with normal: Hilo, 100 per cent; Hamakua, 115 per cent; Kohala, 155 per cent; Waimea (Hawaii), 75 per cent; Kona, 170 per cent; Kau, 70 per cent; Puna, 100 per cent; Maui, 150 per cent; Oahu, 95 per cent; Kauai, 135 per cent.

Mean temperatures: Pepeekeo, Hilo district, 100 feet elevation, mean maximum, 80.4°; mean minimum, 69.5°; Waimea, Hawaii, 2,730 elevation, 82.3° and 65.7°; Kohala, 521 elevation, 79.3° and 67.5°; Waiakoa, Kula, Maui, 2,700 elevation, 78.5° and 60.0°; Ewa Mill, 50 elevation, 84.8° and 67.5°; United States Experiment Station, Jared W. Smith, 350 elevation, 83.4° and 70.2°; W. R. Castle, 60 elevation, highest, 84°; lowest, 66°; mean, 75.2°.

Ewa Mill mean dew-point, 64.6°; mean relative humidity, 68.7 per cent; Kohala, Dr. B. D. Bond, 66° and 78 per cent.

Slight but decided earthquake felt at Honolulu, 4:31 a. m., 16th, day of lunar eclipse; same reported from Kohala, Waimea, 2 shocks, and Hilo, Pepeekeo. On the 20th, Kohala, 5:30 a. m., 26th, Waimea, 3:05 and 11:05 p. m. Heavy swell and surf 15th, 17th, 27th, and 28th. Heavy rains, 3d, 15th, and 27th.

Heaviest 24-hour rains reported: Rhodes Gardens, 4.23 inches; Waiakea, Hilo, 3.31 inches; Luakaha, 4.00 inches, 27th; Puuohua, Hilo, 3.43 inches, 14th.

OBSERVATIONS AT HONOLULU.

The station is at 21° 18' N., 157° 50' W. It is the Hawaiian Weather Bureau station Punahou. (See fig. 2, No. 1, in the MONTHLY WEATHER REVIEW for July, 1902, page 365.) Hawaiian standard time is 10^h 30^m slow of Greenwich time. Honolulu local mean time is 10^h 31^m slow of Greenwich.

The pressure is corrected for temperature and reduced to sea level, and the gravity correction, —0.06, has been applied.

The average direction and force of the wind and the average cloudiness for the whole day are given unless they have varied more than usual, in which case the extremes are given. The scale of wind force is 0 to 12, or Beaufort scale. Two directions of wind, or values of wind force, or amounts of cloudiness, connected by a dash, indicate change from one to the other.

The rainfall for twenty-four hours is measured at 9 a. m. local, or 7.31 p. m., Greenwich time, on the respective dates.

The rain gage, 8 inches in diameter, is 1 foot above ground. Thermometer, 9 feet above ground. Ground is 43 feet and the barometer 50 feet above sea level.

Meteorological Observations at Honolulu, October, 1902.

Date.	Pressure at sea level.	Temperature.		During twenty-four hours preceding 1 p. m. Greenwich time, or 1:30 a. m. Honolulu time.									Total rainfall at 9 a. m., local time.
				Temperature.		Means.		Wind.		Average cloudiness.	Sea-level pressures.		
		Dry bulb.	Wet bulb.	Maximum.	Minimum.	Dew-point.	Relative humidity.	Prevailing direction.	Force.		Maximum.	Minimum.	
	*	†	†			‡	‡		§				
1	29.89	72	68.5	84	70	67.0	72	ne.-n.	2-1	7-1	29.95	29.86	0.00
2	29.95	68	67.3	84	72	66.3	72	n.	1	4-2	29.98	29.87	0.00
3	29.98	75	69	84	68	68.0	79	nne.	1	3	30.02	29.93	0.13
4	29.97	75	69	83	72	66.0	67	ne.	3	3	30.03	29.94	0.02
5	29.95	69	67.7	80	73	66.0	71	ne.	3-1	7	30.04	29.95	0.11
6	29.92	68	67	83	68	68.5	82	nne.	2	3-9	30.00	29.91	0.01
7	29.89	70	68	82	67	68.3	87	ne.-sw.	1-0	8	29.94	29.84	0.03
8	29.91	72	71.5	82	67	69.0	82	s.-sw.	1-0	3	29.94	29.86	0.08
9	29.94	70	69	82	71	71.0	85	sw.	1-0	5	29.97	29.88	0.05
10	30.02	70	68.7	82	70	70.0	85	sw.	1-0	3	30.03	29.93	0.02
11	29.98	75	70	83	69	69.0	83	n.-ne.	1	6-0	30.07	29.97	0.00
12	29.94	75	70.5	84	68	67.7	73	nne.	2	1	30.04	29.94	0.21
13	29.94	76	69.5	83	71	67.0	70	ne.	3-5	2-7	29.99	29.90	0.04
14	29.95	75	69	81	72	66.7	70	nne.	5-2	7-2	29.99	29.89	0.15
15	30.05	74	67	80	72	67.3	74	ne.	3-4	7	30.06	29.96	1.05
16	30.05	74	66	79	70	62.7	67	nne.	5-0	2	30.10	30.03	0.00
17	30.02	69	64	80	73	62.0	63	ne.	3	7-2	30.09	29.99	0.01
18	29.98	73	66.5	81	68	62.3	66	nne.	3	3	30.04	29.94	0.00
19	29.99	75	67	81	73	62.0	64	ne.	3	2	30.04	29.94	0.00
20	30.03	74	68	81	74	63.3	64	ne.	3	3	30.06	29.96	0.01
21	29.97	73	67.5	80	72	64.0	66	ne.	3	4	30.06	29.97	0.00
22	29.96	71	68.5	82	72	65.5	72	ne.	3-1	3	30.02	29.91	0.00
23	29.96	68	67	83	68	67.7	78	se-ne.	1-0	6-3	30.00	29.91	0.01
24	29.96	67	66	82	68	67.7	82	sw-n.	1-0	7-1	30.00	29.91	0.01
25	29.94	69	68.5	83	67	66.3	76	s-ne.	0-2	2	30.00	29.88	0.02
26	29.93	74	69	84	67	68.0	78	se-ne.	1-2	2	29.98	29.91	0.00
27	29.99	75	71	82	72	66.5	70	ne.	3	1	30.02	29.92	0.15
28	29.97	74	70	78	72	68.7	84	nne.	4	5	30.08	29.98	0.45
29	29.94	76	71	81	72	67.7	77	ne.	4	4	30.01	29.91	0.03
30	29.94	75	68.5	81	73	67.7	74	ne.	3-4	5	29.97	29.87	0.00
31	29.95	66	65	82	73	64.5	66	nne.	3	1	30.00	29.92	0.00
Sums	......	......	......	......	......	......	......	......	......	......	......	......	2.59
Means	29.963	72.5	68.2	81.8	70.3	66.6	74.5	......	2-1	3.3	30.017	29.922	......
Departure	+.002	......	......	......	......	+0.4	+3.5	......	......	—1.0	......	......	—0.17

Mean temperature for October, 1902, (6 + 2 + 9) ÷ 3 = 75.8; normal is 76.4. Mean pressure for October, 1902, (9 + 3) ÷ 2 = 29.969; normal is 29.967.

* This pressure is as recorded at 1 p. m., Greenwich time. † These temperatures are observed at 6 a. m., local, or 4.31 p. m., Greenwich time. ‡ These values are the means of (6 + 9 + 2 + 9) ÷ 4. § Beaufort scale.

Rainfall data for October, 1902.

Stations.	Elevation.	Amount.	Stations.	Elevation.	Amount.
HAWAII.					
HILO, e. and ne.	*Feet.*	*Inches.*	MAUI.—*Continued.*	*Feet.*	*Inches.*
Waiakea	50	12.37	Paia	180	2.15
Hilo (town)	100	12.12	Haleakala Ranch	2,000	4.00
Kaumana	1,250	....	Wailuku, ne	200	0.94
Pepeekeo	100	11.52	OAHU.		
Hakalau	200	12.13	Punahou (W. B.), sw	47	2.59
Honohina	300	12.94	Kulaokahua (Castle), sw	50	2.16
Punohua	1,050	18.98	Makiki Reservoir	120	2.96
Laupahoehoe	500	11.78	U. S. Naval Station, sw	6	1.56
Ookala	400	10.14	Kapiolani Park, sw	10	0.73
HAMAKUA, ne.			Manoa (Woodlawn Dairy), c.	285	11.75
Kukaiau	250	6.95	Manoa (Rhodes Gardens)	300	15.46
Paauilo	750	6.26	School street (Bishop), sw	50	2.95
Paauhau (Mill)	300	4.62	Insane Asylum, sw	30	2.15
Honokaa (Muir)	425	4.75	Kalihi-Uka, sw	450	9.13
Honokaa (Meinicke)	1,100	5.93	Nuuanu (W. W. Hall), sw	50	3.04
Kukuihaele	700	5.49	Nuuanu (Wyllie street)	250	5.12
KOHALA, n.			Nuuanu (Elec. Station), sw	405	5.85
Niulii	200	5.83	Nuuanu (Luakaha), c	850	13.12
Kohala (Mission)	521	5.93	Waimanalo, ne	25	2.69
Kohala (Sugar Co.)	235	5.98	Maunawili, ne	300	5.42
Puakea Ranch	......	3.29	Kaneohe	100	4.31
Hawi	600	1.54	Ahuimanu, ne	350	5.75
Puuhue Ranch	......	2.37	Kahuku, n	25	3.22
Waimea	2,720	....	Wahiawa	900	0.79
KONA, w.			Ewa Plantation, s	60	1.64
Kailua	950	....	Waipahu	200	0.65
Holualoa	1,350	9.03	Moanalua	15	1.83
Kealakekua	1,580	11.20	U. S. Magnetic Station	50	1.35
Napoopoo	25	5.90	Tantalus Heights	1,360	11.99
KAU, se.			U. S. Experiment Station	350	3.81
Kahuku Ranch	1,680	2.87	Upper U. S. Exp. Sta. (Castle)	1,150	10.56
Honuapo	15	1.38	KAUAI.		
Naalehu	650	2.17	Lihue (Grove Farm), e	200	5.06
Hilea	310	0.60	Lihue (Molokoa), e	300	4.92
Pahala	850	1.72	Lihue (Kukaua), e	1,000	12.53
Moaula	1,700	....	Kealia, e	15	3.96
PUNA, e.			Kilauea, ne	325	7.19
Volcano House	4,000	3.18	Hanalei, n	10	9.32
Olaa, Mountain View (Russel)	1,690	11.36	Waioli	10	7.40
Kapoho	110	8.63	Waiawa	32	....
MAUI.			Eleele	200	....
Lahaina	......	....	Wahiawa	2,100	....
Waiopae Ranch	700	0.62	Lawai	200	5.37
Kaupo (Mokulau), s	285	....			
Kipahulu, s	300	....	*Delayed September reports.*		
Nahiku, ne	60	....	Kaumana	......	....
Nabiku	800	....	Waiopae Ranch (Maui)	......	1.98
Haiku, n	700	6.32	Haleakala Ranch (Maui)	......	3.08
Kula (Waiakoa), n	2,700	1.68	Wahiawa (Oahu)	......	2.63
Kula (Erehwon), n	4,500	2.81	Waiawa (Kauai)	......	0.00
Puuomalei, n	1,400	6.16	Wahiawa Mt., s (Kauai)	......	10.20

NOTE.—The letters n, s, e, w, and c show the exposure of the station relative to the winds.

CLIMATOLOGY OF COSTA RICA.

Communicated by H. PITTIER, Director, Physical Geographic Institute.

[For tables see the last page of this REVIEW preceding the charts.]

Notes on earthquakes.—October 9, slight shock at 4^h 6^m p. m., duration 2 seconds. October 13, medium shock at 4^h 29^m a. m., duration 9 seconds. October 14, slight shock at 5^h 49^m a. m., duration 7 seconds. October 15, slight shock at 2^h 10^m a. m., duration 5 seconds.

CYCLES OF PRECIPITATION.

By L. H. MURDOCH, Section Director, Salt Lake City, Utah, dated October 20, 1902.

In Utah a cycle of unusually heavy precipitation began in 1866 and continued until 1886. During that period the old settlers confidently asserted that the climate had changed to wetter and even men of scientific training tried to explain the increased precipitation as due to human agencies. It was stated that the humidity had been greatly increased by breaking up the land, irrigation, increased vegetation, etc. Since 1887 the precipitation has been deficient and nothing is now heard on the subject of human agencies increasing the humidity. Most men who spent their youth here between 1866 and 1886 will now tell you that the climate has changed to drier.

It is, therefore, evident that the person who forms the opinion that climate is changing, based upon his own personal experience, is very likely to be mistaken. And yet no one who has stood near Salt Lake City and observed on the mountain sides the shore lines of the ancient Lake Bonneville can doubt for a moment that the climate of the Great Basin has undergone a very decided change. The maximum height of the old fresh water lake was about 1,000 feet above its remnant, Great Salt Lake, and its depth at the point where Salt Lake City now stands was something like 900 feet. Lake Bonneville covered the western half of Utah and small portions of eastern Nevada and southern Idaho. Its waters were discharged through Red Rock Pass, in southern Idaho, and finally reached the Pacific Ocean through the Columbia River. During the existence of the lake its outlet was lowered 375 feet by erosion, producing a corresponding fall in the lake itself.[1]

The lake existed as long as precipitation was in excess of the evaporation and this was for thousands of years. The mere fact that a lake has disappeared does not necessarily demonstrate that this change is due to increased evaporation or diminished rainfall, but, after a careful investigation of the subject, Gilbert concludes that the disappearance of Lake Bonneville can be accounted for only by a change in climate. (See Lake Bonneville, pages 262 to 265.)

Gilbert's studies of this region show that preceding the epoch of high water was a period during which the basin was nearly or quite dry. This period exceeds in length the time that has elapsed since the Lake Bonneville epoch. And still preceding that period of drought was another humid epoch during which the water rose to within 90 feet of the Lake Bonneville stage and continued five times as long.

Geologists generally agree that there were two periods of glaciation on the Northern Hemisphere. An epoch of much warmer weather separates the two, during which most of the ice disappeared. It seems probable that the two great lakes which have covered this basin were produced by the same conditions, which caused the two periods of glaciation, and were therefore coexistent with them.

Many theories have been advanced to explain these great vicissitudes of climate, but the question is far from settled.

The changes in climate which geology seems to require were so slow that they probably would not be appreciable in the most carefully kept record in a thousand years, but a study of the precipitation record of any locality will show that there are extended periods of comparatively dry weather followed by a number of years with excessive precipitation, and these in turn by a cycle of dry years. During the twenty-one years, from 1866 to 1886, the average annual precipitation at Salt Lake City was 18.49 inches, or 1.84 inches more than the average for the entire record, and during the first thirteen years of this wet cycle the average precipitation was 20.08 inches, or 3.43 inches greater than the average for all years. The average precipitation for the fifteen years, from 1887 to 1901, was only 15 inches, which is 1.65 inches below the average for all years.

While no authentic rain gage records were kept in this vicinity prior to 1863, a very good record of the precipitation was kept by the water level of Great Salt Lake.

Fig. 1 shows how nicely the water level has responded to the precipitation to within the last few years. As a result of the excessive precipitation, the lake reached a maximum level of about 13 feet in 1868 and again in 1876. The maximum level for 1886 was a little over 9 feet; responding to the dry cycle which began the following year, a fall began and continues at the present time. The level on October 1, 1902, was 2 feet 8 inches below the zero of the gage, showing a decline of nearly 12 feet since 1886, and an extreme range of about 16 feet.

Irrigation has undoubtedly been a factor in bringing about the present low level, but it is equally certain that the main factor has been the deficiency in precipitation. The divergence between the precipitation and the lake lines for the last few years is evidently due, in part at least, to the accumulated effects of the drought.

When the Mormon settlers entered the valley in 1847 the lake level was nearly as low as at present. The position of the storm line and the growth of sage and other brush down to this line led Gilbert to conclude that it had been many years and perhaps even centuries since the lake had been above the storm line of 1847. In order to throw further light upon the subject, the writer recently made an examination of the lake shore to determine how far down the brush is now growing. A fairly good growth of sage brush and grease wood was found between the 1876 and the 1886 lines, grease wood predominating. The growth of brush on the shore in 1847, therefore, can not be used to prove that the low water of that period had existed for a greater time than from sixteen to twenty-six years, but from all the data available it seems more than probable that it had existed for at least twenty years. This being the case, it can be assumed that a dry cycle began as early as 1827; this cycle continued until 1864, or about thirty-seven years. Judging from the lake level, it is safe to estimate that the average annual precipitation during these years was not over 15 inches.

For Salt Lake City, then, we have a dry cycle extending from 1827 to 1864, during which the average annual precipitation was about 15 inches; from 1865 to 1886, a wet cycle, with an average annual precipitation of 18.42 inches; and from 1887 to the present time a dry cycle, the average annual precipitation from 1887 to 1901 being 15 inches.

Having outlined the wet and dry cycles for Salt Lake City, it will now be found instructive to examine the records of other localities for the same purpose. The stations selected are in about the same latitude as Salt Lake City and include San Francisco, Sacramento, Denver, Omaha, St. Louis, Cincinnati, and Baltimore. According to records extending back to 1850 the wettest twenty consecutive years at both San Francisco and Sacramento were from 1866 to 1885; at Denver, the seventeen years from the beginning of the record, in 1870, to 1886 were the wettest; the record was begun at Omaha in 1871 and shows the first sixteen years to be the wettest; at St. Louis and Cincinnati, from records extending back to 1839 and 1838, respectively, the wettest twenty consecutive years were from 1840 to 1859; at Baltimore the record is broken prior to 1871 and the wettest twenty consecutive years there were found to be from 1873 to 1892.

From the foregoing it appears that the country west of the

[1] The position of the surface of the lake represents the varying balance between rainfall and inflow, on the one hand, evaporation and outflow, on the other. A variation in any one of these four items will cause a variation of the level of the lake. The direct rainfall is measured with comparative ease, and our records go back with considerable accuracy for about forty years; but we know almost nothing of the variations in evaporation and in the outflow and inflow. Of course, the variations in the area of the watershed that feeds the Great Salt Lake appear to have been almost inappreciable in recent years, but this was not so in the older geological eras, when Lake Bonneville was full. Similarly, at the present time we think of the Great Salt Lake as having no outflow, but in former ages Lake Bonneville had an outlet, and its outflow varied from age to age with the wearing away of gorges and waterfalls. Even at the present time the inflow to the lake must vary with changes in the soil and vegetation and the depth of the streams and the quantity of water consumed in irrigation, or, in other words, lost by evaporation from the watershed before it can reach the lake. A slight change in the general inclination of the basin immediately adjoining the lake, by which the present dry lowlands become covered with water, would immediately increase the evaporation to a very large extent. Such tilting of the land seems to have been already demonstrated by the observations of G. K. Gilbert in the region of our Great Lakes. (See the 18th Annual Report of the United States Geological Survey or The National Geographic Magazine, September, 1897.) Similar changes undoubtedly took place in Lake Bonneville, and may even have an appreciable effect over an area as small as Great Salt Lake. It is, therefore, evident that the geological and meteorological conditions that conspire to change or preserve the level of any lake surface constitute such a complex combination that we can not rationally argue from the changes in water level back to changes in rainall or evaporation. There are five or six elements in the problem, and our or five of these must be given before we can conclude anything with ertainty with regard to the remaining one.—ED.

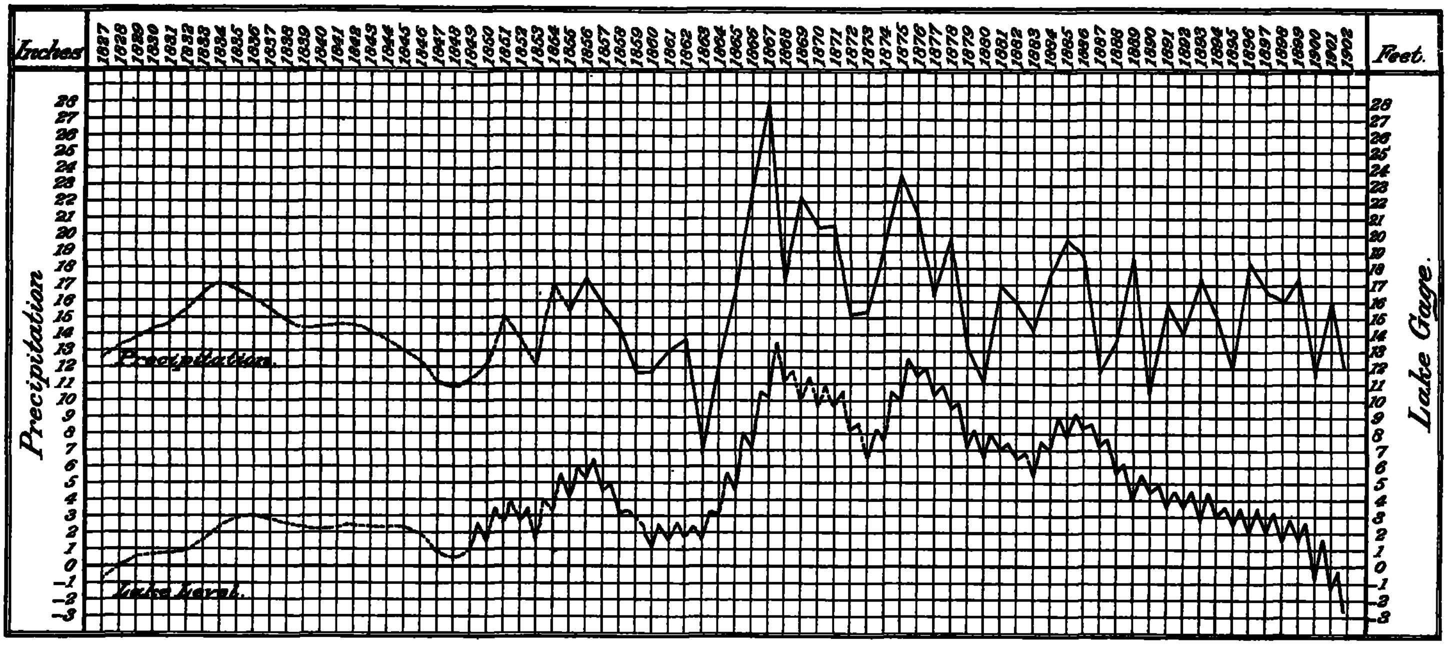

FIG. 1.—Annual precipitation at Salt Lake City and water level of Great Salt Lake.

EXPLANATORY NOTES.

The upper line indicates the precipitation and the lower one the lake level. Dotted lines indicate periods of no authentic observations, or that the data have been approximated; the position of the storm line in 1847 and the growth of sage brush down thereto are the only data upon which both the lake and precipitation lines prior to 1847 are based, except an observation by Fremont in 1845.

The precipitation record at Salt Lake City for 1901 does not fairly represent conditions for the entire drainage basin; from April 2 to 4 4.08 inches of rain fell at Salt Lake City, but this excessive precipitation covered only Salt Lake and Davis counties, and small portions of adjoining counties, about one-twentieth of the basin, while the rainfall was comparatively light over other portions.

Rocky Mountains had its wettest cycle from 1866 to 1887, while the middle Mississippi and Ohio valleys received their heaviest precipitation from 1840 to 1859. It will be observed that while the central portion of the country was receiving an abundance of moisture, the country west of the Rocky Mountains was passing through the longest dry cycle of which we have any record.

The dry cycle that prevails at present is general from San Francisco to Baltimore. The past fifteen years have been the driest fifteen consecutive years on record for all the stations named, except Sacramento, and the drought is equally well marked there, but the fifteen years from 1851 to 1865 were a trifle drier.

How long will the present dry cycle continue? A correct answer to this question would be worth millions of dollars to the people of the United States and be especially valuable to those living in the arid regions.

During the first few years after Utah was settled irrigation was necessary and no "dry" farming was attempted; but during the latter part of the sixties, after an apparent change in climate, it was found that handsome crops of grain could be raised without irrigation, and up to the end of this wet cycle more and more land was broken up for this "dry" farming.[2] During the past fifteen years "dry" farming has generally been a failure and is now being largely abandoned; in fact in several settlements, mostly in the west-central portion of the State, irrigation water has itself become so scarce that very small crops have been raised for several years, and if a continuance of the present dry cycle could be forecast, there would be a general exodus from those parts. The Southern Pacific Company is now extending its road across the north end of Great Salt Lake. Judging from past levels, the track should be placed from 16 to 20 feet above the present level to provide for high water. If it could be forecast that the present dry cycle would continue twenty years longer it would probably mean a saving of at least a million dollars to this company alone. Still another case in point is that of the Great Lakes, which have become so low in recent years as to interfere with navigation. The Government has made financial provision for investigating this difficulty and for the formation of a practical plan for raising the water level. The level will probably be raised by the construction of a dam costing millions of dollars. If it were known that the next twenty years would be unusually wet this expense would be unnecessary for the present.

Many students of the subject have studied the fluctuations in weather conditions as dependent upon sun-spot cycles. The investigations of Wolf and Wolfer, of Switzerland, show that the short sun-spot cycles vary in length from 9 to 13.6 years and that there are grand cycles of increase and decrease, both seeming to cover a period of about fifty-five years.

In comparing precipitation records with sun spots some investigators have found that a maximum of sun spots is accompanied by a deficiency of precipitation and a minimum by an excess, while others equally reliable, but using the precipitation records of different localities, have found the opposite conditions to exist.

The writer has compared the Salt Lake City precipitation record with Wolfer's Sun-spot Tables, published in the MONTHLY WEATHER REVIEW for April, 1902, but has been unable to discover any relation whatever between them. Years of minimum sun spots are sometimes excessively wet and sometimes excessively dry, and the same may be said of years of maximum sun spots. It seems pretty well settled that no well-defined connection exists between the short sun-spot cycles and the precipitation. This may also be said of the 55-year period, but the precipitation records are too short to permit a full investigation of the subject. But there are sufficient data to show that if a relationship does exist it is rather complex. For example, the sun-spot curve for the period from 1840 to 1859 does not appear to differ materially from that from 1887 to 1901. During the first period the central portion of the United States was in a wet cycle, while the country west of

[2] Dry farming is done on land which can not be irrigated.—L. H. M.

the Rocky Mountains was a in very dry one. During the latter period a dry cycle prevailed from San Francisco to Baltimore.

We shall, therefore, have to conclude that there is no known natural law by which we can predict the length of the present dry cycle. The data shows that weather equally as dry prevailed west of the Rocky Mountains for a period of at least thirty-seven years. If it were known that these recurring periods were of equal length no change for the better could be expected in the intermountain country until about 1924, but it is probable that these periods vary in length and, if this be true, they can not be used as an index to the future until much more data and knowledge are accumulated.

RECENT PAPERS BEARING ON METEOROLOGY.

W. F. R. PHILLIPS, in charge of Library, etc.

The subjoined titles have been selected from the contents of the periodicals and serials recently received in the library of the Weather Bureau. The titles selected are of papers or other communications bearing on meteorology or cognate branches of science. This is not a complete index of the meteorological contents of all the journals from which it has been compiled; it shows only the articles that appear to the compiler likely to be of particular interest in connection with the work of the Weather Bureau. Unsigned articles are indicated by a ——.

Quarterly Journal of the Royal Meteorological Society. London. Vol. 28.

Dines, W. H. and Wilson-Barker, D. Report on the Wind Force Experiments on H. M. S. *Worcester* and at Stoneness Lighthouse. Pp. 217–228.

Mill, Hugh Robert. The Cornish Dust-fall of January, 1902. Pp. 229–252.

—— Distribution of Fog in Switzerland. [Note on article by Gottfried Streun.] Pp. 252.

Bayard, F[rancis C[ampbell]. English Climatology, 1891–1900. Pp. 253–281.

Dallas, W. L. Earth Temperature Observations recorded in Upper India. Pp. 283–299.

—— Pressure and Temperature Results for the great Plateau of South Africa. [Review of article by J. R. Sutton.] Pp. 302–304.

Geographical Journal. London. Vol. 20.

Markham, Clements R. Arctic Problems. Pp. 481–485.

Skottsberg, C. Geographical Distribution of Vegetation in South Georgia. Pp. 498–502.

Nature. London. Vol. 66.

S[cott], R. H. The International Meteorological Committee. P. 608.

Schuster, Arthur. The British Association at Belfast. Section A. Subsection of astronomy and cosmical physics. Opening Address. Pp. 614–618.

Shaw, W[illiam] N[apier]. The Treatment of Smoke: a Sanitary Parallel. Pp. 667–670.

Symons's Meteorological Magazine. London. Vol. 37.

Shaw, W. N.; Archibald, D.; Boys, C. V.; Buchan, A.; Dines, W. H.; Mill, H. R. Investigations of the Upper Atmosphere by Means of Kites. Pp. 134–138.

Mill, Hugh Robert. The Rainfall of Ireland. Pp. 138–140.

Ellis, William. The Moon and Rainfall. Pp. 142–143.

Hopkinson, John. The Meteor of July 13. P. 143.

—— The Climate of Pemba in 1901. P. 144.

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Grimsaw, Robert. Barometer Readings. P. 305.

Weir, James. The Physiology of Certain Colors. Pp. 339.

—— Popp-Branly Aerial Telegraphy Systems. Pp. 341–342.

Scientific American Supplement. New York. Vol. 54.

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