

collections of the leading countries of Europe, has grown painfully obvious. Important collections made in America of the objects illustrating the vanishing life of its own native races of men and animals—collections which can never be made again, and never be replaced—are being permanently withdrawn to enrich the museums of Europe. This has already gone so far that it is necessary in order to study the past life of the Mississippi Valley to come to England, while for that of southern Alaska Americans must go to Berlin, and for the Californian coast they have to go to Paris, and so on. It is already then, in European capitals more than in those of the United States, that the most important characteristics of the American races have to be studied, and at the present rate, within a few more years, when the American collector has nothing more left to gather and to sell abroad, it will be in Europe, and not in America, that the student of past American history must seek for nearly everything that most fully illustrates the ancient life and peoples of the American continent.

#### *The Bureau of Ethnology.*

As during previous years, the work of the Bureau of Ethnology has been conducted with special reference to the American Indians in their primitive condition, with a view of securing the largest possible amount of information, both in the form of records for print and in the form of material objects for preservation and future study in the National Museum.

One of the most interesting questions ever raised concerning the early peoples of America relates to the artificial mounds scattered abundantly over the Mississippi Valley, and with less abundance over most of the United States. Many investigators have given attention to these works of a vanished race; and it came to be a general opinion that the builders of the mounds were a distinct people antedating the native races found in possession of the land on the advent of the Europeans. Within the last five years extended surveys of the mound territory have been made by collaborators of the Bureau under immediate instructions from the director and by Dr. Cyrus Thomas. An elaborate report on this subject has been prepared during the year, and is now in press. It is the united opinion of the officers of the Bureau that this document contains the solution to the mystery of the mounds; very greatly to the surprise of the investigators who began the work, they have been led to believe that the mounds and the art products contained therein are in no wise distinct from the works of the modern Indians, and that the distribution of tribes can now be studied from the mounds themselves as well as from other aboriginal records.

Many other important investigations have been carried on, one of the chief being the means of interchanging ideas among the American Indians, including gesture, speech, and picture writing, as well as spoken language. The primitive modes of expression by means of gestures or pantomime, and by means of glyphs or pictures, are held by students as of special interest in that they represent the beginnings of language.

#### *Smithsonian International Exchange Service.*

As an illustration of the extent of this special part of the Institution's activities, it may be stated that it has now about 24,000 active correspondents, of whom 14,000 are in Europe, 200 in Africa, 500 in Australia, and about 9000 in the various countries of the Western Hemisphere. In the course of this work, the Institution has gathered at Washington an immense collection of books, found nowhere else to so great an extent, bearing chiefly upon discovery and invention, which, with others, now occupy nearly 300,000 titles. Over 100 tons of books passed through the exchange office during the fiscal year 1892-93, and while the service is used almost exclusively for the transmission of printed matter of a scientific nature, natural history specimens having no commercial value are occasionally transmitted under special permission, when they cannot be conveniently forwarded by the ordinary means of conveyance.

The National Zoological Park appears to be in a satisfactory condition, and fulfils the chief purpose for which it was made, viz. to keep from extinction species of American animals, several of which are now upon the point of vanishing from the face of the earth, and would vanish for ever if something were not done to preserve them.

In conclusion we must say that the report covers so many branches of science, and so much has been done to advance each of them, that in the above abstract it has only been possible

to mention a few of the investigations. Sufficient has been said, however, to show that considerable contributions to knowledge have been made.

#### *THE GREENLAND EXPEDITION OF THE BERLIN GEOGRAPHICAL SOCIETY.*

PARTICULAR interest is felt by the Geographical Society of Berlin in the results of an expedition to the north of Greenland, which they fitted out some two years ago. At the sitting of the Society held on November 4, 1893, Dr. Erich von Drygalski and Dr. E. Vanhöffen communicated papers on the work of the expedition, Dr. Drygalski giving a general account of their life in Greenland.

On June 27, 1892, they reached Umanak, a Danish colony on the shores of North Greenland, and selected as their base of operations a position some distance inland at the head of the Umanak Fjord. They placed their house in the hollow of a great ice-cirque. East and west were the ice-streams of the Great and Lesser Karajak, behind them stretched the bare expanse of the ice-sheet of the interior, in front lay the open water of the narrow fjord. Dr. Stade had charge of the meteorological station; Dr. Drygalski and Dr. Vanhöffen made journeys into the interior and along coastal regions of glacier and moraine.

At first, when they ascended the Karajak, none of the Greenlanders were willing to accompany them, as they are full of superstitions about the ice-wastes of the interior. Three ultimately consented, and overcame their fears so far as to enter with spirit into the difficulties of the tour. Bamboo canes were fixed as marks in the ice, and the "interference area" studied where the upper ice of the Karajak streams meets the inland ice. In the winter months, Dr. Drygalski, with two trusty Greenlanders, explored the Great Karajak glacier. He took measurements on the relative rate of movement in the smoother and more cleft parts of the glacier. He tells how, as the big blocks of ice tumbled down, fine ice-dust was raised, which hung like a transparent veil around the ice-pillars and hummocks, sometimes catching the sun-rays and glancing with colour effects. Ice-grottoes were found, the remnants of old water-channel in those the temperature was wonderfully high, and the ice-waste quite moist.

From February until June, Dr. Drygalski and Dr. Vanhöffen were engaged in a long sleigh journey to the most northerly part of the Upernivik colony, in Lat. N. 73°. At this latitude the outer margin of the great ice-mantle of the interior extended to the sea level. Another tour which they attempted in June had to be given up on account of the warm Föhn wind. Before their final departure from Karajak, they ascended the ice once more to take observations on the bamboo marks previously set. Dr. Drygalski attributes the movement of the ice-streams to their content of water, and says there would be no motion whatever unless the melting temperature were reached. Farther, the increase of temperature in summer, due to the downward passage of heated surface-water, is much greater than the decrease of temperature in winter. The warming effect of the water is at its maximum in the deepest layers of ice, where also the movement is most marked. Microscopic examination of the ice also proved that it was thoroughly penetrated with water. It will be some time before the expedition can publish their results in detail. Dr. Vanhöffen's work was mainly biological.

#### *THE SUN-SPOT PERIOD AND THE WEST INDIAN RAINFALL.*

THE irregularities of the rainfall from year to year are so large that apparently there is no connection whatever between the sun-spot period and the Jamaica or any other rainfall; but if we smooth down these irregularities by taking the mean for three years as the rainfall for the middle of those years—that is to say, if we take the mean of the rainfall during 1866, 1867, and 1868 as applying to the middle of 1867, the mean of the rainfall during 1867, 1868, and 1869 as applying to the middle of 1868, and so on—we shall then get a series which rises to a maximum about the time of a solar minimum, and which falls to a minimum about the time of a solar maximum.

It is now about a year ago since this connection was found between the sun-spot period and the Jamaica rainfall, and my article on the subject appeared in the *Journal of the Jamaica Institute*, No. 5.



The Barbados, Antigua, and Trinidad rainfalls have been subjected to the same treatment with the same results; but it will be noticed in the following table that the smoothed Jamaica rainfall rises and falls with much greater regularity than the smoothed rainfall in Barbados, Antigua, and Trinidad; the irregularity in the last island is due to the circumstance that we are dealing with the rainfall at one station only, namely the Botanic Gardens, instead of the rainfall deduced from many stations, as in the other islands.

ON PREPARING THE WAY FOR TECHNICAL INSTRUCTION.

SIR PHILIP MAGNUS discoursed on methods of technical instruction on February 14, at the College of Preceptors. In the course of his address he pointed out that our intermediate schools were generally described as in a state of chaos, and it could scarcely be expected that so nebulous a system would be largely influenced by the definite movement in

Year (middle of).	Sun-spot period.	JAMAICA.		BARBADOS.		ANTIGUA.		TRINIDAD.	
		Rainfall, 90 stations.	Average for 3 years.	Rainfall, 90 stations.	Average for 3 years.	Rainfall, 47 stations.	Average for 3 years.	Rainfall, 1 station.	Average for 3 years.
		in.	in.	in.	in.	in.	in.	in.	in.
1843	Min.			45'31	—				
44				74'45	54'56				
45				43'91	61'39				
46				65'82	52'61 Min.				
47				48'10	59'23				
48	Max.			63'77	54'88				
49				52'77	61'47				
50				67'88	60'02				
51				59'40	62'02				
52				58'77	62'34				
53				68'84	59'50				
54				50'88	65'68 Max.				
55				77'31	58'89				
56	Min.			48'49	62'23				
57				60'90	51'54				
58				45'22	53'45 Min.				
59				54'22	52'45				
60	Max.			57'91	61'98				
61				73'82	63'97				
62				59'27	58'49			63'15	—
63				42'38	53'61			66'80	64'28
64				59'19	56'74			62'90	71'66
65				68'64	62'50			85'28	72'01 Max.
66		53'65	—	59'68	66'08 Max.			67'86	73'23
67	Min.	64'47	61'95	69'93	58'07			66'56	63'54
68		67'74	62'53	44'60	54'35			56'21	58'74
69		55'37	70'85 Max.	48'52	51'10			53'46	59'67
70	Max.	89'43	64'96	60'17	50'05			69'35	66'13
71		50'09	61'57	41'46	50'06			75'58	64'96
72		45'18	52'78 Min.	48'55	47'23 Min.			49'95	56'52
73		63'06	59'06	51'69	53'15			44'02	56'75 Min.
74		68'94	61'47	59'22	57'54	31'16	—	76'28	60'40
75		52'42	64'24	61'71	57'89	28'78	33'97	60'90	73'04
76		71'35	64'06	52'73	62'85	41'98	39'94	81'95	71'65
77		68'40	72'06	74'10	66'64	49'05	46'05	72'10	71'43
78		76'42	77'89 Max.	73'10	73'83	47'11	52'55	61'24	66'26
79	Min.	88'84	73'57	74'30	72'79 Max.	61'50	52'77	65'43	69'67
80		55'44	70'96	70'98	71'91	49'69	54'98 Max.	82'34	71'16 ?
81		68'60	60'64	70'45	63'83	53'75	45'49	65'72	67'02
82		57'87	61'91	50'06	61'21	33'04	47'43	52'99	63'07
83		59'26	58'01	63'12	57'04	55'51	44'13 Min.	70'50	60'12
84	Max.	56'90	58'67 Min.	57'95	55'05 Min.	43'98	47'63	56'88	56'87 Min.
85		59'86	69'12	44'08	61'61	43'39	45'05	43'22	62'31
86		90'61	73'71	82'81	65'30	47'78	44'95	86'82	64'71
87		70'66	77'79 Max.	69'01	73'64	43'68	45'23	64'09	72'12
88		72'11	72'31	69'09	71'67 Max.	44'23	53'83 Max.	65'44	67'77
89	Min.	74'15	70'23	76'92	66'18	73'59	50'27	73'79	74'04 ?
90		64'42	74'42	52'53	65'25	33'00	52'20	82'90	70'14
91		84'70	74'03	66'30	—	50'01	40'51	53'74	75'93 ?
1892		72'98	—	—	—	38'53	—	91'14	—

The Barbados rainfall was discussed by Sir Rawson W. Rawson in 1873,<sup>1</sup> and indeed it neither was, nor yet is easy to make out the connection between the years 1843 and 1863; but since 1863 it is all plain sailing, especially when aided by Jamaica on one side and Antigua on the other.

I have written to Mr. Hart, the superintendent of the Botanic Gardens, Trinidad, asking him to assist me in getting the Trinidad rainfall into better form.

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<sup>1</sup> NATURE, vol. viii. pp. 245, 547; vol. x. p. 263; and vol. xi. p. 327.

favour of technical education. As a fact, they had been much less affected than the institutions above and below them, and probably in consequence of the recognised absence of organisation. It might be that the Royal Commission about to be appointed would introduce order into this chaos, and that when each school knew exactly its position in the school hierarchy—its relation to the schools above and below it, and the special and particular purpose it was required to serve—our intermediate schools, both first and second grade, would become more efficient than they now were in preparing the way for that