thought. The scheme is comprehensive and well carried out in a brief compass.

Dr. Donath notes several of the prevalent errors in such investigations, as lack of discrimination between a given stage of culture and the psychic faculties of those who exhibit it, the mistake of assuming that mental power is correlated to cranial capacity, and especially the incorrectness of supposing a parallelism between the psychical evolution of a child and the race, as Bücke, Baldwin and others have too literally assumed. ('Die Anfange des Menschlichen Geistes,' pp. 47; F. Encke, Stuttgart, 1898.)

MUSHROOM-SHAPED IMAGES.

THEOBERT MALER and others have published illustrations of stone pillars with mushroom-shaped summits, occurring in Yucatan, Guatemala and elsewhere in Mayan territory.

In the *Globus* for May 28th Dr. Carl Sapper gives a picture of one in excellent preservation, about 30 centimeters in height, from San Salvador. On the shaft the face of a man (or monkey) is roughly outlined. Over it is the umbrella-like expansion.

These have generally been considered phallic emblems. Dr. Sapper doubts this, and in fact there is no evidence for it beyond a vague resemblance. He advances, however, no other explanation.

I would offer a suggestion. They resemble in shape mushrooms or toadstools, and why should not that be their intention? Why should it be? Because the word for mushroom in Maya (Tzental dialect) is *hu*, sufficiently near to the word for moon, *uh* or *yuh*, to recall it in sound, and the night growth of the fungus would strengthen the mythical alliance. They would thus be emblematic of the lunar and nocturnal divinity.

AMERICAN INDIAN GAMES.

THIS subject is treated in an interesting manner from ample material by Mr. Stewart Culin in the *Bulletin* of the Museum of the University of Pennsylvania, No. 3, Vol. I. He selects for analysis the game of dice or tossed staves, which he finds among sixty-one North American tribes. With much ingenuity he compares their implements and the decorations upon them, reaching the conclusion that they were all derived from some center in northern Mexico or near there; the thread of connection which leads him being the throwing-stick, or *atlatl*, of the Mexicans.

This *is* ingenious, but not wholly convincing. One may ask why the *atlatl* might not have drawn its local symbols and trappings from the game, rather than *vice versa*. The symbolism is surely more recent than the game; *atlatls* are found elsewhere without it; and there are simpler explanations of the elementary symbolism of the game in the northern tribes. In the study of development it is usually wiser to begin with the simple and proceed to the complex, rather than the reverse.

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SCIENTIFIC NOTES AND NEWS.

PREVENTIVE INOCULATION AGAINST PLAGUE.

M. HAFFKINE made recently an address on the above subject at Poona, in the course of which, according to the report in the London *Times*, he compared the invasion of India by the plague bacillus to the invasion of Australia by rabbits, to the invasion of certain soils in south Europe by the phylloxera, and to the invasion of South Africa by the organism of the rinderpest, and used these analogies to show that there are, in both the animal and vegetable worlds, diseases of which the cause, the morbid organism, can live and propagate outside the patient's body, can grow in the soil, in water, be carried by clothing, bedding, instruments, by any living or dead object. If it happens that the natural conditions of a country are favorable to the life and propagation of such an infectious organism, and as long

as these conditions continue unchanged, and we are unable artificially to alter them, there is no instance known of such morbid organisms having been 'stamped out,' as the expression in our daily reports is, by the will of men. If it were otherwise there would be no typhoid fever in the European barracks in India; or the microbe of cholera, let us say, would have been 'exterminated' from the plains of Bengal, or the microbe of malaria from the rest of the country. Every time, therefore, said Dr. Haffkine, that you may think of these matters, recall to your memory that rabbit question of Australia, or the phylloxera problem in the vine-growing countries of Europe. I hope you will then cease to wonder at the fact that, when the government and municipalities appoint committees to deal with and to 'stamp out' the plague, the disease does not seem always to obey their measures.

There are, it must be admitted, many phenomena in nature which it is not in our power to arrest; but we can run away from them, or protect ourselves against them individually. The marvellous success of vaccination against smallpox, and the history of the bacteriological efforts of the last 15 years, made the plan for effecting such a protection against plague obvious; and, early after the outbreak of plague in Bombay, I put myself to the task of working out a preventative inoculation to check the liability of individuals to that awful disease.

The first demonstration of the working of this system can be made in the laboratory, and this has been already repeated and confirmed by many observers. You are aware that rats are exceedingly susceptible to plague. One takes 20 rats from a ship that has newly arrived in harbor, say from Europe, where there is no plague. Ten of them are inoculated with the prophylactic against plague, and the others are left as they are. Put back all the 20 rats together, and introduce among them a rat that has the plague, or infect them all artificially with virulent plague microbes. In the course of time you will find that eight or nine, or the whole of the unprotected, will die of the disease; while perhaps only a single rat that has been inoculated with the protective lymph, or even not a single one, will contract the disease.

During the month of January, 1897, a large number of leading European and native gentlemen offered themselves to be inoculated, to prove the harmlessness of this method, and by the end of that month this question was solved, I believe, to the satisfaction of every one who took the trouble of attentively examining it.

The results of the inoculations, up to the end of 1897, were given in some detail from several different localities. The general facts were that the inoculated and uninoculated persons were everywhere living under the same conditions and exposed to the same risks of infection, and that not only were the occurring cases relatively much fewer among the inoculated, but they were also much milder and attended by a much smaller proportionate mortality. To take totals, there were 1,268 deaths among 7,803 uninoculated persons, and, in the same towns or districts, 62 deaths among 11,968 inoculated persons. In Lower Damaum the number of cases was not stated, either for the inoculated or the uninoculated; but the deaths were 36 in 2,197 of the former, against 1,482 in 6,033 of the latter. This population being omitted, 259 cases among uninoculated persons were productive of 186 deaths, and 73 cases among the inoculated were productive of 26 deaths. It must be borne in mind, in considering the figures, that a large proportion of the cases occurring among the inoculated became declared within 24 hours of the inoculation, and were evidently the consequences of infection previously received into the system.

AN EXHIBIT OF THE HISTORY OF MEDICINE.

As we have already noticed, the Seventeenth Congress of German Men of Science and Physicians will be held at Düsseldorf from September 19th to 24th. In connection with the Congress there will be several exhibits, one of scientific apparatus, one of scientific photography and one illustrating the history of medicine and science. The *British Medical Journal* gives some account of what is aimed at in the last mentioned exhibit. It will comprise two main divisions: (*a*) general history of medicine, (*b*) special exhibits. The former class includes: (1) Ancient Phœnician and Egyptian medicine; (2) Assyrio-Babylonian, Medo-Persian and Old

Indian medicine; (3) Lydio-Trojan medical antiquities; (4) Greek and 'Hellenistic' medicine; (5) Ibero-Etruscan and classical Roman medicine; (6) late Roman medicine, with its Gallo-Roman offshoots in Rhineland and in Gaul; (7) Byzantine medicine; (8) Arabian medicine; (9) Chinese and Japanese medicine; (10) Frankish, Saxon and its Gothic medical antiquities; (11) mediæval medicine of other Western countries; (12) the medicine of the Renaissance and modern times up to the end of last century. The medicine of Semitic and other nations will also be represented as far as possible, and an appeal is made to antiquarians and collectors throughout the world to assist in making the exhibition as completely representative as possible. The special class of exhibits will comprise material illustrating the following subjects: (1) Popular medicine, including that of savage peoples and that of civilized peoples. (2) Instruments of all kinds. (3) Geographical exhibits. (4) History of orders and associations for the care of the sick; knights, religious orders, associations of deacons and deaconesses and lay societies. (5) Plague medals, plague masks and amulets against sickness. (6) Illustratious of hospitals, baths, physicians in the sick chamber, operations, dressers, dissections. (7) Medals and portraits. (8) Poetical scientists and scientific poets in Germany from the oldest times to the present day, with special reference to Goethe and his relations to Düsseldorf and the Rhine country. (9) History of medicine and the Lower Rhine, in the Duchies of Jülich, Cleve and Berg, subdivided into exhibitions relating to (*a*) Laurentius Friesius, (*b*) Paracelsus, (*c*) Weyer, (*d*) Kortum. Here, again, an appeal is made for portraits, medallions, photographs and illustrated works, among the latter, especially such as are of older date than 1580 (receipt books, books about animals, anatomy, distillation, alchemy, astrology, magic, etc.). The exhibitors are not put to any expense, the Exhibition Committee undertaking to pay all freights and the cost of fire assurance. The exhibition, which is to be located in the Kunstgewerbe Museum, will be open in July, and exhibits will be received up to September 15th. The exhibition closes on September 30th. Any further information that may be desired can be obtained by application to Dr. Frauberger, President of the Exhibition Committee, Kuntsgewerbe Museum, Friedrichsplatz, Düsseldorf.

GENERAL.

THE Paris Academy of Sciences has elected as correspondent in the section of medicine and surgery, Professor Ernst von Leyden, of Berlin. Thirty two votes were cast for Professor von Leyden and five for Professor Zambaco, of Constantinople.

ON the occasion of his 80th birthday Professor Bartholomew Price, Master of Pembroke College, Oxford, has been given a dinner at Queen's College by his former pupils. He intends to resign the Sedleian chair of natural philosophy which he has held for forty-five years.

Dr. ALLAN P. SMITH, a distinguished Baltimore surgeon, one of the original trustees of the Johns Hopkins University, died at Baltimore on July 18th. A. H. B. Beals, professor of philosophy and education in the University of Washington, was killed by falling through an open hatch on the steamship 'Arizona' on July 18th.

C. L. SHEAR and Ernst A. Bessey, recently of the department of botany of the University of Nebraska, and now of the United States Department of Agriculture, have been sent to northern Colorado by the Division of Agrostology to collect grasses and seeds and to secure information in regard to the native and introduced forage plants of that region.

DR. L. A. BAUER is engaged this summer in locating and marking the boundary line between Allegheny and Garrett counties, Maryland. This boundary line calls for a straight line connecting two non-intervisible points, 20 miles distant from one another, the one being on the Great Savage Mountain, along the Mason and Dixon line, and the other at the mouth of the Savage River. Upon the completion of this work he will resume the magnetic survey of Maryland.

PROFESSORS H. D. CAMPBELL and D. C. Humphries, of Washington and Lee University, are engaged in the work of the U. S. Geological Survey during the present summer.

Professor Humphries is making measurements of the rivers of southwestern Virginia.

IT is hoped that ground will be broken shortly for the main or central portion of the Peabody Museum, Yale University, in order that the building may be completed at the time of the bi-centennial celebration in 1901. The reserve building fund left by Dr. Peabody now amounts to $100,000, and efforts are being made to collect the remaining $150,000 needed.

THE Dreadnought Seaman's Hospital at Greenwich has organized a school for the study of tropical diseases. The Colonial Office has contributed £3,550 towards the buildings, which it is estimated will cost about £13,000. Provision will be made for from 20 to 25 students, and there will be a fully equipped laboratory, pathological room and museum.

THE sum of £10,000 has been subscribed towards the Jenner Memorial. Half of this sum has been given by Lord Iveagh.

AT a meeting of the standing committee of the Trustees of the British Museum on July 9th a letter was sent to Sir William Flower expressing profound regret in accepting his resignation of the directorship of the Natural History Museum and expressing high appreciation of his services during the past 14 years. The letter continues: "The rare combination of wide scientific knowledge with marked administrative ability and a sympathetic appreciation of the requirements of the uninstructed public has carried you through a most difficult task. Under your hands the natural history collections of the British Museum have fallen into the lines of an orderly and instructive arrangement which no one, whether man of science or ordinary visitor, can examine without admiration. To you, as a worthy successor of Sir Richard Owen, will attach the honor of having organized a museum of natural history which now occupies a preëminent position among all the museums of the civilized world."

A MEMORIAL has been addressed to the Trustees of the British Museum by a number of leading British men of science, protesting against the rumored abolition of the post of Director of the Natural History Museum, resigned by Sir William Flower. Both Sir Edward Maunde Thompson, the Director and principal librarian of the British Museum, and Sir William Flower have written stating that the memorial was founded on a misapprehension. The Natural History Museum has always been a part of the British Museum, of which Sir Edward Maunde Thompson has been the chief executive officer, and the Trustees have no intention of abolishing the office of Director of the Department of Natural History, or of imposing any new limitations on the duties of that office.

THE Congress of the Royal Institute of Public Health will meet in Dublin next month. The meetings will be held in Trinity College, where Sir Charles Cameron will deliver the presidential address on the opening day.

IT may be remembered that there was held an International Congress of Experimental and Therapeutic Hypnotism in Paris in 1889. A second Congress has been arranged to follow the close of the International Medical Congress in the month of August, 1900. Four sections are planned: (1) The clinical and therapeutic relations of hypnotism and suggestion; (2) their medico-legal relations; (3) their psychophysical relations, and (4) their applications in pedagogy and sociology. Further information may be obtained from the Secretary, Dr. Bérillon, 14 rue Taitbout, Paris.

BEFORE the Zoological Society of London, on June 21st, Mr. Abbott H. Thayer, of New York, explained his method of demonstrating, by actual experiments, the underlying principle of protective coloration in animals. An exhibition of his demonstrations was given in the Society's Gardens next day.

THE report of Professor Lawrence Bruner, of the University of Nebraska, special agent for the investigation of the locusts of the Argentine Republic in 1897–98, has just appeared. It includes figures and descriptions of the species which have been found to be most harmful, together with discussions of preventive and remedial measures.

SIR ARCHIBALD GEIKIE is preparing for the press a portion of the third unpublished volume of Hutton's 'Theory of the Earth,' consisting

of six chapters which have been in the possession of the Geological Society since 1856. The rest of the manuscript cannot be found, but these chapters contain many interesting observations.

THE Ninth Report of the Missouri Botanical Garden contains several short papers by Professor Trelease. One on Florida *Epidendrums* shows that the plant of the Florida flora which has long been known as *Epidendrum venosum* is in reality *E. Tampense*, a species quite different from the true Mexican *venosum*. A colored plate of *Tampense* and a half-tone from a photograph of *venosum* render the distinctions quite evident. A second paper on the common species of *Apocynum* calls attention to the characteristic difference in the habit of growth and position of the leaves of the common Dogbanes, *Apocynum androsæmifolium* and *A. cannabinum*, which is well shown in two half-tones. A 'new palm fungus' is a short note concerning a palm disease which has proved quite destructive in Nebraska, and which is described as new, under the name *Exosporium palmivorum*. In a fourth paper Professor Trelease describes and figures a magnificent specimen of *Yucca gigantea*, which he found in cultivation in one of the gardens of the Azores, some years since, and also notes certain changes in nomenclature of *Yuccas*, bearing upon his earlier studies of these interesting plants. A proliferous inflorescence of *Y. constricta* collected in New Mexico, by Miss Mulford, is also described and illustrated by a half-tone engraving.

AT a special meeting of the Royal Geographical Society, London, on June 27th, Professor Elisée Reclus brought forward his scheme for the construction and erection of a great terrestrial globe. According to the report in the London *Times* he began with a reference to the paramount importance which perfect accuracy had assumed in the knowledge of our planet; he pointed out that truthful representation of a fragment of a sphere was impossible on a plane surface. There was only one way of representing truly the surface of the earth; a sphere or fragment of a sphere must be reproduced by another sphere or fragment of a sphere. That was why he had such an intense desire to see scientific opinion give this mode of planetary representation much greater attention than heretofore. Spherography, although the most important department of geography, had not kept pace with cartography, in which immense progress had been made, and he presumed it would be a real revolution when it had taken in science and practice the paramount place it deserved. Even scientific people were not yet sufficiently convinced of the absolute necessity of studying geography on images of our planet reduced to a given scale with the real proportions. If the scale of the globe were very small —one to ten or twenty millions, for example— the surface had to be kept exactly even, polished, so to say, because the proportional size of highlands and mountains could not be represented. In larger spheres another element of truth and beauty was added in that the actual relief appeared on the curvature of the model. The system of exaggerating altitudes was utterly bad, contrary to real science, and to be discouraged by all geographers having respect for Nature and her laws. But as soon as the sphere was large enough to show at least one-millionth part of the real proportions then the heights and depths as well as the planimetric dimensions should be represented on that scale. On a large globe on the scale of 1 : 100,000, rugosities of the surface might be finely shown, even hillocks 50 meters in height. Such representation of ordinary heights would afford an unexpected advantage by furnishing a standard of comparison, since those looking at a relief would easily estimate the real dimensions of a country by the sight of the ridges and mountains that diversified the surface. In conclusion Professor Reclus said the moment had come for a grander representation of the earth than had hitherto been made, for the erection of a model globe which would be as scientifically accurate as possible and which, being kept continually under correction, would become not only a thing most beautiful to look at, but also a standard study for travellers and geographers.

AN explosion of acetylene gas occurred on July 9th at the metal works of Messrs. Goliasch & Co., Berlin. A foreman was killed and another man was slightly injured.

THE report of the Joint Select Committee of the British House of Lords and House of Commons on electrical energy (generating stations and supply) has been published in a Blue Book.

A COMMISSION has been appointed to revise the United States patent laws.

As we have already stated, the Albert Medal of the Society of Arts has this year been awarded to Professor Bunsen. At the annual meeting of the Society held recently, says *Nature*, the work of Professor Bunsen was referred to by the Council in the following words: "Amongst the numerous and important scientific discoveries which have rendered the name of Bunsen famous wherever science is valued, perhaps the most striking is the one in which he was associated with his distinguished colleague, Professor Kirchoff, viz., spectrum analysis, a discovery which has shed a new and unexpected light on the composition of terrestrial matter, and has enabled us to obtain a distinct knowledge of the chemical composition of sun and stars. The contributions which Bunsen has made in the application of chemistry and physics to the arts and manufactures are of the utmost value, and their importance may be measured by two out of many instances. The Bunsen battery was, until the introduction of the dynamo, the cheapest source of electricity; the Bunsen gas-burner, by which a non-luminous, smokeless, but highly heated flame is obtained, is now not only indispensable in all laboratory work, but is used for heating purposes in thousands of houses and manufactories, and for illumination, by the incandescent system, in millions of lamps. Beyond these Bunsen's contributions to the sciences of chemistry and physics have been of the highest importance; but, perhaps, the greatest benefit which he has conferred, through a long life devoted to the advancement of science, has been the influence which he has exerted as a teacher.

UNIVERSITY AND EDUCATIONAL NEWS.

IT was stated in a recent issue of SCIENCE that Mr. George A. Fowler had rebuilt the engineering building of the University of Kansas, which was struck by lightning and destroyed by fire last March. In addition to this gift instruments and machinery to the value of $30,000 have been given to furnish the building.

MR. JOHN D. ROCKEFELLER has subscribed $10,000 toward the special fund now being collected for Barnard College.

CARROLL COLLEGE, of Waukesha, Wis., has received from Mr. and Mrs. Ralph Voorhees, of New Jersey, a gift of $50,000 on condition that $50,000 more be subscribed by October 1st. $6,000 towards the latter sum has already been subscribed.

THE University of Paris has instituted a degree of 'Doctor' without any qualifying word. The new degree is open to foreigners and the tests are a thesis in French or Latin and a few questions on subjects selected by the candidates.

DISCUSSION AND CORRESPONDENCE.

MIOCENE EDENTATES.

IN the *American Naturalist* for December, 1886 (p. 1044), Professor Cope described a number of osseous scuta and toe bones as those of a 'giant armadillo from the Miocene of Kansas,' under the name *Caryoderma snovianum*. The type specimen is now in the University of Kansas Museum. The scuta and toe bones are identical in all respects with another series recently removed from the carapace of a large tortoise from the same formation in Kansas, the Loup Fork. The tortoise is provisionally placed in the genus *Xerobates*, and is specifically probably identical with *Testudo undata* Cope. The error was not an extraordinary one on the part of Cope, since the dermal ossicles are peculiar for a tortoise. Its rectification, however, is important, since this reference was, I believe, the only one of the edentates to the Miocene of North America.

S. W. WILLISTON.
UNIVERSITY OF KANSAS, July 16, 1898.

SCIENTIFIC LITERATURE.

La fatigue intellectuelle. Par A. BINET et V. HENRI. Paris, Schleicher Frères. 1898. Pp. 336. (Bibliothéque de Pedagogie et de Psychologie.)