JOURNAL OF

THE TRANSACTIONS

OF

The Victoria Institute,

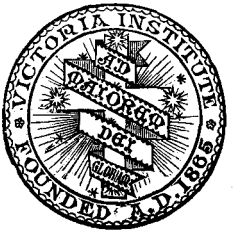
OR

Philosophical Society of Great Britain.

EDITED BY THE HONORARY SECRETARY,

CAPT. FRANCIS W. H. PETRIE, F.R.S.L., &c.

VOL. XX.



LONDON:
(Published by the Institute)
INDIA: W. THACKER & Co. UNITED STATES: G. PUTNAM'S SONS, *N.Y.*
AUSTRALIA AND NEW ZEALAND: G. ROBERTSON & Co. LIM.
CANADA: WILLARD Co., LIM., *Toronto.*
S. AFRICA: JUTA & Co. *Cape Town.*
PARIS: GALIGNANI.
1887.

ORDINARY MEETING, April 19, 1886.

D. Howard, Esq., V.P.C.S., in the Chair.

The Minutes of the last Meeting were read and confirmed, and the following Elections were announced :—

Life Member :—Rev. R. Taylor, M.A., N. S. Wales.

Associates :—Rev. Canon F. R. T. Balfour, S. Africa ; W. Russell, Esq., N. S. Wales ; Rev. Canon Taylor, D.D., Liverpool ; Rev. C. H. Wainwright, M.A., Blackpool.

A lecture was then delivered by Mr. W. St. C. Boscawen, F.R.Hist. Soc., on "Recently Deciphered Assyrian Inscriptions." A brief discussion took place, after which the following paper was read by Mr. H. Cadman Jones, M.A., the author being unavoidably absent on duty at Beirût.

NOTES ON THE METEOROLOGY OF SYRIA AND PALESTINE. By Rev. George E. Post, M.D., Professor of Surgery and Diseases of the Eye and Ear, in the Syrian Protestant College at Beirût, Syria.

THE meteorology of Syria and Palestine can be understood only when taken in connexion with that of Northern Africa, Northern Arabia, the Syrian desert, Asia Minor, and the adjacent Mediterranean Sea.

The climate of Northern Africa, except on the sea coast, and of Northern Arabia, and the Syrian desert, is exceedingly hot and dry. So thoroughly is the air heated in its passage over the Sahara, that rain seldom falls in Upper and Middle Egypt, where there are neither mountains, nor any large body of water, to cool the air and precipitate its moisture. A glance at the accompanying tables, which were compiled from the records of the Lee Observatory of the Syrian Protestant College at Beirût, and at the graphic chart, which represents the same facts, as regards the direction of the wind, in a different form, will show that the south-west wind is the prevailing one on the Levantine coast, having blown for 172 days of 1883, 170 days of 1884, and 138 days as the mean average of eleven years and a half. The next in frequency is the west, which blew in 1885 for 66 days, and a general average of 50 days for eleven years and a half.

As long as the wind blows steadily from the west or south-west, there is usually no rain. But when it blows for a day or two from the east, south, or south-south-west, and then veers suddenly to the west or south-west, rain is very apt to fall. This appears again from the tables. In the month of January, 1885, there were thirteen days of south-east, one of east, and one of south wind. The large amount of 10·37 inches of rain was a natural result. Again in January, 1884, there were fifteen days of south-east wind, and 10·64 inches of rain. In January, 1883, there were five days of south-east, three of east, and four of south wind, with a rainfall of 12·73 inches. November of the same year gave, with nine days of south-east wind, and nine days of north-east, 15·30 inches of rain; and so on through the tables. Furthermore, a glance down the columns, and still better at the graphic chart, will show uniformly, that during the summer months, when there is little or no rain, there is little or no wind from the south, or east, or south-east. It might be inferred from these figures that the south, south-east, and east winds bring the rain. The Jews, in our Saviour's time, said, when they saw the south wind blow, "There will be heat." This is still true, and equally so of south-east and east winds, as they all blow over vast heated plains. In their course they lick up the moisture from the surface of the ground, and on reaching the sea, become loaded with vapour. After these winds have blown from one to five or six days, the direction of the gale usually changes suddenly to the south-west, and in a few hours a storm of rain follows. This is well understood by the residents of the country, native as well as foreign.

The wind which prevails while rain is actually falling is almost always between south-west-by-west and south-west-by-south. In exceptional cases, however, it may shower with an easterly wind, and very rarely with a northerly one. Job xxxvii. 22, although a mistranslation as respects the word *fair weather*, expresses a scientific fact. *Fair weather does come out of the north.* Often after a storm from the west do we see the wind from the north come down like a giant over the sea, smite the south-west wind in full career, beat it back, with its gloomy retinue of clouds, and, perhaps in a single hour, clear the sky, and let in a flood of brilliant sunshine over sea and land. This wind is cooled and robbed of its moisture during its passage over the successive snow-clad ranges of Asia Minor.

It will be seen that the annual average of rain for eleven years and a half at Beirût is 35·66 inches. It is remarkable that in nine and a half of those years the amount of the rain-

fall for the year was between 30 and 37 inches. Only in two, 1877 and 1883, when it was respectively 51·04 and 50·68, did it vary much from the general average. Far different, however, is the case with the rainfall for the rainy season, the stress of which is usually between November and March. Here there is a great discrepancy. The figures read 39·52; 23·32; 47·20; 48·93; 17·07; 41·15; 31·81; 38·74; 39·11; 46·71; 27·63. Now it happens that upon the winter's rain, and not upon the total for the calendar year, depends the harvest. Hence a calendar year like that of 1879, with the good rainfall of 33·68, following another calendar year with a rainfall of 32·32, may have a very light harvest, having enjoyed only 17·07 inches as the portion of rain allotted to maturing its crops. Its 13·37 inches of rain in December inured to the benefit of the harvest of the succeeding calendar year.

As might be expected, the rainfall grows less toward the south, until about the latitude of the 'Arîsh (the torrent of Egypt) one enters the comparatively rainless desert of the Tîh. This arises from the fact that the southern portions of the country are more and more surrounded by deserts, and in the Tîh deserts lie to the east, south, and west. In a record kept by Dr. Chaplin at Jerusalem for twenty-two years, and covering most of the period indicated in our tables, the mean annual rainfall was 22·96 inches,—nearly 13 inches, that is about a third of its rainfall, less than that of Beirût. In the rainy season of 1877–8, when there were 48·93 inches at Beirût, there were 42·932 inches at Jerusalem. In that of 1876–7 there were 47·20 inches at Beirût, and only 13·70 at Jerusalem. In 1879–80 there were 41·15 inches at Beirût, and 23·56 inches at Jerusalem.

Accurate records have not been kept of the rainfall in Northern Syria. Two visits to Cassius and Amanus, however, convinced the writer that the rainfall there must be heavier than in Central Syria. The evidence of this is found in the luxuriance of the forests; in the far greater abundance of the summer vegetation; in the perennial character of a large number of small streams, such as dry up in summer elsewhere throughout the East (and this notwithstanding the fact that the mountains of these chains are lower than those of Lebanon, and are not snow-clad from June to November, while the top of Lebanon is never free from snow); and finally in the testimony of the residents, who declare that the rain falls there more or less through the summer, and very copiously during the winter.

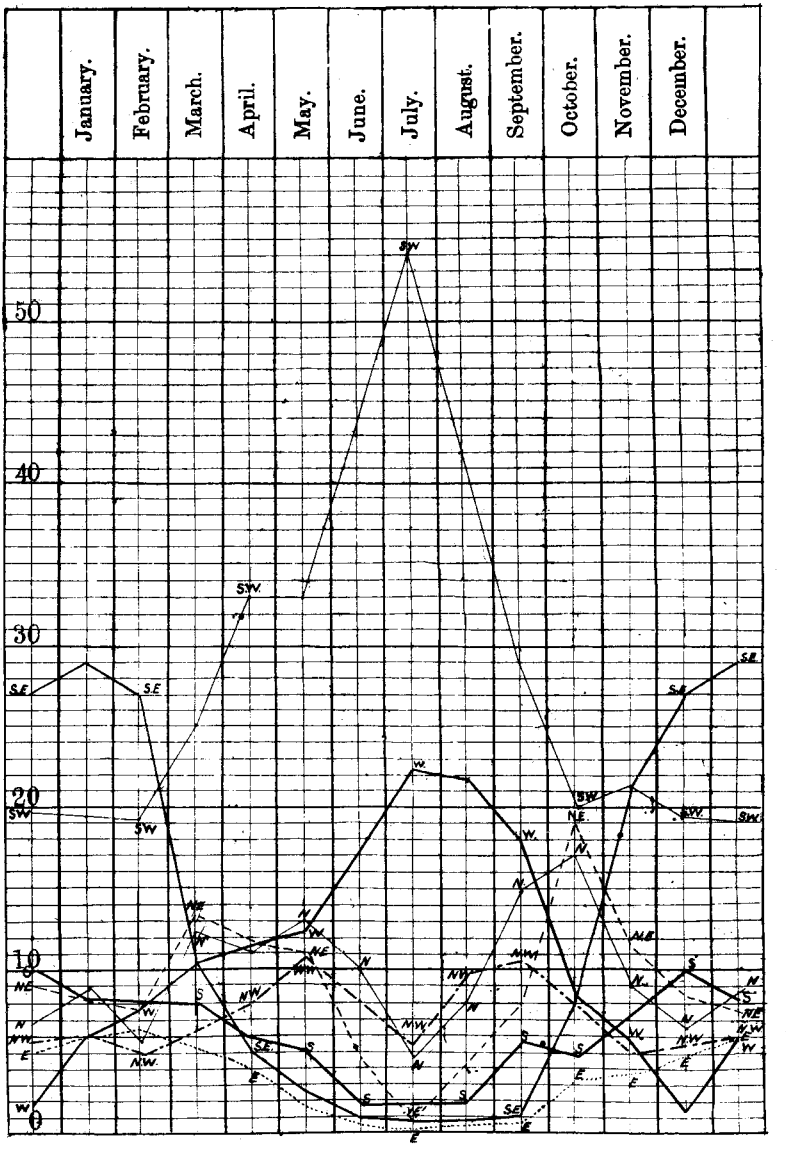
The rainfall of the Anti-Lebanon and Damascus is far less than that of the maritime plain, and the seaward face of

Lebanon. Many times heavy storms occur on the western slopes of Lebanon, while all is serene in Cœle Syria, and on the Damascus plain. The scene is very striking, when the observer in Cœle Syria, or on the top of Antilebanon, sees the dark cloud-masses roll threateningly from the west to the top of Lebanon, and then dissolve in mist, which is in turn dissipated by the clear sunshine of this torrid valley. The same phenomenon may be observed, even in a more striking manner, over the valley of the Jordan and the Dead Sea. The reason of the lesser rainfall in the regions east of the coast range is to be found in the fact that the greater part of the moisture is precipitated from the clouds while passing over that range, and in the proximity of the great desert which dries out the moisture that remains.

The "early rain" begins usually in September. In eight out of the twelve Septembers noted, there was some rain; in one, only six-hundredths of an inch. By the 10th or 15th of October, however, there has usually been a rain sufficient to thoroughly cleanse the surface of the ground, and to cause the dry watercourses to flow for a while. In eleven out of the twelve Octobers recorded there was rain, often considerable in amount. The families who have taken refuge in Lebanon from the summer heat of the sea-coast plain expect and await this early rain, as the signal for their return to their city homes. And these occur with sufficient regularity to cause little variation in the annual home-coming. The farmers also await this rain with assured confidence, as it is essential to soften the soil, and enable them to plough the ground, and put in the seed, before the heavy continuous rains from the latter part of December to the middle of March, when it would be impossible to do this work. A distinct break of a month or more, often with no rain, or slight showers, intervenes between the first copious rain and the setting in of the rainy season. The "latter rain" is rather a gradual lessening of the quantity of water, and increase in the intervals between the showers, than a rain coming after a long interval, in the manner of the early rains. The tables show a gradual tapering off from March to May, after which there is practically no rain until September or October. In one summer of the twelve only was there but one month without rain, usually three, and sometimes five. Practical immunity from danger of showers in travelling exists for seven months. In the heavily-wooded Amanus range showers occur all through the summer.

As regards the manner of the rain, the greatest difference exists between those seasons when the water comes down

GRAPHIC CHART of the direction of the wind at Beirût, Syriá, founded on observations taken three times daily. The figures represent the mean of the number of times each direction was observed during each month, the different kinds of lines indicating the directions. Prepared for the writer by Professor Robert West, M.A.



almost in sheets, accompanied by violent wind, and those more favourable winters in which the showers are gentle, penetrating, and unaccompanied by violent tempests. The velocity of the wind has reached 8. In such a wind, occurring the 18th of November, 1874, the dome of the Lee Observatory, in Beirût, where the accompanying tables were made up, was blown off.

The thermometer is far steadier than the rainfall or the wind. The variations of the mean of temperature for any given month are slight, more particularly during midsummer. Thus, with the one exception of 1878, when it reached 88·34°, the mean temperature of August only varied from 82° to 85·60° for eleven years, and was generally about 84°. July is almost as regular; September and June hardly less so.

The difference between the maximum and minimum of the thermometer is greatest during the rainy season, particularly in March, when the temperature rose in 1877 during a sirocco (east, south-east, or north-east wind) to 90°, and fell during the subsequent storm to 43°; or in April, when in the same year the maximum reached 97·2°, while the minimum fell to 48·9°. The average difference during the rainy season is nearly 40°, whereas for the summer months it is from 25° to 30°. The highest temperature recorded for all these years was 100°, and the lowest 35·1°, and the highest solar maximum was 160°. Thus the difference between the hottest day of the hottest summer, and the coldest day of the coldest winter, is only 65°. The writer has known a change as great as this to occur, within twenty-four hours, in the northern part of New York, the thermometer being one morning 35° below zero, and the next morning the roofs dripping from the thawing of the snow. In summer especially the temperature is very steady. Day after day the temperature registers the same at a given hour, in the same place. Between day and night the variation is often not more than 10°, sometimes less. The rise of temperature from midwinter to midsummer is usually very steady and gradual, as is also the fall to the midwinter temperature again. Such an even climate is peculiarly favourable to pastoral labours, hence Syria and Palestine have always been noted for their flocks and herds.

The barometer partakes of the steadiness of the thermometer. For the whole year 1884, the difference between the maximum and minimum was only 0·880 in.; and in 1885, 0·819 in. The highest barometer is always during the months of the heavy rains, and the lowest usually just after the rainy season is over. The barometer is so constant as to enable a traveller to use the aneroid with far more advantage than in a more

variable climate. The barometer *is usually* on the rise during a rain. A south-west wind usually concurs with a rise from a low barometer. A north wind may come with any state of the barometer. A west wind accompanies a high rising barometer.

During the whole period covered by these tables, snow fell only once at Beirût. It seldom comes lower than 2,000 feet altitude, and does not last any length of time lower than 5,000 feet. Hail, however, is quite frequent, more especially in February and March.

It is impossible to doubt that Syria and Palestine are suffering, in common with all the East, from the denudation of forests, and consequent diminution in the rainfall, and irregularity in its advent. Certainly, in the northern wooded regions the rain falls during the summer as well as the winter. Observations have not yet been extended over a sufficient number of years to be decisive, but there are indications that increasing cultivation, especially tree-planting on Lebanon and in the maritime plains, is exercising a favourable influence on the climate and water supply. Could the heights of Lebanon be again clothed with forests of cedar, and the same be planted on the Anti-Lebanon range, a greatchange would come over the whole Levant. The rains would set in earlier, continue later, come more mildly, and be less frequently accompanied with destructive floods than at present.

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
1874			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
June	29·796	75·99	1	19	5	...	5	...	...	...	0·	
July	29·666	81·15	2	21	...	3	3	...	2	...	0·	
Aug.	29·717	80·4	...	11	13	6	1	...	...	...	0·	
Sept.	29·717	82·	2	6	8	3	7	3	1	...	0·	
Oct.	29·689	79·9	1	2	5	11	10	1	1	...	0·233	
Nov.	29·959	70·6	5	3	3	1	8	8	1	1	7·02	
Dec.	29·922	62·3	2	6	2	8	5	5	1	2	7·97	
Half-year	...	...	13	68	36	32	39	17	6	3	15·223	

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
1875			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
Jan.	30·072	54·8	1	15	2	4	3	3	1	2	5·34	
Feb.	29·923	57·3	2	10	2	4	5	2	1	2	5·12	
March ...	29·913	58·71	4	7	3	7	2	4	2	2	9	
April	29·961	63·5	1	9	6	8	3	1	1	1	2·48	
May	29·918	67·3	...	11	2	5	10	2	1	...	2·36	39·52
June	29·811	80·8	1	19	4	3	3	...	...	...	0·	
July	29·747	84·2	1	23	3	3	1	...	...	...	0·	
Aug.	29·789	84·4	2	14	5	5	3	2	...	...	0·	
Sept.	29·918	79·88	1	8	1	4	13	3	...	...	0·06	
Oct.	29·992	75·38	...	4	3	3	15	4	1	1	0·	
Nov.	30·001	67·	2	10	4	3	6	1	1	3	5·32	
Dec.	30·058	59·97	3	17	2	1	3	1	1	3	5·06	
			18	147	37	50	67	23	9	14	34·74	
1876												
Jan.	30·160	55·76	1	3	1	8	8	3	4	4	1·57	
Feb.	30·034	58·76	3	10	3	2	2	4	2	3	4·61	
March ...	29·924	64·76	2	7	4	3	2	9	2	2	1·91	
April	29·937	68·19	...	8	2	3	4	7	3	3	4·35	
May	29·903	76·30	1	9	2	1	5	11	1	1	0·28	
June	29·902	80·25	2	12	6	2	8	...	...	...	0·04	
July	29·772	84·02	...	28	3	...	...	...	...	...	0·12	23·32
Aug.	29·804	84·20	...	4	16	10	1	...	...	...	0·	
Sept.	29·899	82·6	...	9	9	5	4	...	...	...	0·	
Oct.	29·96	77·23	2	9	4	3	6	6	2	1	2·48	
Nov.	30·004	66·68	2	9	3	4	2	2	...	8	10·75	
Dec.	30·120	64·42	5	13	3	2	3	3	...	2	4·37	
			18	121	56	43	45	45	14	24	30·48	

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
1877												
Jan.	30·068	59·18	3	15	5	2	1	2	2	1	6·44	
Feb.	30·009	58·69	2	16	3	...	1	1	1	4	15·74	
March ...	30·036	63·26	2	8	2	2	4	9	2	2	4·87	
April	29·895	68·27	1	11	1	1	3	11	1	1	2·55	47·20
May	29·934	74·14	2	13	2	3	4	5	1	1	0·	
June	29·921	79·43	...	15	3	6	3	3	...	...	0·	
July	29·819	85·1	...	23	6	2	...	...	...	...	0·	
Aug.	29·859	85·62	...	8	8	4	4	4	3	...	0·23	
Sept.	29·934	83·24	2	7	3	4	10	4	...	...	0·25	
Oct.	29·958	79·70	1	8	3	1	2	10	...	6	3·94	
Nov.	30·001	67·	2	11	3	4	5	2	...	3	6·34	
Dec.	30·027	60·98	6	8	3	2	2	5	2	3	10·68	
			21	143	42	31	39	56	12	21	51·04	
1878												
Jan.	30·089	56·30	6	5	2	4	2	3	1	8	10·97	
Feb.	30·096	54·3	3	6	4	4	5	1	2	3	7·17	
March ...	30·042	60·50	3	11	3	3	6	3	2	1	4·35	
April	29·902	67·28	2	13	5	1	3	11	...	2	1·67	
May	29·915	73·22	2	15	3	4	1	6	...	...	0·60	
June	29·829	80·42	1	17	6	1	3	2	...	...	2·73	48·93
July	29·741	85·64	2	9	8	3	5	4	...	...	0·	
Aug.	29·753	88·34	3	13	7	3	4	1	...	...	0·	
Sept.	29·834	83·84	1	8	9	4	4	2	1	1	0·82	
Oct.	29·990	78·	...	3	5	3	11	7	2	...	0·65	
Nov.	30·130	73·6	1	3	1	4	6	8	3	4	0·	
Dec.	30·091	66·09	3	9	3	3	3	8	1	1	3·36	
			27	114	56	37	53	56	12	20	32·32	

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
1879			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
Jan.	30·106	60·92	3	8	5	3	4	5	...	3	3·10	
Feb.	30·079	65·24	2	10	3	2	4	3	2	2	2·23	
March ...	29·910	62·33	2	13	3	2	3	4	2	2	5·60	
April	29·970	69·26	1	8	4	2	5	9	1	...	0·54	
May	29·954	73·38	2	6	6	6	3	4	3	1	0·77	17·07
June	29·930	81·35	...	15	5	7	1	2	...	...	0·	
July	29·739	85·75	...	14	10	6	1	...	...	...	0·	
Aug.	29·741	84·20	...	15	5	5	4	2	...	...	0·	
Sept.	29·871	82·05	2	4	6	6	4	6	1	1	0·12	
Oct.	30·023	74·96	1	11	3	6	6	2	...	2	3·39	
Nov.	30·070	67·55	3	13	2	2	4	3	...	3	4·56	
Dec.	30·446	60·58	3	7	3	2	1	9	1	5	13·37	
			19	124	55	49	40	49	10	19	33·68	
1880												
Jan.	30·330	52·20	4	8	2	2	6	5	2	2	9·33	
Feb.	30·048	58·60	1	2	4	3	3	8	3	5	4·20	
March ...	29·940	57·81	2	7	2	3	5	6	3	3	3·58	
April	29·924	55·70	2	13	2	4	2	6	...	1	2·12	
May	29·815	70·30	...	10	6	3	3	7	1	1	0·48	41·15
June	29·819	79·50	1	12	4	4	4	5	...	...	0·	
July	29·760	82·88	...	12	10	4	3	...	1	1	0·38	
Aug.	29·800	84·40	2	9	12	5	3	...	...	...	0·	
Sept.	29·910	81·20	1	11	4	4	7	3	...	...	1·01	
Oct.	29·993	77·90	...	5	3	3	3	13	2	2	0·51	
Nov.	30·056	71·80	2	4	3	3	5	8	1	4	1·05	
Dec.	30·028	59·50	4	7	2	2	1	4	3	8	9·66	
			19	100	54	40	45	65	16	27	32·32	

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
1881												
Jan.	30·070	61·70	...	13	2	3	1	5	2	5	1·32	
Feb.	29·910	58·00	1	8	2	2	2	4	3	6	9·44	
March ...	30·004	61·70	...	12	3	3	4	5	...	4	5·36	
April	29·910	67·40	2	14	1	4	2	5	...	2	2·97	
May	29·950	71·70	1	11	4	4	5	6	...	...	0·	
June	29·910	72·70	...	15	5	2	4	4	...	...	0·11	31·81
July	29·776	82·80	...	21	6	4	...	...	...	...	0·	
Aug.	29·745	85·60	1	17	4	2	2	5	...	...	0·	
Sept.	29·871	82·90	2	11	7	1	8	1	...	...	0·76	
Oct.	29·993	76·50	2	9	4	1	10	4	...	1	1·39	
Nov.	30·010	67·40	4	8	3	2	2	3	3	5	5·54	
Dec.	30·066	60·80	5	8	1	2	5	1	1	8	5·76	
			18	147	42	30	45	43	9	31	32·65	
1882												
Jan.	30·186	56·70	1	9	1	1	5	4	...	10	4·91	
Feb.	30·103	53·20	1	9	1	1	2	4	2	8	10·18	
March ...	30·016	62·30	1	10	2	3	8	5	2	...	1·32	
April	29·890	66·00	...	16	5	2	6	...	1	...	6·25	
May	29·910	69·60	...	16	6	4	4	...	...	1	2·57	
June	29·898	76·10	...	13	5	4	5	3	...	...	0·06	38·74
July	29·770	81·40	...	19	12	...	...	...	...	...	0·	
Aug.	29·812	82·60	...	8	14	8	1	...	...	...	0·	
Sept.	29·916	81·70	...	9	10	7	4	...	...	...	0·	
Oct.	29·989	74·64	1	10	3	...	14	3	...	...	3·12	
Nov.	30·028	68·16	1	11	1	3	6	6	...	2	3·10	
Dec.	30·052	61·10	...	9	2	2	3	3	2	10	6·36	
			5	139	62	35	58	28	7	31	37·87	

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
1883												
Jan.	29·994	56·20	4	12	1	1	3	2	3	5	12·73	
Feb.	29·979	55·26	4	11	4	...	...	3	2	4	9·25	
March ...	29·952	64·40	2	12	6	2	2	5	...	2	3·30	
April	29·886	65·60	1	12	5	5	4	3	...	...	0·90	
May	29·934	70·78	...	15	8	1	3	4	...	...	0·35	39·11
June	29·847	78·65	...	22	4	3	1	...	...	...	0·	
July	29·780	81·90	...	29	2	...	...	...	...	...	0·	
Aug.	29·801	83·47	...	16	2	7	5	1	...	...	0·29	
Sept.	29·906	81·55	...	11	7	5	3	4	...	...	0·	
Oct.	29·995	76·90	...	11	3	2	2	13	...	...	2·12	
Nov.	30·010	67·30	...	11	...	1	...	9	...	9	15·30	
Dec.	30·040	60·60	1	10	...	...	1	3	...	16	6·44	
			12	172	42	27	24	47	5	36	50·68	
1884												
Jan.	30·068	54·60	...	13	...	...	1	2	...	15	10·64	
Feb.	30·026	55·30	...	7	...	2	2	4	...	15	6·07	
March ...	29·964	60·10	...	13	...	3	3	8	...	4	3·65	
April	29·878	66·40	1	12	5	4	4	3	...	...	1·65	
May	29·908	71·16	1	15	1	5	6	3	...	...	0·55	46·71
June	29·915	77·90	...	19	7	2	1	1	...	...	0·	
July	29·787	80·35	...	21	5	3	2	...	...	...	0·01	
Aug.	29·791	82·00	...	22	2	3	3	1	...	...	0·03	
Sept.	29·902	76·30	...	19	...	2	8	1	...	...	1·01	
Oct.	29·992	74·20	...	10	...	4	6	7	1	3	1·94	
Nov.	29·992	74·20	3	12	...	1	...	8	...	6	4·35	
Dec.	30·065	65·20	1	7	1	...	3	7	...	12	0·24	
			6	170	21	29	39	45	1	55	30·14	

	Mean, Barometer.	Mean, Thermometer.	Direction of Wind, days.								Rain, inches.	Rain of Rainy Season.
1885			S.	S.W.	W.	N.W	N.	N.E.	E.	S.E.		
Jan.	29·991	56·60	1	10	1	...	4	1	1	13	10·37	
Feb.	30·034	59·30	1	9	...	...	3	4	...	11	4·16	
March ...	29·941	62·40	...	12	1	1	4	10	1	2	1·64	
April	29·878	65·80	..	14	1	5	1	6	...	3	3·43	
May	29·893	74·60	1	14	1	5	2	6	2	...	0·05	
June	29·847	78·40	...	24	4	1	1	...	...	..	0·40	27·63
July	29·781	82·50	...	13	18	...	...	...	...	...	0·	
Aug.	29·749	83·30	...	14	10	4	3	...	...	...	0·	
Sept.	29·877	80·90	...	10	6	2	9	3	...	...	0·70	
Oct.	30·000	76·80	...	15	2	1	2	9	2	...	0·08	
Nov.	30·018	68·90	2	7	9	...	3	8	1	...	3·91	
Dec.	30·048	62·40	2	6	10	1	2	7	1	2	6·91	
			7	148	63	20	34	54	8	31	31·55	

Mean of eleven years and a half.

			16	137	49	36	46	46	9	26	35·66	

The CHAIRMAN (Mr. D. Howard, V. Pres. Chem. Soc.)—The paper just read is a very valuable contribution to our knowledge of the meteorology of Syria and Palestine. Our thanks are due to its author, and also to Mr. H. Cadman Jones for reading it. It is now open for any present to offer remarks upon it.

Sir JOSEPH FAYRER, K.C.S.I., F.R.S.—I am sure that the Institute is much indebted to Dr. Post for his valuable paper. It is a very interesting and useful contribution to the meteorology of the part of the world with which it deals, and we may hope that other observers will be able to add to what Dr. Post has so ably recorded. It seems to me that it would be ungracious to criticise, nor do I know that I am in a position to do so; still, there are one or two things that have struck me as somewhat remarkable. Dr. Post speaks, in his paper, of the climate in Syria and Palestine as being an equable one, and says that "such an even climate is peculiarly favourable to pastoral labours, hence Syria and Palestine have always been noted for their flocks and herds." When we recall the physical condition of the country, with its numerous valleys and mountain ranges, the mountains rising from plateaux of 2,000 and 2,500 feet, to 4,000 and 5,000 feet, and even higher, with great deserts on the one side, and the sea on the other, one would hardly expect to find a very equable climate. Nor does it seem to me that Dr. Post's record shows it to be so. I could not help thinking, while the paper was being read, of the beautiful story of Ahab and the Prophet Elijah on Mount Carmel; how the latter sent his servant to look toward the sea, when the servant saw a little cloud arising out of the sea, like a man's hand, and how Elijah then sent to Ahab, telling him that he was to prepare his chariot and get down, that the rain stop him not. Such must have been the condition spoken of in the paper. There is a continuance of hot weather, and then the rain comes on, as one sees in India and in the tropics. The last paragraph of the paper concerning forest denudation is very interesting. I should like to ask the Author to tell us how the views entertained on this particular subject at the present time compare with those of 1,500 or 1,800 years ago? that the state of things in that part of the world has wonderfully altered under Turkish and other rule there can be no doubt. Instead of a rich and fertile territory, feeding and nourishing a large population, as was once the case, we know that it is altogether different at the present day. But what is the cause? If it be true that there has been a great denudation of the forests—that the trees have been cut down on the mountains—we might expect, from what occurs in other parts of the world, that there would be a considerable diminution of the rainfall. And we might hope that the restoration of vegetation and the replanting of the hills and surface of the soil would bring such an increase of rainfall as would restore the natural equilibrium. I do not know whether the records that would give the information we need, as to there having been a steady diminution of the

rainfall, have been preserved. I believe that it has been thus in Greece, and probably it has been so here. I have only to add that I regard the paper as very interesting and valuable. Not having had time to read it before to-night, I should not like to criticise it further. I can, therefore, only express my gratification at such a paper having been read here, and offer my thanks to the member who has so kindly contributed it to the proceedings of this Society.

Mr. W. St. Chad Boscawen, F.R.Hist.Soc.—As I resided at one time for nearly three months in Beirût, perhaps I may be allowed to refer to one or two points upon which I may be able to throw a little light. I do not speak on the subject of meteorology, because I know nothing about it; but rather with reference to Lebanon, a matter of some interest. There can be no doubt that the Assyrian and Egyptian inscriptions show the time when Lebanon was covered with large forests of cedar pine to be a very early period. There is one interesting circumstance in regard to the proposed restoration of these plantations. The present Turkish Ambassador in this country, Rustem Pacha, was, at the time I was out there, Governor of the Lebanon; and I believe he and Midhat Pacha were the instigators of important improvement in the Lebanon district, in the replanting of the old forests. I journeyed on one occasion from the Damascus road to a very out-of-the-way village about eight miles off—one of the worst roads I ever travelled—and we found that all along the slope of the hill plantations of firs had been established. I may specially mention that on the Damascus road, about three miles from Beirût, a forest of firs covering an area of about three miles had been planted. The trees had been growing about six years when I saw them, and are now about twelve years old. The inhabitants of the houses built in the neighbourhood of the wood are already beginning to find the place much pleasanter now than before the trees were planted. If the Governors of the Lebanon would only carry on this work of replanting the mountains, and stop the cutting down of trees, which, even at the present day, goes on in some parts of the Northern District, a great improvement might, in a comparatively short period, be effected in the climate of the country. Perhaps it would not be going beyond the scope of this Institute if I were to say, from the experience I had during the time I was out there, that I never saw a Turkish Governor who did so much in so short a time as Midhat Pacha did in that district, in road-making, police organization, and other matters of social importance. Now, unfortunately, he is lost to the work.

Sir Joseph Fayrer.—May I ask whether there are any other observatories where records were kept, besides those referred to by the author of this paper?

Captain Francis Petrie, F.G.S. (Hon. Sec.)—I am informed that there is one at Jerusalem, one at Jaffa, and two others, one being at Nabloos.

Mr. Boscawen.—I think there is one at Nazareth. There certainly was at the time I spoke of, namely in 1879. It was not elaborately fitted up,

but it was a place that in all essential respects served the purposes of an observatory.

The CHAIRMAN.—The question of the effect of forests upon climate is one of very great importance. It is not Syria only that is suffering from forest denudation, for one constantly sees, in Provence and the Riviera, how terribly the climate suffers from the cutting down of the timber, while the mere work of keeping the soil on the slopes of the hills from being washed down by the torrents of rain that occur in the wet season, is enormously increased by the removal of the trees from the hill sides. The matter is one of intense interest, all over the world, and even in Europe it is only being taken up in time—if, indeed, it be in time.

The meeting was then adjourned.

THE AUTHOR'S REPLY.

1. *Equability of the Climate of Syria and Palestine.*

SIR JOSEPH FAYRER says, "When we recall the physical condition of the country, with its numerous valleys and mountain ranges, the mountains rising from plateaux of 2,000 and 2,500 feet to 4,000 and 5,000 feet, and even higher, with great deserts on the one side, and the sea on the other, one would hardly expect to find a very equable climate."

In point of fact, however, the climate is equable. Of course there is a great difference between the temperature of the different elevations. Thus, the standard shade temperature of the summer months, at 10 a.m., is between 82° and 88° F., at Beirût on the sea-coast. At a level of 2,500 to 3,000 feet on the maritime slope of Lebanon, the thermometer will range from 73° to 80°, while at the former degree in Beirût. Day after day the thermometer will register the same degree, at the same hour, in the same place. And for months the range of variation hardly exceeds that expressed by the above figures. As one rises to the higher regions of Lebanon and Anti-Lebanon, the range of variation between day and night increases, owing to the increasing nearness to the snow-drifts, which remain on the summit through the year. But on the plains and the lower mountain levels, the variation between day and night is very steady. Not having taken thermometric observations in the night, I cannot say what is the exact difference between the temperatures, but frequent journeys by night in all

parts of the country enable me to say that one can predict with almost certainty the change of clothing needed to make himself comfortable, both by day and night. And in journeys of many days together, the same changes are required at the same hours.

Such sudden changes as those from our sultry August mornings to our cool afternoon thunder-gusts, and chilly damp nights, are *quite unknown* in Syria and Palestine. Twice only in twenty-three years has the writer known of a serious rain-storm in midsummer, and even then it was unaccompanied with severe cold.

It may be safely said again, then, that on the sea-coast and inland plains and the lower mountains, during the whole of the dry season, the climate is equable, and a traveller has need of few precautions against changes of weather.

On the mountain tops of Lebanon and Anti-Lebanon, above 8,000 feet, the great snow-drifts cool the air at night almost to the freezing point. The writer encamped for three nights of September on Jebel Sunnîn, at a height of 8,500 feet, and found the range between day and night about 35° F. Nevertheless, the temperature of any given hour of one day varied little from that of the preceding or succeeding ones.

As the rainy season approaches, the range of variation between one day and another increases, and reaches its maximum towards the end of the heavy rains in the latter part of February and the early part of March, when the sirocco winds sometimes raise the temperature to almost summer heat, and the sudden change to the stormy winds brings about as sudden a fall, almost to midwinter cold. Some of the heaviest falls of snow on the mountains come after a heated term in the latter part of the winter; yet, even then, the changes are infrequent, and when a change has taken place, either to fair weather or foul, it is apt to last for several days. Thus we often have ten days or a fortnight of clear, cool, but even weather in midwinter, followed by the prodromata of a storm, and then an equal period of boisterous wind, driving rain, and often, what is for this country, severe cold, varying, of course, with the altitude.

Among other evidences of the regularity of the climate, I may mention the almost uniformity of the occurrence of sheet-lightning in the north for several days before the "early rain" in the autumn. This phenomenon is so constant, that on its occurrence every one predicts the speedy approach of the first longed-for shower of autumn. This lightning, which is often as vivid and beautiful as the aurora borealis of northern latitudes, is far distant, unaccompanied by any rumbling of thunder, and often with a sky quite cloudless except in the north, where the display is made, and sometimes in a sky quite cloudless everywhere. This lightning does not occur in midsummer nor in spring. In winter the lightning is more regularly seen in the west and south-west, though it may appear in other quarters of the sky. Thunderstorms of sudden origin are not known here at all. The severest strokes of lightning occur in the course of the long, steady winter storms.

2. *Denudation of Forests.*

It is clear from the Bible history that there were forests in those days where all is now bare. In Solomon's days the wood of the cedar of Lebanon was shipped, in all probability, from Tyre and Sidon. In that case, we must believe that Southern Lebanon had large forests of this valuable tree. Even were we to suppose that the Tyrians obtained the tree from Northern Lebanon, there must have existed there large forests of it, to yield timber in the quantities then furnished. The author has discovered extensive forests of cedars in the Amanus, and it is well known that they are abundant in the Taurus. This implies a connexion, through the Nusairy chain, between Amanus and Lebanon, by which these forests were propagated. That these and other forests existed in Biblical times is clear from the fact that the Phœnicians were a maritime power, and largely given to ship-building. In the then condition of the world, it is every way improbable that they built with foreign timber. The process of denudation is still in progress. The author has visited the sites of several groves of cedars which have been felled during the last thirty years. The process is going on at an alarming rate in Cassius and Amanus, where many trees are barked for tanning purposes, and many more felled for timber and fuel, while no measures are taken for replanting the forests. The laws of the country regarding pasturage on the public lands on the mountains make it impossible even for so enlightened a governor as Rustem Pacha, who was fully convinced of the importance of replanting Lebanon with trees, to carry out his wishes on this subject.

A book has been written by the Hon. Mr. Marsh, formerly U.S. Minister at Constantinople, setting forth in detail the evidence of the changes, brought about by human instrumentality, in the old-inhabited lands of the East; and, foremost among the destroying agencies which have devastated these fair and fertile lands, he has shown to be the cutting down of the forests, or forest fires kindled by the carelessness or malice of the people. In the Amanus it is no uncommon sight in summer to see a mountain side on fire. The peasants fell the trees, let them dry, and then burn them to clear the land for sowing. Such clearings are enormously productive for a while, but the soil is soon exhausted, or washed away by the floods of winter.

3. *Plantations of Trees.*

The trees referred to by Mr. Boscawen are not firs, but pines, the *Pinus maritima*. They are not (except in the case of those on the Beirût plain, which were planted by Ibrahîm Pacha about 1840, to arrest the progress of the blown sands, which threatened to cover the irrigated grounds about the Beirût river) government property, nor is the planting aided by government, but is purely a private enterprise, from which a good profit is realised.

Midhat Pacha had nothing to do with the Lebanon in any way, and could not have in any way influenced tree-planting. As for Rustem Pacha, whom the writer knows intimately, and upon whom he urged most earnestly the importance of this subject, he frequently expressed his regret that he had no power to replant the mountains with trees, owing to the vested rights of the shepherds, who would not yield a jot of their privileges. Cyprus has suffered in the same way. A forester appointed by the British government is now making arrangements to begin the work of restoration. There, as here, the goats are the great hindrance. But for them, the forests would in many places extend by natural processes, but as they nibble the seedlings, no tree can grow where they are allowed to pasture.

4. *The moisture of different parts of Syria and Palestine* differs greatly. The sea-coast plain is loaded with moisture. Steel instruments soon rust out in Beirût and other coast cities. The maritime slopes of Lebanon and its continuous ranges north and south are liable to be wrapped in clouds, which makes the air at such times damp. At other times the mountain air is dry. The air of the table-lands is dry and stimulating to the nerves.