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THE WATER POWER OF THE BRITISH EMPIRE.

Physical geography includes the study of the forms of the land and the circulation of water through the air; rainfall research is concerned with just those portions of physical geography, and the application of rainfall research to practical problems is required in all questions of the utilizations of water for the supply of towns, the production of power, the conservation of rivers, the maintenance of canals, as well as in agriculture and public health. While the observation of rainfall has always been part of the routine of meteorological stations, the main value of rainfall records is in reality less meteorological than geographical. The distinction may, perhaps, best be seen by reflecting that meteorology is concerned mainly with *why* rain falls, geography with *where* it falls and whither it flows.

The use of water in the production of power depends practically less on the amount of water power available than on the cost of it as compared with other sources of power. Hence it may be said that the price of coal and mineral oil regulate the demands on the water power of a country. Where coal is abundant and cheap water power is naturally neglected; but where coal is difficult to obtain and costly the existence of water power becomes very interesting to the industrial world. Hence, at this time when coal-supplies are short everywhere and coal-prices are rising week by week there is a general awakening to the importance of exploring the water-power resources of the world. To the scientific man it often seems that the practical man opens his eyes too late to the importance of unused resources. In the *Geographical Journal* for April, 1896, more than twenty years ago, we elaborated a scheme for the complete geographical description of the British Isles with special reference to the survey of natural resources, and the time

estimated for the completion of the work was twenty years. Had the scheme, which perished in a general chorus of praise of its promise, been carried out, the Ministry of Reconstruction would now have before it a mass of elaborated data, the like of which cannot now be obtained in time to guide the after-war development of the country. It is not too much to say that many millions of public money would have been saved during the war in public works begun in panic hurry and abandoned only when failure became the reward of ignorance.

Late though it is, the country seems to have fairly awakened to the importance of water power, and we have before us the Preliminary Report of the Water Power Committee (formerly called Sub-committee) of the Conjoint Board of Scientific Societies, presided over by Sir Dugald Clerk, F.R.S., with Professor A. H. Gibson as Secretary. It consists of 28 pp., and its importance demands a brief summary here.

The Committee was appointed "to report on what is at present being done to ascertain the amount and distribution of water power in the British Empire," but this purpose was interpreted to include the preliminary results as well as the existing agencies for acquiring information, and even to enter into the general question of water power and its utilization.

The Report begins with the consideration of the world's present power demands in steam, gas and water-power, and this is stated as about 120 million horse-power, of which 75 million are required for factories, including the output of electricity, 21 million for railways and 24 million horse-power for the world's shipping. Of the 75 million horse-power required in the world, the United States is responsible for 29 million, the United Kingdom for 13 million, and the rest of the British Empire for 6 million. Of the amount of power utilized in various parts of the world water power amounts to much less than 1 per cent. in the United Kingdom, to 24 per cent. in the United States, 27 per cent. in continental Europe and to 33 per cent. in the British Dominions and dependencies. In Germany the Report states 43·4 per cent. of the industrial horse-power is derived from water.

Having shown the extraordinary backwardness of the United Kingdom in the present use of water power, the Report goes on to consider the probable available water power of the British Empire, though it is acknowledged that the paucity of data, save for two of the Dominions, makes such an estimate "highly speculative." First attention is given to the forms of industrial activity to which water power may be applied effectively, and these are practically all dependent on electricity, the generation of which is the first stage in all modern applications of water power. Electric power may be transmitted to any distance, the only limitation being financial, and at present there are transmission lines of as much as

200 miles in existence. In addition to its use for running machinery, including railways, electricity has a great future in metallurgical and chemical operations, such as the manufacture of aluminium and carbide of calcium, and, perhaps most important of all, the fixation of atmospheric nitrogen for the production of explosives and fertilizers, the paramount essentials for war and peace. In this work at present 400,000 horse-power are being used from water in Norway alone. The demand is enormous and increasing. One very attractive feature of this industry is that the raw material exists everywhere in the air in inexhaustible quantities, and that the product is so valuable in proportion to its bulk that it can afford to pay a considerable amount for transport; hence factories can be erected near the source of power even at considerable distances from centres of population.

In view of the great possibilities presented by the use of water power and the complex questions of law, administration and engineering that are involved, the Report states :—

"In view of the immensity of the interests involved it is urged that nothing short of statutory control of these developments is desirable. The exact method of control is not for the Committee to suggest. So far as is possible private enterprise should be encouraged, but under conditions which would prevent the perpetual rights being lost to the community."

The cost of power is, it is pointed out, a relative matter, and changes of conditions might make possible in the future the development of sources which it would not pay to deal with at present. An examination of 120 European installations shows that where upwards of 10,000 horse-power is developed the cost is on the average in the neighbourhood of £10 10s. per electrical horse-power per annum.

Great stress is laid in the Report on the necessity for preliminary investigations before the development of water power can be taken in hand on a great scale. It is clear that there may be abundant water power in a locality where circumstances make its utilization too costly to be practicable at present, though in future conditions the cost might be justified. While in most cases the usefulness of a water supply depends on maintaining its uniformity over the whole year, there are cases in which supplies that vary with the seasons may be utilized for work that does not need to be continuous. In any case an investigation to be of real service must extend over a number of years. Perhaps the Report may be considered by some physical geographers a little too didactic in the statement "Rainfall records, though forming the basis of any such investigation, are only of partial assistance in dealing with water-power questions. The actual run-off from the catchment area is the all-important factor, and the ratio of run-off to rainfall varies with the physical characteristics of the area, the vegetation, and the climate, so that

rainfall gaugings cannot be substituted for the more laborious and costly collection of continuous records of river levels, combined with frequent gaugings of flow." Possibly more general acceptance would be given to the dictum :—" If a reasonably long record of rainfall exists, the determination of the run-off for a few years will serve to give a relation between precipitation and run-off which can be carried back as far as the rainfall records go."

Space does not allow us to give in detail the estimates of water power for the different parts of the British Empire. Suffice it to say that while valuable surveys of water power exist for the Dominions of Canada and New Zealand little in the way of a systematic census of power resources exists in other parts of the Empire, although approximate estimates may be given with a wide margin of error.

The Report proceeds to say, " It is a matter of urgent importance that the preparation of the necessary hydrographic and meteorological data should be undertaken at the earliest possible date in the remaining dominions and dependencies of the Empire.

" In this connection an adequate rainfall map is of great value and importance, and where, as is the case, for example, for the greater part of the British Isles, data for such a map are available, its preparation would appear to be most advisable."

The Report concludes with six recommendations, which may be summarized thus :—That the British Government bring before the other Governments of the Empire the necessity of an exact survey of water powers, ascertain if the respective Governments are prepared to undertake the work. Should they not be so prepared the British Government should place the work on an " Imperial Water Power Board " or " Conservation Commission," to be created including a representative from each Dominion or dependency. This Board should act in an advisory capacity. As it is unlikely that private capital for developing water power will be available for many years, the State should assist or undertake such development.

Correspondence.

To the Editor of Symons's Meteorological Magazine.

ASHDOWN FOREST CLIMATOLOGY.

THE forest ridges of east Sussex probably offer the nearest approach to true mountain scenery of the softer woodland type, that is to be found within 100 miles of London.

During a rainy walk on a July day, from Uckfield to Forest Row, over the Ashdown Forest Ridge and back by another and wilder route, we particularly noted the following climatic features :—

(1.) The transition on both sides of the ridge between the heather and pine forest of the upper slopes and the richly tangled oak forest of the lower is very sharp, an indication, we thought, that the climatic factor in the altitudinal distribution was only secondary to the edaphic or geological.

(2.) Both at Nutley, on the south side of the ridge, and at Forest Row, on the north side, a snow plough was conspicuously set in the village green, a fine indication we observed of bleak country, since snow ploughs are not usually so obtrusive in Thames Valley villages.

(3.) The warm, south-easterly wind rain that had set in before we left Uckfield, at 9 a.m., continued till we reached the summit of the range, but soon afterwards it seemed to degenerate into a true moorland drizzle, all scenery in the higher zone being blotted out by thick hill-mist driving along much as in the high hill regions of the west and north of England. As the day wore on the weather gradually improved in the surrounding lower country, but the Ashdown ridge remained thickly enveloped in mountain mist through which on our return journey an occasional smart spurt of true rain would fall. We came to the conclusion that on this day the orographic factor of condensation was very prominent on Ashdown Forest, and that on a range of only moderate elevation of barely 1,000 feet this factor could only be conspicuous on days of more or less general rainfall. Again we had an example of the observation so often made that hill-mist and true rainfall are only with difficulty associated. The sudden short spurts of true rain, referred to above, we ascribed to the passage of *general* showers produced at a higher level and falling through the hill-born mist. Six days later, on the contrary, during heavy rain of the thunder type, with no wind, there was no mist at all on Ashdown Forest, and from the top of the ridge the outline of the South Downs could be clearly seen through a fairly thick rain-sheet.

L. C. W. BONACINA.
M. A. GIBLETT.

A GREEN FLASH.

On going through my old meteorological record I came across the following note :—

" At sunrise on February 15th, 1906, the sky was clear of clouds with a low temperature, 30° F. below zero, there was a heavy wood smoke drifting from the chimneys, immediately after the limb of the sun appeared above the horizon a cloud of smoke passed between me and the sun, as it did so the small sector of sun that was visible turned a bright green ; the smoke rolled away, and when it rolled in front of the sun again there was about one-eighth of sun's diameter visible the green flash did not appear."

The above requires a little explanation. At that time the only fuel used was wood, with temperatures below zero the water vapour in wood smoke on coming into the air condenses and forms a somewhat thick white cloud. The house I was in was at higher elevation than the rest of the village, which stands on rising ground on the west side of Lake Temiskaming, which is five miles wide here, so that I had an uninterrupted view of the eastern horizon across the lake ; the smoke clouds were rolling slowly from the south, some of the puffs rising just high enough to cover the horizon so that the place of the rising sun was obscured intermittently. The point to be specially noticed is that the green flash came when only a very *small portion* of the sun was above the horizon, when one-eighth of the sun's diameter was visible no flash appeared.

PAUL A. COBBOLD, F.R.Met.Soc.

Haileybury, Ont., February 18th, 1918.

OUR RAINFALL TABLES.

Six hundred and thirty-one numbers of this Magazine have been issued during the last fifty-two years and never until to-day has the new number failed to contain statistical data of the preceding month. No. 632 appears without the Tables to which our readers are in the habit of turning, but the fault is not ours or our printers. We have striven against difficulties arising from the war for four years, and so far we have striven successfully, carrying out what we know to be a national service of real value. At times the labour and strain have almost proved too much for us ; but hitherto each difficulty has been met and surmounted as it occurred. The last difficulty, however, springs from one of those conditions against which "the gods themselves fight in vain " and we have to submit. Time will, no doubt, overcome this difficulty also, and when it does so the Tables and map missing from this number will be forwarded to all subscribers served from this office and supplied to the publishing agents for other purchasers.

VOLUNTARY OBSERVERS AND THE NEW STAR.

A NEW star in the constellation Aquila suddenly blazed up to the first magnitude on June 8th, and, after shining brilliantly for a few nights, gradually faded and has now become inconspicuous. The Astronomer Royal, writing to *The Times* on June 15th, handsomely acknowledges the value of amateur Observers, who, while on the outlook for meteors and variable stars, picked up Nova Aquilae in many cases before it had attained its maximum brilliancy. Our old friend, Mr. Denning, was one of the first to see the new star, but he was anticipated by a schoolboy of astronomical tastes. The value of early notice being given to professional astronomers of such an occurrence as the change in brilliancy of a star lies in the importance of following the changes with the spectroscope, and so ascertaining the true nature of the occurrence. It must, of course, be remembered that the professional astronomer is pinned down to specific duties which may compel him to devote all his attention to a particular quarter of the heavens. The wide-sweeping eye and the passion for finding something new are, perhaps, more common in the amateur, and it is recorded of one professional astronomer that when the new star caught his eye as he was going to his observatory he said to himself that there was something unfamiliar in the stars of that part of the sky, but set himself to his routine duties and forgot to call his chief's attention to the fact.

We have long felt that in many departments of science immense services may be rendered by enthusiastic Observers with no special knowledge but keen interest in phenomena. The professional specialist alone can make full use of the information collected by the army of amateurs, and perhaps he sometimes fails in acknowledging his debt. In meteorology even more than in astronomy the work of the amateur Observer is of the utmost value, and no one has more constant proof of this than the Director of the British Rainfall Organization.

METEOROLOGICAL NEWS AND NOTES.

PROFESSOR FILIPPI EREDIA has, says *Nature*, been awarded the Natural Sciences Gold Medal of the Societa Italiana delle Scienze for his important work in Meteorology, this being the first time that such a distinction has been awarded for meteorology in Italy.

THE METEOROLOGICAL OFFICE announces that the *Daily Weather Report*, the *Weekly Weather Report* and the *Monthly Weather Report* will not be issued to the public henceforth during the continuance of the War. Subscribers to these Reports may, on giving notice to the Director of the Meteorological Office, have their copies kept for them to be delivered at the end of the War.

Climatological Table for the British Empire, March, 1918.

STATIONS. (*Those in italics are South of the Equator.*)	Absolute. Maximum. Temp.	Date.	Absolute. Minimum. Temp.	Date.	Average. Max.	Min.	Dew Point.	Humidity.	Absolute. Max. in Sun.	Min. on Grass.	Total Rain. Depth.	Days.	Aver. Cloud.
	°		°		°	°	°	0-100	°	°	inches		
London, Camden Square	70·3	23	27·2	9	52·9	35·8	...	84	109·6	24·0	1·09	8	6·1
Malta	66·7	28	48·5	22	59·5	51·6	...	81	121·0	29·0	5·49	12	2·0
Lagos	90·4	2	68·0	18	87·3	75·3	73·3	75	153·4	65·0	7 86	14	7·4
Cape Town	92·1	12	50·8	25	77·3	58·0	56·0	68	...	...	·90	4	2·3
Johannesburg	77·5	10	46·2	23	70·6	54·1	55·4	87	...	47·2	4·73	23	7·9
Mauritius	86·4	10	65·0	4	83·5	70·7	70·4	81	...	14·8	11·43	21	6·0
Bloemfontein	86·6	10	48·9	2	77·1	60·2	68·7	72	..	...	3·28	11	6·2
Calcutta...	98 8	9	60·9	13	93·2	70·8	65·8	62	...	43·3	·82	2	1·8
Madras	91·7	21	66·6	12	87·8	70·6	71·1	78	156·2	62·2	·02	1	1·5
Colombo, Ceylon ...	90·2	17	69·6	2	88·4	73·2	71·3	78	158·5	63·3	1·85	6	4·2
Hongkong	78·2	25	54·1	15	68·6	60·7	58·3	81	...	...	1·11	10	7·7
Sydney	86·4	6	52·7	30	75·6	60·7	60·7	74	144·6	56·4	2·48	15	4·8
Melbourne	87·8	23	40·0	18	73·4	55·0	52·5	64	146·7	31·5	4·46	14	5·7
Adelaide	96·2	23	49·6	26*a*	80·0	57·6	50·6	50	153·0	35·5	·50	4	3·6
Perth	92·3	19	51·0	4	80·2	60·2	55·9	62	167·0	42·3	1·91	6	3·9
Coolgardie	93·8	7	47·8	6	82·3	57·4	49·4	46	153·6	46·0	1·01	6	3·6
Brisbane	84·8	15	58·0	26	79·1	64·0	61·6	72	151·9	52·8	3·05	20	5·6
Hobart, Tasmania ..	87·3	23	40·4	16	68·5	51·9	47·2	60	140·8	34·7	1·38	13	5·8
Wellington ...	76 3	8	43·7	25	66·7	55·1	53·2	76	139·0	31·6	3·50	11	7·2
Jamaica, Kingston ..	87·5	9, 11	65·3	7	85·3	67·6	66·2	79	...	...	1·02	5	3·6
Grenada	85·0	26*a*	69·0	sev.	82·0	71·0	...	71	137·0	...	2·49	17	2·5
Toronto	67·2	20	6·0	11	42·4	24·7	23·2	73	118·0	—1·0	2·08	10	4·1
Fredericton	54·0	21	—27·0	8	33·4	7·9	13 5	75	...	..	3·05	7	4·4
St. John, N.B. ...	54·6	31	—8·0	8	32·2	16·2	16·2	71	130·2	—8·6	2·90	12	5·0
Victoria, B.C.	60·0	28	28·0	5	48·4	37·4	35·0	79	122·0	19·5	2·79	17	7·3

a—27.

Johannesburg.—Bright sunshine 157·6 hours.

COLOMBO, CEYLON.—Mean temp. 80°·8, or 0°·5 below, dew point 1·3 below and R 2·36 in. below averages. Mean hourly velocity of wind 3·6 miles. TS on 5 days.

HONGKONG.—Mean temp. 64·0. Bright sunshine 122·1 hours. Mean hourly velocity of wind 13·6 miles.

Melbourne.—Temp. 0°·3 below, and R 2·30 in. above, averages.

Adelaide.—Mean temp. 1·1 in. below, and R ·56 in. below, averages.

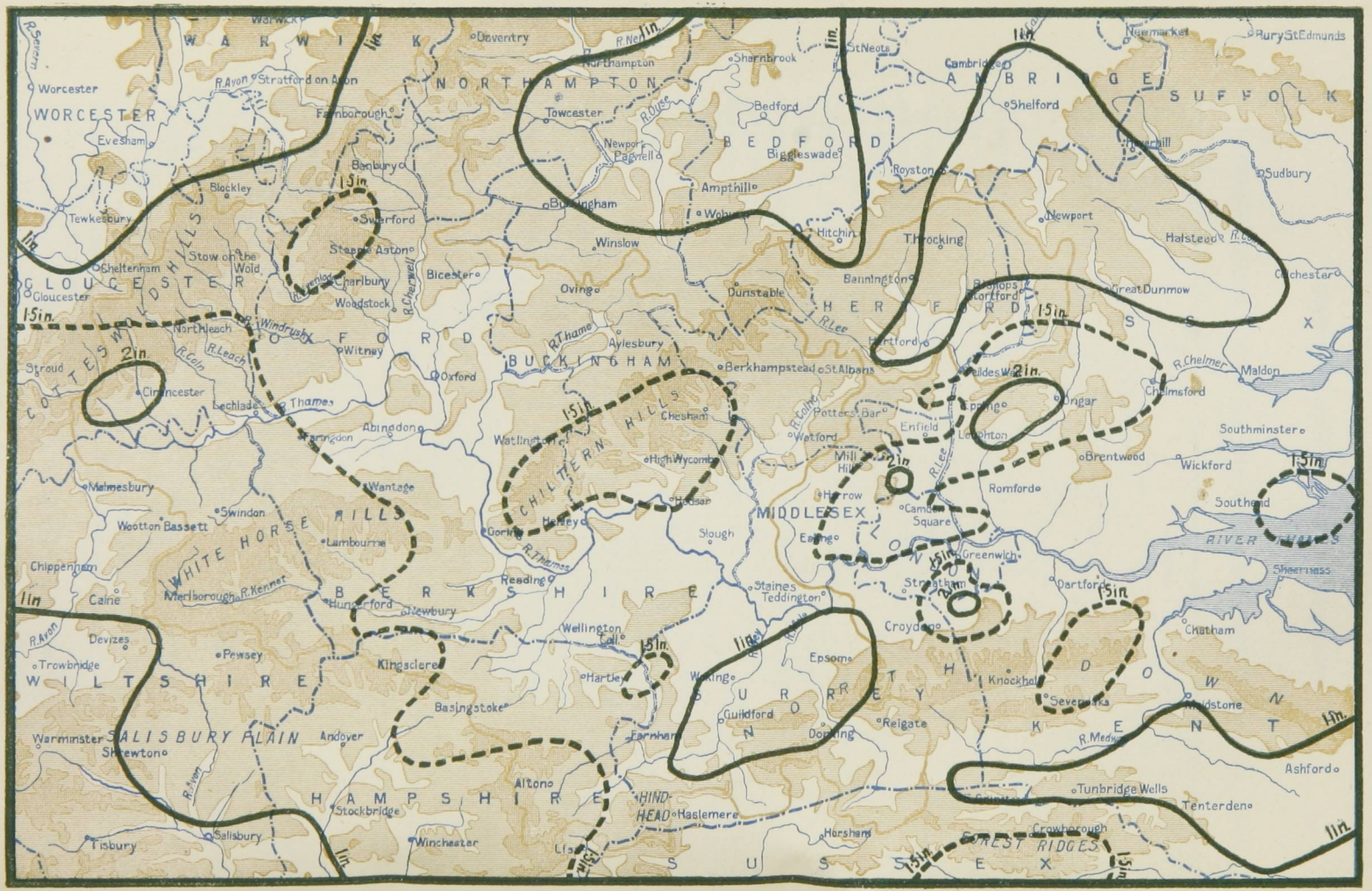
Coolgardie.—Temp. 1·8 in. below, and R slightly above, averages.

Brisbane.—Temp. 3·2 in. below, and R below, averages.

Hobart.—Bright sunshine 167·1 hours.

Wellington.—Mean temp. 0°·4 above, and R ·13 in. above, averages. Bright sunshine, 149·5 hours.

THAMES VALLEY RAINFALL. AUGUST, 1918.



RAINFALL TABLE FOR AUGUST, 1918.

STATION.	COUNTY.	RAINFALL. Aver. 1875—1909. in.	1918. in.	Diff. from Av. in.	Per cent. of Av.	Max. in 24 hours. in.	Max. in 24 hours. Date.	Nos. of Day
Camden Square	*London*	2·39	1·78	— ·61	74	·48	2	12
Tenterden	*Kent*	2·42	·94	—1·48	39	·27	2	12
Arundel (Patching)	*Sussex*	2·52	2·22	— ·30	88	·63	2	10
Fordingbridge (Oaklands)	*Hampshire*	2·76	2·91	+ ·15	105	·83	1	13
Oxford (Magdalen College)	*Oxfordshire*	2·44	·99	—1·45	41	·36	25	9
Wellingborough (Swanspool)	*Northampn*	2·36	·71	—1·65	30	·16	25	11
Bury St. Edmunds (Westley)	*Suffolk*	2·52	1·32	—1·20	52	·24	27	12
Geldeston [Beccles]	*Norfolk*	2·22	1·72	— ·50	78	1·15	2	8
Polapit Tamar [Launceston]	*Devon*	3·17	3·29	+ ·12	104	1·00	5	13
Rousdon [Lyme Regis]	,,	2·84	2·30	— ·54	81	·69	1·25	11
Stroud (Field Place)	*Gloucester*	2·90	1·70	—1·20	59	·48	3	9
Church Stretton (Wolstaston)	*Shropshire*	3·43	2·46	— ·97	72	·55	27	14
Boston	*Lincoln*	2·39	1·27	—1·12	53	·34	2	9
Worksop (Hodsock Priory)	*Nottingham*	2·55	1·91	— ·64	75	·62	3	9
Mickleover Manor	*Derbyshire*	2·80	2·97	+ ·17	106	1·23	2	14
Congleton (Buglawton Vic.)	*Cheshire*	3·52	2·90	— ·62	82	·54	2	19
Southport (Hesketh Park)	*Lancashire*	3·73	2·88	— ·85	77	·69	27	12
Wetherby (Ribston Hall)	*York, W.R.*	2·78	2·84	+ ·06	102	·86	4	9
Hull (Pearson Park)	,, *E.R.*	3·05	2·62	— ·43	86	·85	3	12
Newcastle (Town Moor)	*North'land*	3·20	1·58	—1·62	49	·29	25	14
Borrowdale (Seathwaite)	*Cumberland*	11·47	...	...	...	...	...	...
Cardiff (Ely)	*Glamorgan*	4·54	3·61	— ·93	80	1·06	24	17
Haverfordwest	*Pembroke*	4·21	3·15	—1·06	75	·85	1	16
Aberystwyth (Gogerddan)	*Cardigan*	4·88	3·97	— ·91	81	1·02	25	16
Llandudno	*Carnarvon*	3·16	1·57	—1·59	50	·39	25	13
Cargen [Dumfries]	*Kirkcudbrt.*	4·23	6·05	+1·82	143	1·87	25	21
Marchmont House	*Berwick*	3·54	1·81	—1·73	51	·41	27	15
Girvan (Pinmore)	*Ayr*	4·54	5·71	+1·17	126	1·80	26	19
Glasgow (Queen's Park)	*Renfrew*	3·62	2·53	—1·09	70	·46	20	21
Islay (Eallabus)	*Argyll*	4·49	4·39	— ·10	98	·65	11	27
Mull (Quinish)	,,	5·00	5·88	+ ·88	118	·92	22	25
Balquhidder (Stronvar)	*Perth*	6·22	4·20	—2·02	68	1·00	27	22
Dundee (Eastern Necropolis)	*Forfar*	3·34	2·26	—1·08	68	·45	24	19
Braemar	*Aberdeen*	3·63	2·45	—1·18	68	·55	31	16
Aberdeen (Cranford)	,,	3·07	3·50	+ ·43	114	1·25	31	15
Gordon Castle	*Moray*	3·29	3·33	+ ·04	101	...	...	...
Drumnadrochit	*Inverness*	3·11	2·83	— ·28	91	·53	31	20
Fort William	,,	6·15	5·69	— ·46	93	·71	22	25
Loch Torridon (Bendamph)	*Ross*	6·61	9·98	+3·37	151	1·57	31	23
Dunrobin Castle	*Sutherland*	2·71	3·79	+1·08	140	·74	31	17
Glanmire (Lota Lodge)	*Cork*	3·83	2·25	—1·58	59	·99	2	15
Killarney (District Asylum)	*Kerry*	4·57	2·89	—1·68	63	·41	4	21
Waterford (Brook Lodge)	*Waterford*	3·73	3·02	— ·71	81	1·04	1	13
Nenagh (Castle Lough)	*Tipperary*	4·04	4·67	+ ·63	116	1·39	1	22
Ennistymon House	*Clare*	5·01	5·60	+ ·59	112	·97	2	24
Gorey (Courtown House)	*Wexford*	3·31	2·66	— ·65	80	·64	1	12
Abbey Leix (Blandsfort)	*Queen's Co.*	3·94	2·76	—1·18	70	·52	1	16
Dublin (Fitz William Square)	*Dublin*	3·08	2·19	— ·89	71	·60	25	17
Mullingar (Belvedere)	*Westmeath*	4·00	2·32	—1·68	58	·36	26	15
Crossmolina (Enniscoe)	*Mayo*	4·68	4·66	— ·02	100	1·25	5	24
Cong (The Glebe)	,,	4·70	...	...	...	...	...	...
Collooney (Markree Obsy.)	*Sligo*	4·30	2·78	—1·52	65	·51	26	22
Seaforde	*Down*	3·64	3·61	— ·03	99	1·34	5	15
Ballymena (Harryville)	*Antrim*	4·18	4·69	+ ·51	112	1·57	5	22
Omagh (Edenfel)	*Tyrone*	4·22	3·18	—1·04	75	·45	5	24

SUPPLEMENTARY RAINFALL, AUGUST, 1918.

iv.	STATION.	Rain inches.	Div.	STATION.	Rain inches.
II.	Warlingham, Redvers Road..	1·23	XI.	Lligwy	1·39
,,	Ramsgate	·77	,,	Douglas, Isle of Man	2·16
,,	Hailsham	1·55	XII.	Stoneykirk, Ardwell House...	3·54
,,	Totland Bay, Aston House...	1·81	,,	Carsphairn, Shiel.....	6·88
,,	Stockbridge, Ashley..	1·89	,,	Langholm, Drove Road	5·41
,,	Grayshott	1·18	XIII.	Selkirk, The Hangingshaw..	1·73
III.	Harrow Weald, Hill House...	1·24	,,	North Berwick Reservoir.....	2·16
,,	Pitsford, Sedgebrook.....	1·56	,,	Edinburgh, Royal Observaty.	1·57
,,	Woburn, Milton Bryant.....	·98	XIV.	Biggar.....	2·00
,,	Chatteris, The Priory.....	1·02	,,	Maybole, Knockdon Farm ...	3·72
IV.	Elsenham, Gaunts End	·92	XV.	Buchlyvie, The Manse.....	3·80
,,	Shoeburyness	1·68	,,	Ardgour House	9·56
,,	Colchester, Hill Ho., Lexden	·86	,,	Oban.....	3·90
,,	Ipswich, Rookwood,Copdock	1·55	,,	Campbeltown, Witchburn ..	...
,,	Aylsham, Rippon Hall.... ..	2·65	,,	Holy Loch, Ardnadam.....	4·82
,,	Swaffham	2·00	,,	Tiree, Cornaigmore	...
V.	Bishops Cannings	2·28	XVI.	Glenquey	4·90
,,	Weymouth.....	1·54	,,	Loch Rannoch Dall.....	2·62
,,	Ashburton, Druid House.....	2·99	,,	Blair Atholl	2·08
,,	Cullompton	3·37	,,	Coupar Angus	3·25
,,	Lynmouth, Rock House	3·23	,,	Montrose, Sunnyside Asylum.	2·32
,,	Okehampton, Oaklands.....	2·97	XVII.	Balmoral	2·00
,,	Hartland Abbey.....	2·32	,,	Fyvie Castle	3·10
,,	St. Austell, Trevarna	2·60	,,	Keith Station	1·63
,,	North Cadbury Rectory.....	3·10	XVIII.	Rothiemurchus	2·33
VI.	Clifton, Stoke Bishop	2·57	,,	Loch Quoich, Loan	20·40
,,	Ledbury, Underdown..... ...	1·55	,,	Skye, Dunvegan	11·39
,,	Shifnal, Hatton Grange.....	1·89	,,	Fortrose.....	2·56
,,	Droitwich.....	·92	,,	Glencarron Lodge	9·31
,,	Blockley, Upton Wold.....	1·26	XIX.	Tongue Manse	5·28
VII.	Grantham, Saltersford.....	1·55	,,	Melvich	4·39
,,	Louth Westgate	1·97	,,	Loch More, Achfary	9·70
,,	Bawtry, Hesley Hall	1·78	XX.	Dunmanway, The Rectory ..	3·01
,,	Whaley Bridge, Mosley Hall	3·43	,,	Mitchelstown Castle.....	3·82
,,	Derby, Midland Railway.....	1·82	,,	Gap of Dunloe Gearahameen	5·00
VIII.	Nantwich, Dorfold Hall	2·75	,,	Darrynane Abbey.....	4·51
,,	Bolton, Queen's Park	4·17	,,	Clonmel, Bruce Villa	2·44
,,	Lancaster, Strathspey	4·04	,,	Broadford, Hurdlestown.....	3·67
IX.	Langsett Moor, Up. Midhope	1·08	XXI.	Enniscorthy, Ballyhyland...	2·80
,,	Scarborough, Scalby	2·82	,,	Rathnew, Clonmannon	1·80
,,	Ingleby Greenhow	2·43	,,	Ballycumber, Moorock Lodge	2·46
,,	Mickleton	...	,,	Balbriggan, Ardgillan	2·23
X.	Bellingham, High Green Manor	2·66	,,	Castle Forbes Gardens.....	2·08
,,	Ilderton, Lilburn Cottage ...	1·19	XXII.	Ballynahinch Castle.....	6·80
,,	Keswick, The Bank.....	5·26	,,	Woodlawn	4·00
XI.	Llanfrechfa Grange	3·57	,,	Westport, St. Helens	2·04
,,	Treherbert, Tyn-y-waun	4·70	,,	Dugort, Slievemore Hotel ...	5·56
,,	Carmarthen, The Friary	3·54	XXIII.	Enniskillen, Portora.....	3·81
,,	Fishguard, Goodwick Station.	3·91	,,	Dartrey [Cootehill]	3·13
,,	Crickhowell, Tal-y-maes.....	2·70	,,	Warrenpoint, Manor House ..	2·43
,,	Gwernargllwydd	2·00	,,	Belfast, Cave Hill Road	3·86
,,	Birmingham WW., Tyrmynydd	2·45	,,	Glenarm Castle	2·53
,,	Lake Vyrnwy	2·49	,,	Londonderry, Creggan Res...	5·25
,,	Llangynhafal, Plas Drâw.....	2·20	,,	Milford, The Manse.....	5·18
,,	Rhwibryfdir	14·99	,,	Killybegs	5·92
,,	Dolgelly, Bryntirion.....	4·03			