainfall and number of rainy days for the forty-five years from 1856 to 1900. The driest month was February, 1891, with .01 in., the wettest October, 1891, with 8.71 in. The mean rainfall shows April to be the driest month with 2.18 in., and October the wettest with 3.78 in., the mean annual fall being 34.86 in.

BOOKS RECEIVED.

Falmouth Observatory. Meteorological and Magnetical Tables and Reports for the year 1900; also additional Meteorological Tables for Falmouth for six consecutive lustra, 1871 to 1900, and tables of sea temperature by Wilson Lloyd Fox, F.R.Met.Soc., and Edward Kitto, F.R.Met.Soc. Reprinted from the Annual Report of the Royal Cornwall Polytechnic Society, 1900. Falmouth, 1901. Size $8\frac{1}{2} \times 5\frac{1}{2}$, p. 28.

Magnetical, Meteorological and Seismological Observations made at the Government Observatory, Bombay, 1898 and 1899, under the direction of N. A. F. Moos, Esq., B.Sc., F.R.S.E. With Appendices. Printed by order of His Majesty's Government. Bombay, 1901. Size 14×10 . Pp. [192]. *Plates*.

Report on Cloud Observations and Measurements in the plains of the North Western Provinces of India during the period December, 1898, to March, 1900, by E. G. Hill, Esq., B.A., Professor of Natural Science, Muir Central College, Allahabad. Being Vol. 11, Part 3 of the Indian Meteorological Memoirs. Calcutta, 1901. Size 14×10 . Pp. [50].

Le Climat de la Belgique en 1899, par A. Lancaster. Bruxelles, 1901. Size $7\frac{1}{2} \times 5$. Pp. 180. This and other papers kindly forwarded by M. Lancaster, are reprints from the *Annuaire Météorologique* for 1900, noticed in this Magazine for May, p. 65.

Meteorologische Beobachtungen angestellt in Jurjew im Jahre 1897. Zuryeff, 1901. Size $9\frac{1}{2} \times 6\frac{1}{2}$. Pp. 118. "Jurjew" is the German phonetic rendering of the Russian name which to English ears sounds Zuryeff, now applied to the ancient University town of Dorpat, in Russia.

Ueber die Wärmeleitungsfähigkeit des Schnees von Martin Jansson. (On the thermal conductivity of snow). Öfversigt af Kongl. Vetenskaps-Akademiens Föhandlingar, 1901, No. 3. Stockholm. Size $8\frac{1}{2} \times 5\frac{1}{2}$. Pp. (14). A study carried out at the University of Upsala.

Ergebnisse der Meteorologischen Beobachtungen an der Station I. Ordnung Chemnitz im Jahre 1898. Herausgegeben von Dr. Paul Schreiber. Chemnitz, 1901. Size $12\frac{1}{2} \times 10$. Pp. 40. *Plates*.

Decaden Monatsberichte (Vorläufige Mittheilung) des Königl. sächsischen Meteorologischen Institutes, 1900. Jahrgang III. Herausgegeben vom Director Professor Dr. Paul Schreiber. Chemnitz, 1901. Size $12\frac{1}{2} \times 8$. Pp. 48.

Climate, by William Miller. Cork, 1901. Size $7\frac{1}{2} \times 5$. Pp. 16.

Mysore Meteorological Memoirs, No. 1. Containing for the period 1895-1898 the hourly records obtained with the autographic instruments at the Bangalore Observatory; containing also a descriptive sketch of the Observatory and the Instruments. By John Cook, M.A., F.R.S.E. Bangalore, 1901. Size 14×11 . Pp. vi. + 100. *Plates*.

Report on Rainfall Registration in Mysore for 1900, by John Cook, M.A., F.R.S.E., Director of Meteorology in Mysore. Bangalore, 1901. Size 12×10 . Pp. 30. *Plates and Maps*.

Bulletin annuel de la Commission de la Météorologie du Département du Bouches-du-Rhône. Année 1900—19me. année. Marseille, 1901. Size $11\frac{1}{2} \times 9$. Pp. 104. *Plates*.

Jahrbuch der Meteorologischen Beobachtungen der Wetterwarte der Magdeburgischen Zeitung im Jahre 1899, Herausgegeben von Rudolph Weidenhagen. Band xviii. Jahrgang xix. Magdeburg, 1901. Size $12 \times 9\frac{1}{2}$. Pp. 94. *Plates*.

METEOROLOGICAL NEWS AND NOTES.

THIS month sees the departure of two fully equipped scientific expeditions to explore the Antarctic area, paying special attention to Magnetic and Meteorological Observations, but neglecting no branch of natural science. The British expedition in the *Discovery* sailed from London on July 31st, and from Spithead on August 5th, under the command of Captain R. F. Scott, R.N., with Mr. George Murray, F.R.S., as Chief of the Scientific Staff. Dr. H. R. Mill accompanied the vessel to Madeira, in order to assist in arranging the routine of oceanographical observations. The German ship *Gauss* sailed nearly simultaneously with an expedition under the command of Professor Erich von Drygalski, of the University of Berlin.

WE note with pleasure that an effort is being made at Windermere to obtain exact records of the duration as well as the amount of fall of rain. Possibly some holiday-makers are deterred by the notorious wetness of the Lake District from visiting the most beautiful scenery in England, and steps are now being taken at Bowness to establish a recording gauge which shall supply data as to the number of hours, as well as the number of inches of falling rain, and enable the tourist to estimate his chances of dry weather. It is worth remembering that the fine weather of districts of high rainfall is perhaps the very finest weather to be found, and that intense rains are usually soon over.

FREEZING FRESH WATER in Nature presents the puzzling phenomenon that even while ice is forming, the temperature of the water remains higher than 32° F. A recent number of *Petermanns Mittheilungen* contains a note by Herr Schuls, of Gmunden, in Upper Austria, who describes an experiment he made last February in the Gmunden lake, while it was beginning to freeze. By the use of a floating horizontal minimum thermometer he found that the extreme surface layer of the water was at 32° before the ice appeared; but it was impossible to dip a thermometer in the water in the ordinary way without mixing this very thin layer with the warmer water beneath, and so raising the temperature to 34° or 35°.

THE INFLUENCE OF FORESTS on the dampness of the ground and the yield of springs is discussed by Professor H. Gravelius in *Petermanns Mittheilungen* for March, in a review of a number of recently-published treatises on the subject, most of which have appeared in the Russian language, and so require an interpreter to bring them before even the learned of western Europe. The result is to show very clearly that forests do not preserve the moisture of the ground or promote the flow of springs. All the experiments showed that the level of ground water was lower under great forests than in open country, even in the Russian steppe. The forest appears to protect the ground altogether from light rains, which are

absorbed by the foliage or evaporated from the immense surface formed by the leaves as the drops trickle downwards. Heavy rains reach the ground nearly as freely as in open land, but here the tree roots play their part, and the transpiration of the vegetation keeps the soil dry to a considerable depth. These facts go to prove the immense value of forests on mountain sides for checking floods, and of the planting of woods in swampy country as an aid to drainage in drying the land.

A CLASSIFICATION OF CLIMATES, by Professor W. Köppen, occupies a large share of the March issue of the *Meteorologische Zeitschrift*, although it is only an abstract of the complete memoir published elsewhere. The classification is extremely elaborate, and is explained by supposing an ideal continent to stretch from pole to pole, with the sea on both sides. The tropical zone stretches straight across the centre, while three cooler zones on the north and south are wide on the west coast, narrowing towards the east. From the west side of the tropical zone an arid zone stretches northeastward, and another southeastward, across the cooler zones into the centre of the continent. There are thus, in addition to the tropical zone, four climatic divisions to the north, and the same four divisions repeated to the south. These great divisions are subdivided with reference to range of temperature and amount of rainfall, and each of the thirty sub-climates is named after one of its characteristic plants or animals. The merit of this classification lies in the recognition of the great climatic contrasts between the east and the west sides of continents, as well as the sharper contrasts between the equatorial and polar regions.

THE MEAN TEMPERATURE AT PARIS for the period 1851-1900 is discussed by M. Angot in the April number of the *Annuaire* of the French Meteorological Society. He gives the following monthly means and absolute extremes, which we translate into Fahrenheit degrees :—

Month ...	Jan.	Feb.	Mar.	Apr.	May.	June.	July.	Aug.	Sep.	Oct.	Nov.	Dec.	Year.
Mean ...	36.2	38.6	42.6	49.9	55.4	61.7	65.0	63.8	58.5	50.1	42.5	36.9	50.1
Max. ...	60.3	69.3	75.0	84.9	92.5	95.7	101.1	99.3	95.9	79.7	71.1	64.1	101.1
Min. ...	1.4	4.3	12.2	25.7	29.7	35.8	42.3	41.2	33.1	22.5	5.0	-14.1	-14.1

RAINFALL OBSERVATIONS seem to be badly wanted on the drainage area feeding the Great Salt Lake of Utah, the shrinkage of which has been causing some alarm in Salt Lake City. So much of the water which would naturally flow into the lake is now diverted for irrigation, that an exact knowledge of the available supply, by the establishment of a complete system of rain gauges, would seem to be as profitable to the state of Utah as a geological survey to the territory of Alaska. It is always difficult to grasp the idea of the intrinsic value as a national asset of the powers of the atmosphere rendered available by the form of the land ; but in some parts of the world the necessity of doing so is becoming very apparent.

MR. H. H. HARDING, in an article which has appeared in several newspapers, gave an interesting epitome of the weather of the nineteenth century, devoting a few lines to the salient features of each of the hundred years. He dealt of course with the general weather of the country, not that of any particular locality, and two circumstances strike one on reading the curt summaries; first, the remarkable variety of the weather from year to year, so that the description does not become wearisome from monotony; and second, the surprising similarity of the general type, extreme years being scattered with some approach to uniformity throughout the series. How difficult it is to form a true average of any element of weather from observations extending over a short period is shown by the fact that the first nine years of the century were without exception greatly deficient in rain (indeed, as Mr. Symons showed in *British Rainfall*, 1891, the rainfall of the country was above the average on only three years between 1800 and 1820, while it was below the average only on one year between 1875 and 1886, the longest wet period). The worst storm of the century is said to have been that of Christmas Day, 1836, and the wettest year 1852, while 1864 was one of the driest. The winters of 1816 and 1879 are recorded as the most severe in the century, and June, 1846 was the hottest summer month on record. Such a summary, while without the definite value which figures alone can give, is very useful as an aid to the memory of old people, who naturally tend to remember extremes and forget the many common-place years which lie between.

A SAND-BOW is apparently a new phenomenon, the observation of which is reported in *Science* by Prof. J. E. Talmage, of Utah University, who explains the appearance of a large "rainbow" when rain was not falling by the reflection of light from the outer surface of spherical grains of oolitic sand raised by the wind from the shore of Great Salt Lake.

Correspondence.

THE MAIDENHEAD STORM OF JULY 12TH.

To the Editor of Symons's Meteorological Magazine.

I SEE a letter from you in to-day's *Times* with regard to yesterday's storm. It may interest you to know that in the great storm here on the 12th inst. I measured 3.05 in. My neighbour, at a distance of half-a-mile, measured 3.22 in., and at Cookham Mr. Rogers measured 3.48 in. The storm here lasted from 7 to 11, during which time there was an interval of at least one hour, so that the rain fell at the rate of over an inch an hour. I have never before measured as much as two inches, and, as you know, I have kept registers for twenty-five years.

G. H. PALMER.

*Stafferton Lodge, Maidenhead,
26th July, 1901.*

A CONTRAST IN RAINFALL.

To the Editor of Symons's Meteorological Magazine.

THE following records of rainfall at Hazelhurst may be worth putting on record :—

From April 17th to April 30th (14 days), 1 day with rain.....	0·07 in.
„ May 1st to 31st (31 days), 7 days with rain	1·02 „
„ June 1st to 28th (28 days), 7 days with rain	0·67 „
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Making 73 days, with rain on 15	1·76 in.
June 29th, Thunderstorm.....	0·45 in.
„ 30th, „ „	0·85 „
July 1st
„ 2nd	1·16 „
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In 4 days	2·46 in.

The rain of July 2nd occurred principally between 10 and 11 a.m., during which time about 1 inch fell. There was no thunderstorm.

T. P. NEWMAN.

*Hazelhurst, Haslemere,
July 7th, 1901.*

A WARM MONTH AT NEWCASTLE.

To the Editor of Symons's Meteorological Magazine.

PERHAPS the following may interest some of your readers. On the 19th July the thermometer in the Stevenson screen rose to 86°·3, which is the highest temperature recorded here during the years 1887—1901. On July 20th the thermometer rose to 86°. The previous record for the same period was 84°·5 on September 4th, 1898. The thermometer has reached or exceeded 83° during the years 1887—1901 only nine times, and has reached or exceeded 80° only thirty-four times. This month has proved very warm :—

80°·6 on 5th, 84°·2 on 12th, 81°·2 on 18th,
86°·3 on 19th, 86°·0 on 20th,

while the thermometer has failed to reach 70° on only seven days so far. The situation of my screen is much above the town (altitude 314 ft.), where, of course, higher readings have been obtained.

E. L. MERZ

*The Quarries, Newcastle-upon-Tyne,
July 22nd, 1901.*

CLIMATOLOGICAL TABLE FOR THE BRITISH EMPIRE, FEBRUARY, 1901.

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		
London, Camden Square	53·3	28	17·9	14	41·2	31·4	32·1	85	85·7	16·3	1·21	9	6·9
Malta.....	67·2	2	40·3	15	60·1	48·2	46·5	80	122·3	36·2	3·68	12	4·6
Cape Town ...	99·1	23	48·7	21	79·1	60·3	58·3	67	...	...	·64	9	3·3
Mauritius.....	88·7	19	64·1	10	86·2	72·1	70·6	77	152·4	57·0	3·67	13	5·9
Calcutta.....	87·1	4, 5	53·1	26a	81·5	61·6	58·5	66	143·5	47·9	1·95	3	3·5
Bombay.....	90·6	25	58·4	22	80·4	66·2	59·3	62	140·7	48·9	·00	0	2·0
Colombo, Ceylon	94·0	19	71·0	20	90·4	73·5	73·4	81	154·0	69·8	3·55	11	3·5
Melbourne.....	109·5	7	49·1	4	80·7	57·5	54·0	62	158·3	36·8	·64	3	5·0
Adelaide	110·0	6	51·1	16	91·4	67·1	52·7	41	160·9	46·4	·03	2	4·6
Sydney	90·0	8	59·3	4	77·3	65·0	63·1	74	150·5	51·5	2·04	16	5·6
Wellington	75·0	22	46·0	26	67·4	55·0	49·8	67	132·0	43·0	2·65	12	4·5
Auckland	76·5	20	50·5	8	70·3	58·1	52·4	65	146·0	47·0	3·98	12	5·5
Jamaica, Halfway Tree	87·0	25	23·0	5	84·5	66·9	65·4	75	...	...	·00	0	1·3
Trinidad	93·0	27	61·0	17b	90·3	65·3	69·7	79	162·0	54·0	1·12	4	...
Grenada.....	85·2	19	69·0	3	82·8	72·5	69·1	72	153·0	...	1·33	13	2·0
Toronto.....	34·0	25	-2·4	10	24·3	8·9	12·7	80	57·0	-8·2	1·44	12	6·1
Fredericton	39·9	5	-14·3	2	26·1	7·2	9·0	73	...	...	3·28	11	6·3
New Brunswick, {													
Winnipeg, Manitoba ...	35·5	28	-27·6	20	11·2	-11·0	...	...	...	...	·90	9	...
Victoria, British {													
Columbia	58·4	28	28·3	9	45·8	36·3	...	...	...	...	3·36	16	6·0

a—and 27. b—and 27.

REMARKS.

MALTA.—Adopted mean temp. of air 53°·7 or 0°·4 below the average. Mean hourly velocity of wind 11·0 miles or 0·9 below average. Mean temp. of sea 60°·2. TSS on 3 days. H on 2 days. J. F. DOBSON.

Mauritius.—Mean temp. of air 0°·3, of dew point 0°·3, and R 2·99 in. below their respective averages. Mean hourly velocity of wind 7·2 miles, or 3·9 miles below the average; extremes, 18·1 on 1st and 1·8 on 13th; prevailing direction S.E. by E. to E. by N., and with occasional light airs from W. T on 4 days, L on 2 days, and L and T on 5 days. T. F. CLAXTON.

COLOMBO, CEYLON.—Mean temp. of air 0°·5 above, of dew point 3°·1 above, and R 1·66 in. above, their respective averages. Mean hourly velocity of wind 7·1 miles; prevailing direction N.E. and S.W. TSS occurred on 2 days, and L on 2 days. W. C. S. INGLES.

Adelaide.—Mean temp. of air 5°·2 above the average, having only twice been higher in February in 44 years. R ·61 in. below average. Fine well distributed rains over the interior of the State and the N. Territory. Dry and very hot in the more settled districts. C. TODD, F.R.S.

Sydney.—Mean temp. of air 0°·2 above, and R 3·05 in. below, their respective averages. H. C. RUSSELL, F.R.S.

Wellington.—Mean temp. of air 1°·3 below, and R ·89 in. below their respective averages. Generally showery, but with intervals of fine weather; cool for the time of year. Prevailing wind N.W., and often strong. R. B. GORE.

Auckland.—Unusually cool, mean temp. 3° below the average. R half-an-inch above the average. T. F. CHEESEMAN.

TRINIDAD.—R ·57 in. below the 30 years' average. J. H. HART.

SUPPLEMENTARY TABLE OF RAINFALL,
 JULY, 1901.

Div	STATION.	Total Rain.	Div.	STATION.	Total Rain.
		in.			in.
I.	Uxbridge, Harefield Pk..	1.38	XI.	Castle Malgwyn	3.19
II.	Dorking, Abinger Hall ..	1.77	„	Builth, Abergwesyn Vic.	2.14
„	Sheppey, Leysdown	2.31	„	Rhayader, Nantgwillt...	...
„	Hailsham	1.70	„	Lake Vyrnwy	3.85
„	Crowborough	2.28	„	Corwen, Rhug	2.99
„	Ryde, Thornbrough .....	...	„	Criccieth, Talarvor	2.91
„	Ensworth, Redlands	1.87	„	I. of Anglesey, Lligwy..	.70
„	Alton, Ashdell	2.80	„	Douglas, Woodville.....	1.21
„	Newbury, Welford Park ..	3.82	XII.	Stoneykirk, Ardwell Ho.	1.29
III.	Oxford, Magdalen Coll..	4.34	„	New Galloway, Glenlee ..	.84
„	Banbury, Bloxham	4.52	„	Moniaive, Maxwellton Ho.	1.60
„	Pitsford, Sedgebrook	1.66	„	Lilliesleaf, Riddell	3.63
„	Huntingdon, Brampton ..	1.93	XIII.	N. Esk Res. [Penicuik]	.85
„	Wisbech, Bank House...	1.48	XIV.	Glasgow, Queen's Park..	2.39
IV.	Southend	1.52	XV.	Inveraray, Newtown ...	2.22
„	Colchester, Lexden	2.53	„	Ballachulish, Ardsheal ...	3.68
„	Saffron Waldon, Newport	1.96	„	Islay, Eallabus	1.49
„	Rendlesham Hall .....	.57	XVI.	Dollar	1.45
„	Swaffham .....	.92	„	Balquhiddie, Stronvar...	4.51
V.	Salisbury, Alderbury ..	2.49	„	Coupar Angus Station...	1.47
„	Bishop's Cannings	2.74	„	Blair Atholl	2.04
„	Blandford, Whatcombe ..	1.70	XVII.	Keith H.R.S.	2.51
„	Ashburton, Druid House ..	2.44	„	Forres H.R.S.	3.75
„	Okehampton, Oaklands ..	1.81	XVIII.	Fearn, Lower Pitkerrie..	3.23
„	Hartland Abbey	1.53	„	S. Uist, Askernish	3.00
„	Lynton, Glenthorne ...	...	„	Invergarry .....	.87
„	Probus, Lamellyn	1.25	„	Aviemore, Alvie Manse.	1.37
„	Wellington, The Avenue ..	2.38	„	Loch Ness, Drumnadrochit	2.64
„	North Cadbury Rectory ..	2.04	XIX.	Invershin	2.84
„	Clifton, Pembroke Road ..	2.71	„	Durness .....	...
VI.	Ross, The Graig	2.96	„	Watten H.R.S.	1.83
„	Wem, Clive Vicarage ...	3.89	XX.	Dunmanway, Coolkelure ..	1.88
„	Wolverhampton, Tettenhall	...	„	Cork, Wellesley Terrace ..	.47
„	Cheadle, The Heath Ho. ...	3.24	„	Killarney, District Asyl.	1.01
„	Coventry, Priory Row ..	2.39	„	Caher, Duneske .....	.59
VII.	Market Overton	4.54	„	Ballingarry, Hazelfort...	1.17
„	Grantham, Stainby	3.70	„	Limerick, Kilcornan ...	...
„	Horncastle, Bucknall ...	2.03	„	Miltown Malbay	2.19
„	Worksop, Hodsck Priory ..	3.05	XXI.	Gorey, Courstown House ..	1.38
VIII.	Neston, Hinderton	2.57	„	Moynalty, Westland ...	1.33
„	Southport, Hesketh Park ..	1.72	„	Athlone, Twyford	1.32
„	Chatburn, Middlewood ..	1.96	„	Mullingar, Belvedere ...	.94
„	Duddon Val., Seathwaite Vic.	1.95	XXII.	Woodlawn	1.68
IX.	Baldersby	1.89	„	Crossmolina, Enniscoe ..	1.41
„	Scalby, Silverdale	2.37	„	Collooney, Markree Obs.	1.81
„	Ingleby Greenhow Vic..	4.23	XXIII.	Enniskillen, Model Sch.	2.07
„	Middleton, Mickleton ...	1.25	„	Warrenpoint .....	.73
X.	Haltwhistle, Unthank H. ...	...	„	Miltown, Banbridge.....	1.15
„	Bamburgh	2.07	„	Belfast, Springfield	1.37
„	Keswick, The Bank	1.14	„	Bushmills, Dundarave..	1.60
XI.	Llanfrechfa Grange	2.56	„	Stewartstown	1.12
„	Treherbert, Tyn-y-waun ..	2.28	„	Killybegs	1.35
„	Llandovery	2.44	„	Horn Head	1.89

JULY, 1901.

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 1890-9.	Greatest Fall in 24 hours.		Max.		Min.		In shade.	On grass.	
						Deg.	Date	Deg.	Date			
inches.	inches.	in.										
I.	London (Camden Square) ...	5.04	+ 2.79	2.85	25	8	89.9	19	48.4	8	0	0
II.	Tenterden	2.22	— .38	.54	26	8	85.0	12 ^b	48.5	8	0	0
"	Hartley Wintney	1.82	— .54	.38	26	11	91.0	18	45.0	1, 17	0	0
III.	Hitchin	1.83	— .58	.85	26	7	87.0	19	46.0	8	0	0
"	Winslow (Addington)	1.40	— 1.07	.39	26	8	90.0	19	45.0	8	0	0
IV.	Bury St. Edmunds (Westley)	1.06	— 1.85	.69	26	5	87.5	18	46.0	10	0	0
"	Norwich (Brundall)	1.19	— .	.46	24	6	83.3	21	46.8	10	0	0
V.	Winterbourne Steepleton ...	...	...	...	...	...	...	...	...	...	...	...
"	Torquay (Cary Green) ...	1.84	— .	.62	27	7	78.6	10	50.3	16	0	0
"	Polapit Tamar [Launceston]..	1.20	— 1.82	.73	24	9	85.2	19	39.5	16	0	0
VI.	Stroud (Upfield)	2.27	— .34	.48	13	9	86.0	19 ^c	55.0	13 ^e	0	0
"	Church Stretton (Woolstaston)	3.83	+ 1.50	1.56	24	12	83.0	18	51.0	1 ^f	0	0
"	Worcester (Diglis Lock)	2.69	+ .93	.77	24	8	...	...	...	...	...	...
VII.	Boston	1.74	— .38	.59	24	7	90.0	18	50.0	16	0	0
"	Hesley Hall [Tickhill]	2.33	+ .36	.88	24	9	92.0	19	41.0	14	0	0
"	Derby (Midland Railway)	3.31	+ 1.00	1.28	24	9	91.0	18 ^b	47.0	14	0	0
VIII.	Manchester (Plymouth Grove)	3.30	+ .18	2.07	25	9	93.0	20	48.0	13	0	0
IX.	Wetherby (Ribston Hall) ...	1.22	— 1.07	.40	1	11	...	...	...	...	...	...
"	Skipton (Arncliffe)	1.96	— 3.07	1.29	27	9	...	...	...	...	...	...
"	Hull (Pearson Park)	1.96	— .36	.84	27	10	84.0	5 ^d	45.0	14	0	0
X.	Newcastle (Town Moor)	3.52	+ .83	1.29	19	13	...	...	...	...	...	...
"	Borrowdale (Seathwaite)	2.27	— 7.14	1.02	14	9	84.0	20	46.4	14	0	0
XI.	Cardiff (Ely)	3.57	+ .33	1.09	28	8	...	...	...	...	...	...
"	Haverfordwest	1.16	— 2.18	.34	24	8	84.5	20	47.1	16	0	0
"	Aberystwith (Gogerddan) ...	2.58	— 1.04	.96	24	8	93.0	20	...	...	...	...
"	Llandudno	2.10	— .48	.95	25	13	89.5	20	49.0	7	0	0
XII.	Cargen [Dumfries]	1.75	— 1.59	.85	20	6	89.0	20	45.0	31	0	0
XIII.	Edinburgh (Royal Observatory) .....	.96	— .	.26	24	12	80.6	11	44.7	4	0	0
XIV.	Colmonell .....	.92	— 2.28	.25	21	7	85.0	20	43.0	6	0	0
XV.	Tighnabruach	1.43	— .	.50	21	10	75.0	20	46.0	2, 6	0	0
"	Mull (Quinish) .....	...	...	...	...	...	...	...	...	...	...	...
XVI.	Loch Leven Sluices .....	.69	— 2.38	.31	22	6	...	...	...	...	...	...
"	Dundee (Eastern Necropolis) .....	.90	— 1.46	.30	26	8	82.7	18	48.4	2	0	0
XVII.	Braemar	1.32	— 1.45	.25	26	11	78.0	4	41.0	3	0	0
"	Aberdeen (Cranford)	2.05	— .58	.50	24	13	82.0	30	43.0	6	0	0
"	Cawdor (Budgate)	3.20	— .22	1.33	25	12	...	...	...	...	...	...
XVIII.	Strathconan [Beaul]	2.42	— 2.24	.70	23 ^a	6	...	...	...	...	...	...
"	Glencarron Lodge	4.07	— 2.83	.62	20	17	79.1	3	37.0	22	0	0
XIX.	Dunrobin	2.93	+ .23	.87	25	12	78.5	7	41.0	12	0	0
"	S. Ronaldshay (Roeberry) ...	1.50	— 1.39	.95	25	13	78.0	18	46.0	2, 3	0	0
XX.	Darrynane Abbey	1.16	— 2.56	.24	16	13	...	...	...	...	...	...
"	Waterford (Brook Lodge) ...	1.22	— 2.16	.49	28	10	81.0	19	41.0	7	0	0
"	Broadford (Hurdlestown) ...	1.33	— 1.65	.32	1	18	80.0	18	48.0	15	0	0
XXI.	Carlow (Browne's Hill)	1.09	— 1.86	.32	1	10	...	...	...	...	...	...
"	Dublin (Fitz William Square)	2.08	— .50	.75	1	13	81.8	17	49.9	7	0	0
XXII.	Ballinasloe	1.66	— 1.61	.64	1	14	82.0	21	44.0	5, 6	0	0
"	Clifden (Kylemore)	2.49	— 4.10	.41	15	13	...	...	...	...	...	...
XXIII.	Seaforde	1.59	— 1.60	.41	24	11	79.0	11 ^c	43.0	6	0	0
"	Londonderry (Creggan Res.)	1.52	— 2.18	.46	18	16	...	...	...	...	...	...
"	Omagh (Edenfel)	1.65	— 1.90	.29	21	14	78.0	20	48.0	11 ^b	0	0

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

a—and 24. b—and 19. c—and 20. d—and 17, 18. e—and 15. f—and 16, 26.

METEOROLOGICAL NOTES ON JULY, 1901.

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

ENGLAND.

LONDON, CAMDEN SQUARE.—Absolute drought prevailed from the 3rd to 21st; slight R fell on 22nd and 23rd, and heavy R daily from 24th to 27th. The fall on the 25th is the greatest since June 23rd, 1878, when 3·28 in. fell. L and T on 25th, 27th and 29th. Mean temp. of the month 66°·5, or 3°·2 above the average.

TENTERDEN.—Dry weather continued with increased heat and occasional TSS, some of which were very partial, more than ·75 in. falling at Biddenden on 29th, and none at Tenterden. Duration of sunshine, 270·5 hours. TSS on 6th, 13th, 25th and 26th.

HARTLEY WINTNEY.—The rains were sufficiently heavy to produce nearly a normal fall, but so far apart as to make the prolonged drought since April 16th severe. The last week was showery. Distant TSS on 12th, 16th, 28th and 29th. Shade temp. of 91°, 90° and 90° occurred on 18th, 19th and 20th. Light breezes from N. were prevalent. Ozone on 10 days, with a mean of 3·2.

WINSLOW, ADDINGTON.—Another July with a small R. T on 12th, 13th, 24th and 26th, generally distant. From the 16th to 21st the max. temp. was very high.

BURY ST. EDMUNDS, WESTLEY.—A very hot month, the max. temp. being only twice below 65°. No R fell from the 7th to the 23rd, and the TSS of 25th, 26th and 27th were very partial.

NORWICH, BRUNDALL.—A fine summer month, and the third exceptionally warm July in succession. The rains in the fourth week were exceedingly local in character. TSS on 1st, 5th and 25th. Much L on 21st.

POLAPIT TAMAR [LAUNCESTON].—A dry and exceptionally hot month. The max. shade temp. on the 18th, 19th and 20th, namely, 84°·7, 85°·2 and 83°·9, are the highest readings in the 8 years' record, and the average shade max. was 72°·1. During the night of the 20th the temp. in the screen did not fall below 62°·5. Absolute drought prevailed from 3rd to 21st inclusive.

MANCHESTER, PLYMOUTH GROVE.—Fine summer weather prevailed till the 20th; TSS on 21st and 26th. The mean temp., 66°·5, is the highest in July since 1868.

WALES.

HAVERFORDWEST.—The month was fine and warm, with a fair amount of bright sunshine. On 5 days the temp. exceeded 80°, and the minima were generally high, the highest being 62°·0 on the 21st. The max. temp (84°·5) has been exceeded only twice in July in 50 years; viz., by 88°·5 in 1870, and 86°·6 in 1876.

ABERYSTWICH, GOGERDDAN.—The first three weeks were very hot, with drying winds chiefly from the E. In the last week welcome R came in a deluge from all quarters, and the total fall is the largest for some years.

SCOTLAND.

CARGEN [DUMFRIES].—An exceptionally severe TS occurred on the 20th between 8 p.m. and 10 p.m. A wire fence within 200 yards of this house was fused, and a wooded stool split to matchwood. T and L on the 14th and 22nd also, and T on 10th and 21st.

COLMONELL, CLACHANTON.—Mean temp. 63°·2, being 4°·2 above the average of 25 years, and the highest in that period. T and L on 20th and 21st.

TIGHNAERUAICH, CRAIGANDARAICH.—A perfect summer month.

ABERDEEN, CRANFORD.—A very warm month. Sharp TS on 15th.

S. RONALDSHAY, ROEBERRY.—A dry, fine month. Mean temp. $57^{\circ}\cdot 2$, or $2^{\circ}\cdot 2$ above the average of 11 years.

IRELAND.

DARRYNANE ABBEY.—A dry month. It was hot at first and then for some days cold; it was again hot during the last three days. There was a good deal of fog towards the end.

BROADFORD, HURDLESTOWN.—A very dry July, and water was very low, many streams and wells being quite dry. Cattle were very short of grass, and meadows were very poor. Other crops doing well. TS on 27th.

DUBLIN, FITZWILLIAM SQUARE.—A warm and pleasant month, in many respects resembling July, 1900. Mean temp. $63^{\circ}\cdot 5$, or $2^{\circ}\cdot 9$ above the average. High winds were noted on only 3 days. The temp. in screen reached or exceeded 70° on 16 days. TSS on 21st, 24th and 25th, and L on 26th and 27th. Foggy on 1st and 8th.

OMAGH, EDENFEL.—A warm, settled month, but with sufficient B to prevent anything like a parching or premature ripening of grass, cereals or green crops, all of which give promise of great abundance. Although the max. temp. has often been exceeded, the min. of 64° , on the night of 17th, is the highest min. recorded in 36 years. On only two nights did the min. fall below 50° , which is also a record.

THE SCOTTISH METEOROLOGICAL SOCIETY.

THE half-yearly general meeting of the Scottish Meteorological Society was held on July 24th, in Edinburgh, Sir Arthur Mitchell, K.C.B., in the chair. The Report from the Council gave an account of the work of the Society since the previous meeting, and expressed the regret that was felt at the death of Professor P. G. Tait, and of the Earl of Moray. The preparation of the first of the three volumes of observations at the Ben Nevis Observatory, and the associated Low Level Observatory at Fort William, was stated to be in so advanced a state as to make it possible to promise its publication during next winter.

It was announced that the same generous donor who has maintained the Ben Nevis Observatory for the last three years, Mr. Mackay Bernard, has volunteered to contribute a fourth sum of £500 to keep the observatory in operation until the end of 1902, by which time regular hourly observations will have been carried on continuously for twelve years. The Meteorological Council also continues its grant of £250 to the Low Level Observatory.

Dr. A. Buchan, F.R.S., read a paper on the "Fogs round the Scottish coasts," and Mr. R. T. Omond read a paper on "The Utilisation of the high-level meteorological observatories of Europe." These papers will be published in full in the *Journal* of the Society.