serving the fire furnished by the active volcano of one of the islands are very ingenious. Many misstatements have been made concerning their former ignorance of fire.

The closing part of Mr. Man's paper, relating to superstitions, beliefs, and mythology, furnishes a tempting field for the prolongation of this notice; but the want of space forbids. — (*Journ. anthrop. inst. Gr. Br.*, xii. 117.) [340

The Papuans and the Polynesians. — Students of ethnology are astonished and perplexed at the occurrence of a patch of mop-headed blacks occurring in the oceanic area that extends south-easterly from New Guinea to Fiji, and various have been the attempts to classify them. Mr. A. H. Keane has elaborated a scheme of all the oceanic peoples in the ethnologic appendix to Stanford's Compendium for Australasia. To this arrangement Mr. C. Staniland Wake takes exception, in a paper read before the London anthropological institute, which called forth a sharp rejoinder from Mr. Keane. Mr. Wake's own views may be briefly stated: —

1. The Eastern Archipelago was early inhabited by a straight-haired Caucasian race, represented by the Australians. 2. To this race belonged also ancestors of the Papuans, Micronesians, Tasmanians, and Polynesians. 3. The special peculiarities of the dark races are due to foreign elements, the Negritos having influenced them all in varying degrees. 4. The lighter races show Negrito influence, but they have been intermixed with Asiatic peoples, giving rise to the Malay and the Polynesians. 5. Traces of an Arab or Semitic element appear among all, but chiefly among the Papuans and Melanesians, the former of whom may also possess a Hindoo admixture. — (*Journ. anthrop. inst.*, xii. 197.) [341

Pebbles resembling artificial objects. — Dr. Jos. Leidy called attention to a collection of large pebbles, which illustrated how closely certain natural forms may sometimes resemble works of primitive manufacture. The pebbles have the general shape of human feet, and might readily be supposed to have been used as lasts upon which the moccasins or sandals of prehistoric man were shaped. — (*Acad. nat. sc. Philad.; meeting* Feb. 5.) [342

PSYCHOLOGY.

Apparent size of magnified objects. — A paper (to appear elsewhere) was read by Prof. W. H. Brewer, in which he gave the results of several hundred estimates by as many different observers chosen from different classes of people, of a common insect as seen magnified by a microscope. These estimates were found to vary from a fraction of an inch to several feet, the actual apparent size at ten inches being a little over four inches. — (*Conn. acad. arts sc.; meeting*, Dec. 20.) [343

Experiments in binary arithmetic. — Simple addition involves several distinct but nearly simultaneous mental operations, and a capital of more than fifty propositions committed to memory. The object of the experiments by the author of the paper, Mr. Henry Farquhar, was to test the possibility of diminishing the mental strain, and consequent liability to error, by the use of numbers expressed in powers of 2, the mental work being reduced to counting similar marks and halving their sums. Columns of numbers of six or eight figures each were written with the ordinary, and with various forms of binary, notation; and comparative additions were made. To avoid confusion of columns it was found best to give different shapes to the marks denoting neighboring powers of 2; and, for brevity of expression, two or more of them were combined in one written figure. About seventy combinations were tried, with various results. With the best combination, addition required only three-fourths the time taken with ordinary figures; and this was reduced to one-half when the binary notation was taught to a person unskilled in arithmetic.

The only natural division is by bisections; hence the superior convenience of a binary scale of weights; and hence another reason for endeavoring to introduce a binary arithmetic.

In the discussion which followed, Mr. William B. Taylor said the world was losing so much by the use of the denary arithmetic, that even a single generation might find economy in substituting the octonary. The paper had especial value in that it proved the ability of binary arithmetic to compete with the established system in rapidity of computation. — (*Phil. soc. Wash.*; *meeting* Jan. 13.) [344

Varying the thermal background of reflex perception. — The background of conscious perception, physiologically speaking, is defined by W. T. Sedgwick as "that standard (usually unconsciously held) with which we compare any stimulus which awakens consciousness." We perceive difference of relative intensity between a specific stimulus and its background. The latter may vary so that a stimulus which will to-day cause consciousness or motion will not do so to-morrow. Instead of studying the reflex background by means of inhibitions, the author varies the background as a whole thermally, and observes its effect on reflexes. A reflex or headless frog may be heated so slowly, that, although the heart may beat very fast, *rigor caloris* may be caused without any motor re-action of its limbs. If the heart be tied beforehand, reflexes occur from gradual heating.

This the author thinks explained by assuming, that, in the first case, the hot blood passing inward equalizes the progressive heating throughout, or changes the thermal background; while in the second case, with no circulation, the background is fixed, and the surface temperature rises to the point of difference which causes movement. — (*Johns Hopk. univ. circ.*, Feb., 1883.) G. S. H. [345

INTELLIGENCE FROM AMERICAN SCIENTIFIC STATIONS.

GOVERNMENT ORGANIZATIONS.

National museum.

Manitoba fishes. — A collection of fishes from Manitoba, the first received for twenty years, shows that the fish-fauna of that region does not differ materially from that of the lake states.

Number of visitors in 1882. — The reports of the doorkeepers, which have been regularly made since Feb. 8, 1882, show that the average daily attendance at the museum building for that year was 535 persons, and, at the Smithsonian building, 488 persons. Estimating upon this basis, the attendance for the year 1882 may be placed at 183,265 for the museum building, and 152,822 for the Smithsonian building. When the re-arrangement of the collections in the latter

building is completed, the number of persons entering the doors will undoubtedly be the same as the number entering the museum building. The average daily attendance upon the museum at present is about 1,200.

Fisheries exhibit. — A preliminary display of the fisheries exhibit to be sent to London took place in the halls of the museum on the evenings of the 26th and 27th insts. About five thousand invitations were distributed by the commissioner of fisheries for the first evening, and were universally responded to. On the second occasion the general public was admitted without reserve. The exhibit may be pronounced remarkably comprehensive in scope, and complete in detail. The mounting of the various objects has been done in a very careful and artistic manner. Packing will begin at once.

Geological survey.

Division of mining statistics and technology. — According to an act of Congress passed at the last session, the survey is charged with the duty of collecting and publishing statistics of the mineral industries of the country (other than gold and silver mining). The plan also includes technical discussions and industrial notes; the general aim being to furnish matter of a practical character, thus correlating the purely geological work of the survey. The reports are to be issued as semi-annual bulletins, in octavo, the first of the series bearing date of July 1, 1883.

The scope of this work embraces a wide range of topics, among which are coal, iron, petroleum, copper, lead, zinc, quicksilver, nickel, tin, manganese, antimony, bismuth, salt, graphite, phosphates, barytes, asbestos, borax, gypsum, sulphur, mica, felspar, and many other substances; together with lists of localities of the useful minerals, statistics of mine accidents, etc.

Although mining statistics have been for many years published as government reports in Great Britain, France, Belgium, Holland, Russia, Germany, Austria, Sweden and Norway, Victoria, New South Wales, Queensland, Nova Scotia, and other countries and colonies, the United States have been hitherto without accounts of their mineral products, excepting such as are included in the reports of mining commissioners for the precious metals, state mineralogists, state geological surveys, and in census returns and the commercial reports of the bureau of statistics. While much creditable work has been done, and valuable information imparted, in a desultory way, both have been limited by local restrictions, or have wanted continuity. The general government has never before attempted systematic effort in this direction.

Bureau of ethnology.

Explorations of the pueblos of Tusayan. — During the earlier part of the past field-season, one of the parties of the bureau, under the charge of Mr. Victor Mersdeleff, has been at work among the pueblos of the ancient province of Tusayan, making such measurements, drawings, and plans, as will enable him to prepare models of the seven Moqui towns, on a scale sufficiently large to exhibit not only the architectural details of the villages themselves, but also the essential features of the high, precipitous mesas upon which they stand.

The party first visited the towns of Té-wa, Sechum-o-vi, and Wol-pi, — all built, in the order named, on one mesa promontory.

It is an interesting fact that the inhabitants of Té-wa, although in such close proximity to the other towns, have preserved their own customs and institutions in many respects entirely distinct from their neighbors. They manufacture a certain quality of undecorated pottery, which is not found at any other of the Moqui towns. It will be well represented in the collections from this region.

Wol-pi is remarkable for the position it occupies on the extreme point of the mesa peninsula, the neck connecting it with the main body of the mesa being not more than twelve feet wide. It is the largest of the three villages; and the small, rocky promontory on which it is built is well crowded with clusters of dwellings. In many cases, a back wall is built within a few inches of the edge of the vertical precipice; and the weathering and undermining of the rock has, in some instances, disturbed the foundations of the homes, compelling their abandonment. The trails from these villages to the plains below are very steep and rugged, in some cases descending by means of rude steps in crevices between the rocky wall of the mesa, and detached slabs of rock that have fallen from above.

The next field studied was the town of O-rai-be, which is by far the largest of the entire group, and the most isolated, maintaining very little intercourse with strangers. This pueblo is arranged with much regularity, considering the extent of ground it covers. The vast, irregular, hive-like cluster of houses usually seen in other pueblos is not found here. The buildings are arranged approximately in rows, and never exceed four stories in height. The fact that several additions to houses were being built during our short stay would seem to indicate that these people are increasing.

The three towns of the 'middle mesa' were the last group visited. Two of them — Mē-shong-i-ni-vi and Shi-pau-a-lu-vi — are quite close together; while Shong-a-pa-vi, the third, is on a spur of the same mesa, three miles to the westward. The latter is the most regularly planned of all the towns. Entrance from the roof — a conspicuous feature in the architecture of more exposed pueblos — is here found only on the first mesa, and then only occasionally, many houses being unprovided with them. The natural inaccessibility of these villages would seem to render this precaution unnecessary. It is a noteworthy fact, that, in almost every instance, the terraced side of the houses, with all the doors and windows, face eastward; the back of each row usually being a vertical wall without receding stories, and with very few openings. Even when parallel rows occur, they occupy the position stated above, instead of being built facing each other.

Incidentally to the work among these pueblos, the party visited and surveyed the ruins of a very extensive ancient pueblo, situated ten miles east of the first Moqui mesa, and known by the Navajo name of 'Talla Hogan.' From the data collected, models can be made which will be accurate as to the relative position and size of minor features; such as doors, chimneys, ladders, etc.

Upon the completion of the surveying-work, Mr. Frank H. Cushing joined the party, and a collecting expedition was organized to work among these Indians. In addition to a very full and complete collection of the modern pottery, baskets, and dance-paraphernalia, there were secured many pieces of ancient ware of rare form and decoration, and in a perfect state of preservation. The Moquis stated that some of these had been dug up on the sites of ancient pueblos; and, indeed, many of them bear evidence of recent exhumation. A few, however, seemed to be considered as heirlooms. Some of the villages appear to entertain reverence for certain ruin

sites, — so much so, that the prospect of gain cannot induce them to collect any of their ancient remains, or to reveal the location of these ruins to the white man. Other ruins they explore as thoroughly as their rude means will permit, without any compunction.

Stone implements, and stone images of animals, used as fetiches, were also collected. Many specimens of basket-ware — some of types not made by the present pueblos — were secured. The art of basket-making flourishes best among the O-rai-bes, who exchange their products for the pottery of the other villages. Most of these are made in the form of flat, circular trays, of two styles of manufacture, — one a wooden variety, very light, made by the people of O-rai-be only; the other type, coiled spirally, and much stronger and heavier, is made by both the O-rai-bes, and the inhabitants of the villages on the middle mesa.

A large number of brightly decorated wooden images — representations of gods presiding over various dances — were collected. Some of these had been deposited at a sacrificial shrine that was discovered in the vicinity of Mē-shong-i-ni-vi.

PUBLIC AND PRIVATE INSTITUTIONS.

State university of Kansas, Lawrence.

Weather report for February. — Although the lowest temperature of this month was one degree lower than any previous February minimum of our sixteen-years' record, its mean temperature was not so low as in 1874, 1875, and 1881. The mean height of the barometer exceeded every previous monthly mean. The rainfall was nearly double the average; and this is but the third month in the past year in which the rainfall has reached the average. The cloudiness and humidity were much above the average, while the wind-velocity and depth of snow were normal. Before the ice 'broke up' in the Kansas river in the middle of the month, it had reached a thickness of twenty inches.

Mean temperature, 27.92°, which is 5.64° below the average February temperature of the fifteen preceding years. The highest temperature was 67°, on the 28th; the lowest was 13° below zero, on the 4th; monthly range, 80°. The mercury fell below zero on three days. Mean temperature at 7 A.M., 21.34°; at 2 P.M., 34.44°; at 9 P.M., 27.96°.

The winter now closing, although cold, has been less severe than the winters of 1872–73, 1874–75, and 1880–81.

Rainfall, including melted snow, 2.31 inches, which is 1.05 inches above the February average. Rain or snow, or both, fell on ten days, on one of which the quantity was too small to measure. The depth of snow was 4 inches. The entire depth of snow for the winter has been 14½ inches. There was one thunder-shower, with sleet, on the 3d.

Mean cloudiness, 51.67 % of the sky, the month being 5.98 % cloudier than the average. Number of clear days (less than one-third cloudy), 12; entirely clear, 3; half-clear (from one to two thirds cloudy), 5; cloudy (more than two-thirds), 11; entirely cloudy, 7; mean cloudiness, — at 7 A.M., 55.36 %; at 2 P.M., 55.71 %; at 9 P.M., 43.93 %.

Wind, N.W. 29 times, S.W. 26 times, N.E. 24 times, S.E. twice, S. once, N. once, E. once. The entire distance travelled by the wind was 10,593 miles, which gives a mean daily velocity of 378 miles, and a mean hourly velocity of 15.76 miles. The highest velocity was 50 miles an hour, on the 24th.

Mean height of barometer, 29.340 inches; at 7 A.M., 29.340; at 2 P.M., 29.332; at 9 P.M., 29.348; maximum, 29.869,* at 9 P.M., on 17th; minimum, 28.492, on 15th, at 2 P.M.; range, 1.377 inches.

Relative humidity: mean 77.9, at 7 A.M. 85.8, at 2 P.M. 64.9, at 9 P.M. 83.0; greatest, 100, on ten occasions; least, 41, on 19th.

The following table furnishes a comparison with preceding years:—

FEBRUARY.	Mean Temperature.	Maximum Temperature.	Minimum Temperature.	Inches of Rain.	Mean Cloudiness.	Mean Humidity.	Miles of Wind.	Inches of Snow.
1868	35.71	72.0	*—3.0	0.19	24.71	.....	.....	0.50
1869	30.63	66.0	—5.0	1.44	51.20	83 1	.....	5.25
1870	35.42	69.0	—4.0	0.03	43.69	61.6	.....	0.00
1871	35.30	71.5	—6.0	2.43	49.85	74.3	.....	4.00
1872	30.44	62.0	—12.0	0.82	54.94	70.4	.....	7.75
1873	30.26	62.0	—6.5	0.86	45.95	68.1	12,827	3.00
1874	27.05	49.0	2.0	0.95	60.94	78.2	9,195	10.00
1875	21.92	55.0	—8.0	0.80	50.48	74.7	11,865	4.00
1876	37.80	74.5	—5.0	0.36	38.16	59.0	15,236	0.25
1877	39.65	66.0	21.0	0.80	47.13	71.8	7,718	2.00
1878	40.22	66.0	15.5	2.86	54.63	78.5	7,393	2.50
1879	34.06	74.0	5.0	0.41	39.04	64.7	10,097	4.50
1880	37.58	64.0	8.0	0.73	24.94	61.5	11,861	0.00
1881	25.78	61.5	—5.5	4.60	54.17	79.8	12,142	22.00
1882	41.65	73.0	12.0	1.66	45.49	69.7	11,907	2.00
1883	27.92	67.0	—13.0	2.31	51.67	77.9	10,593	4.00
Mean of 16 Februaries	33.21	66.0	—0.29	1.33	46.06	71.7	10,901	4.49

* The minus-sign denotes temperature below zero.

Peter Redpath museum of McGill university, Montreal.

Logan memorial collection. — This includes: 1°. Series of large slabs of Protichnites and Climactichnites, collected by Mr. Richardson at Perth, Ont. 2°. Collection of graptolites and trilobites from the Quebec group, collected by Mr. Richardson at Lévis and Matane. 3°. Cast of skeleton of Megatherium Cuvieri, cast of skull of Mastodon, footprints of dinosaurs, and other large casts of fossils, purchased of

Messrs. Ward & Howell. 4°. Collection of animals especially illustrative of geology. 5°. Large slabs of Laurentian limestone, with Eozoon canadense.

The whole of these are labelled 'Logan memorial collection,' and a large commemorative inscription is attached to the support of the skeleton of Megatherium.

Carpenter collection of Mollusca. — This magnificent collection now appears with all the advantages of ample space and light; the four table cases occupied in the old museum having been increased to eight, with upright cases for the larger specimens and alcoholic preparations. In the process of removal, the arrangement has been carried out in the manner originally contemplated by Dr. Carpenter; and all the tablets have been carefully gone over by Mr. Curry, and cleaned, and loose specimens re-cemented; while additional species have been mounted or removed from the drawers to the glass cases, so as to render the exhibited collection more complete. The collection is now in excellent condition, and thoroughly available for scientific use, and, it is hoped, is so protected that it will remain free from dust or other injury for an indefinite period.

Collections of Principal Dawson. — These include: 1°. Specimens of Eozoon canadense and illustrative forms, as Stromatopora, etc. 2°. Cambrian fossils from New Brunswick, etc. 3°. Upper Silurian fossils from Nova Scotia, Gaspé, etc. 4°. Devonian plants and fishes from Gaspé, New Brunswick, Maine, etc. 5°. Carboniferous reptiles, fishes, insects, millipedes, crustaceans, shells, etc., mostly from Nova Scotia. 6°. Carboniferous plants, principally from Nova Scotia and New Brunswick. 7°. Post-pliocene fossils of Canada, with additional specimens from the United States and Europe. 8°. Recent shells dredged in the Gulf and River St. Lawrence, illustrating the modern fauna and the post-pliocene fossils. Also collections of Canadian crustaceans, hydroids, bryozoons, sponges, etc. 9°. Miscellaneous collections of Canadian and foreign fossils, rocks, etc.

The whole of these specimens are disposed in their places in the general collection, with the exception of the fossil plants and recent shells, which are in separate cases. They include the greater part of the types of the species described or catalogued by Dr. Dawson, and many of the specimens are unique.

Illinois state laboratory of natural history, Normal.

Distribution of school collections. — This institution, which seems to be unique in some of its characters, makes regular provision for the supply of small synoptical collections in zoölogy to the public high schools of the state. A distribution recently closed includes 10,170 specimens of pinned insects, representing 529 species, belonging to all the orders except Diptera; 2,350 alcoholic specimens of Illinois fishes, belonging to 71 species; and 890 echinoderms, coelenterates, and other aquatic invertebrates in alcohol. Similar collections were issued two years ago, the present distribution completing the supply of all the public high schools of Illinois in which zoölogy is taught as a regular study of the course. It is interesting to note that the number of high schools in which this subject is systematically studied is between seventy and eighty.

NOTES AND NEWS.

— The treasurer of the Balfour memorial fund acknowledges the following subscriptions: Thomas J. Clarke, New York, $2; Henry Sewall, Univ. Michigan $15,; C. V. Riley, Agric. Dept., Washington, $5; C. E. Hanaman, New York, $25; Dental classes 1883 and 1884, Univ. Michigan, $6; O. C. Marsh, New Haven, $25; Alex. Agassiz, Cambridge, $50; Henry Holt, New York, $10; previously acknowledged, $247.

— Peter Merian died last month at Basel, his native town, at the age of eighty-seven, having been born in 1795. After studying at Paris from 1817 to 1819 under Cuvier, Brongniart, and Geoffroy St. Hilaire, Merian returned to Basel, and began at once the study of the geology of the Swiss Jura, and the formation of one of the best collections of fossils now in existence. Attached to the university of his native place as professor of physics and chemistry, then as rector, and finally as professor of geology, he devoted nearly all his time to the development and progress of the museum of natural history, which is mainly his work. There he first classified the large and important family of Ammonites, separating them into groups according to their external forms. During a visit from Leopold von Buch (the great Prussian paleontologist and geologist, engaged then on his monograph of the Ammonitidae), this *savant* was not a little impressed to find that Merian had anticipated his classification in all the main points. From that time a most intimate friendship existed between the two men until the death of von Buch in 1853. By its central position in western Europe, Basel was a place of necessary detention for all travellers, especially before the construction of railways; and few travelling geologists have passed through it without visiting the museum of Peter Merian. Rarely absent, very hospitable, having inherited a large estate, he gladly received at his table in town or at his country-place all who called on him. Scientific men certainly are not always rich, nor always most particular in their dress or manners; yet all, rich or poor, well or shabbily clothed, were received with equal cordiality. His wife, however, somehow came to the conclusion that all scientific men were a ragged or extraordinary set, even the rich; such, for instance, as Leopold von Buch, always so odd, the absent-minded Charles Lyell, the original Ami Boué, or the stiff and formal Elie de Beaumont. One day, in 1846, a young geologist presented himself at the museum, taking notes of all the fossils. Merian, struck by the application and good air of the foreigner, asked him to dine with him; "because," said he, "Madame Merian is always reproaching me for bringing home the most indecorous and rough-looking set of fellows; and I shall be glad to show her one man at least on whom she will look without contempt."

Merian never published much; but all his memoirs are very suggestive and important. The first was on the Jurassic formation in the canton Basel. It appeared as long ago as 1821, and was completed in 1826 by a new survey of the cantons of Basel and