leads. In general readiness Russia came next to the United States.

There are 30,000 French exhibitors; 6,564 United States exhibitors; 2,500 Belgian; Germany has 2,000; Italy, 2,000; Russia 1,500; Scandinavia 1,400; Austria, 1,000; Great Britain, 600. The United States exhibits occupy 329,052 square feet, in forty-seven distinct exhibition spaces, thirty-three in the main Exposition grounds, and fourteen in the Vincennes Annex.

NATIONAL ACADEMY OF SCIENCES.

BY MARCUS BENJAMIN, PH.D.

The spring meeting of the National Academy of Sciences was held at Columbian University in Washington on April 17–19.

The meeting of the Academy held in Washington has usually for its most important feature the business that is transacted before it. Much of this is naturally routine, and only a portion of it is given to the public. The reports from the committees in charge of the various trust funds are usually presented and the committees in charge of the award of the medals of the Academy announce their decisions.

Perhaps the most important feature of the meeting is the election of new members. The names of those who have achieved eminence in science are presented by their sponsors before the Academy, and sometime before the April meeting a full list of those proposed are sent to the members for their approval. From this list the names of the seven candidates securing the highest number of votes are selected, and from them not more than five new members can be chosen each year. Owing to the difficulty in arriving at a unanimous decision in regard to the claims of those presented for membership, there is always much anxiety as to who the fortunate persons are. This year, those who were selected included James E. Keeler, who, after serving as an assistant at the Lick Observatory, passed to the charge of the Allegheny Observatory, only to return to the Lick as its director, succeeding Edward S. Holden in that place two years ago; Henry F. Osborn, the Da Costa Professor of Biology in Columbia University, New York, whose brilliant investigations in vertebrate paleontology has marked him as the proper successor to fill the vacancies caused by the deaths of Cope and Marsh; Franz Boas, who is professor of anthropology in Columbia University and an assistant curator in the American Museum of Natural History, New York, and whose ethnological studies among the Indians of the Northwest have gained for him much reputation; and Samuel L. Penfield, professor of mineralogy in Sheffield Scientific School of Yale University, whose frequent contributions to science in the way of new minerals made him a desirable addition to the Academy.

An award of the Barnard medal was made to William Conrad Roentgen for his discovery of the X-rays. The Barnard medal is given but once in every five years, and then to the person who has made the most important contribution to physical science during that period. Its first presentation was to Lord Rayleigh and Prof. William Ramsay, for their joint discovery of argon.

Another very important piece of business was the offer of Dr. Agassiz to give the sum of $5,000 to the National Academy as the beginning of a building fund to be raised in order to erect a suitable home in Washington, for the use of the Washington Academy of Sciences and of local or affiliated societies, on condition that the land needed for such a building be either given by the government or obtained from other sources; and, furthermore, that the sum of at least $100,000 be raised for that purpose, the National Academy to have such privileges granted them as they might need in the way of use of the hall at the proper time for their meetings, and of suitable smaller rooms to be used for office purposes. Dr. Agassiz also offered to give $1,000 to serve as a beginning of a general fund, provided sufficient money was raised to make that fund $20,000 as a minimum amount. Committees were appointed to take charge of raising both of these funds and to solicit subscriptions for them.

The papers presented before the Academy were very few, and of them that which created the most interest was "The Cruise of the U. S. Fish Commission Steamer 'Albatross' in the South Seas," by Alexander Agassiz. That cruise was begun in the month of August, 1899, and continued until the end of March of this year. Doctor Agassiz, with the aid of charts, gave a graphic account of the voyage, and told of the dredging and deep soundings made by the scientists of the expedition. Dredging and soundings were made at a depth of 4,500 fathoms, which is 1,600 fathoms deeper than any previous record. He described the animal life found at those depths, and also discussed the formation of coral reefs, contending that each reef required special study in order to determine the causes of its formation. Mr. J. E. Duerden, who was introduced by Prof. William K. Brooks, of Johns Hopkins University, presented a paper on "West Indian Madreporarian Polyps," in which he discussed the methods by which those corals were formed. A brief paper on the "Secondary Enrichment of Sulphides in Ore Deposits," was read by Samuel F. Emmons of the U. S. Geological Survey. He described the oxidation of ore zones of the noted mines in this and foreign countries, giving an interesting account of the various researches he had made and of the conclusions he had reached concerning the formation of ore deposits.

Among anthropologists there is probably no one subject on which a more decided opinion is held than on the subject of the presence of human remains in the Trenton gravels. At the Detroit meeting of the American Association a few years ago, it seemed as if those who believed that human remains in that formation were impossible, were in the ascendant, but the persistent efforts of the opposing faction may yet result in changing that opinion. Prof. Frederic W. Putnam presented a paper entitled "A Human Bone from the Glacial Deposit at Trenton, N. J.," in which he briefly described the finding of a human femur by one of his assistants, and exhibited photographs of the bone itself and a photograph of the bone in situ. Prof. Putnam has always been a firm believer in the existence of the Trenton gravel man. Prof. Theodore Gill, of the Smithsonian Institution, read a paper on "The Zoogeographical Relationships of Africa," in which he showed the relationship of the animals which recent geographical exploration of Africa has brought to light, with those on other continents. The "Report of the Watson Trustees on the Award of the Watson Medal to David Gill," was presented by Simon Newcomb, in this he described the qualifications of Prof. Gill for the Watson medal, telling how, as a comgaratively young man, he had been called to the charge of the observatory at the Cape of Good Hope, where with indifferent equipment and small funds, he had been able to obtain results that had gained him a high rank among astronomers of the world. He referred to the fact that Prof. William L. Elkin, of Yale University, had been associated with him in some of his important work.

In addition to the foregoing the following papers were presented by gentlemen not members of the Academy: "The Anatomy of Nautilus Pompilius," by L. E. Griffin, who was introduced by Prof. William K. Brooks (this was read by title); "On the Use of Electric Motors, of the Shunt Type, for Solving Linear Differential Equations of any Order with Variable Coefficients," by Reginald A. Fessenden, who was introduced by Prof. Cleveland Abbe (this was also read by title); Mr. Fessenden also read a paper "On the Prediction of the Physical Properties of the Pure Metals;" and Rollin A. Harris, who was also introduced by Prof. Cleveland Abbe, read "A Partial Explanation of Some of the Principal Ocean Tides." Both of these papers were results of investigations now being carried on at the United States Weather Bureau in the first instance, and at the United States Coast and Geodetic Survey in the second instance.

The additional members of the council who are annually chosen were as follows: Dr. John S. Billings, Dr. Henry P. Bowdich, Prof. George J. Brush, Prof. Wolcott Gibbs, Mr. Arnold Hague and Prof. Simon Newcomb.

It was with considerable regret that the Academy received the announcement from Prof. Wolcott Gibbs that his advancing years compelled him to resign from the presidency of the Academy. Doctor Gibbs is one of the three surviving original members of the Academy, and the one who has fairly earned the title of the "Nestor of American Science." He was for a quarter of a century Rumford professor at the Lawrence Scientific School of Harvard University, and on his retirement, some ten years ago, he returned to his home in Newport, where he has since devoted himself to the prosecution of chemical investigations. All of the great honors that can be conferred upon an American scientist have been given to him, and his absence from the meetings in the years to come will be severely felt.

AN AMERICAN AUTOMOBILE RACE.

The first real race of modern motor carriages which has ever been held in the United States, was run on April 14, on the Merrick Road, Long Island's splendid thoroughfare. The contest was held under the auspices of the Automobile Club of America. It was a battle royal between five gasoline, three steam carriages, and one electric vehicle. The course was fifty miles, and the prize a cup, donated by M. Léon Blanchet, was won by A. L. Riker, with his electric carriage. The time was 2:03:30. S. T. Davis, Jr., with a steam carriage, came in second, the time being 2:18:27. He was followed by A. Fisher, with a gasoline carriage, the time being 2:30:01.

The other competitors was D. Wolfe Bishop, Jr., gasoline carriage, 2:37:52; A. C. Bostwick, gasoline carriage, 2:46:40; G. F. Chamberlain, gasoline carriage, 2:48:42; and C. J. Field, gasoline carriage, 3:15:30.

Two carriages failed to finish, one of them losing a tire. The various towns along the course, from Springfield to Babylon and return, have never been particularly partial to racing of any kind, but on this occasion the authorities not only did nothing to interfere with the race, but did excellent work in keeping the road clear.

The turn at Babylon was made around two barrels at cross roads, and was successfully accomplished by all, except one steam carriage, whose driver attempted to make the turn too quickly, resulting in the loss of a tire. The winning machine carried sixty-four cells of battery, arranged in three sections, only two of which were used.

There were many wheelmen along the course, and several motor tricycles and quadricycles went over the course, one of them covering it in one hour and fifty-eight minutes.

PARIS EXPOSITION NOTES.

A model of the Brooklyn Bridge, made by the Roebling Company, which was shipped on the steamer "Pauillac," has been given up as lost, and a new model is being made. It will be sure to create general interest in Paris when it is exhibited. Miniature trolley cars will be run on the tracks.

In the two boiler annexes there is hardly a single plant actually erected, says The Iron Age, and there is also a great absence of gas and oil engines, which were in evidence in large numbers in the same locality in 1899. The United States machinery section is not well located, a considerable portion of it being below the gallery, which cuts off a great deal of the light.

The market price of admission tickets to the Exposition has fallen, and they are now selling as low as 6 cents. This is caused by the fact that when bonds were issued a few years ago to pay the expense of erecting the buildings, 65,000,000 tickets went with the bonds, and it is now estimated that the attendance will fall far below that figure, so that there will be a large quantity of the tickets which cannot be used. The authorities are requiring anywhere from two to five tickets, depending upon the hours of admission. The appearance of the grounds is much worse than on the opening day, and some of the smaller buildings are only just commenced and many of the large buildings are still incomplete. The Russian Pavilion is a notable exception.

Eleven of the valuable models of American warships have been injured during their transportation from New York to Havre on the auxiliary cruiser "Prairie." The models were inclosed in glass cases which were packed in wooden boxes and stowed in the hold. During the voyage the rolling and pitching of the ship caused them to shift, with the result that the glass was broken and this in turn broke and scratched the models, cutting their rigging and otherwise injuring them. The model of the "Olympia" suffered the greatest damage. It was thought at first that it would be necessary to have workmen sent from the Washington Navy Yard to repair the miniature vessels, but the French government offered Assistant Naval Constructor Gillmore facilities for doing this work at the shipyard at Cherbourg, which proposition was accepted. It is probable that the repairs will be of a temporary character.

CELLULITH.

In the making of paper it is known that by beating the pulp for a long time, a transparent and elastic mixture is obtained, which hardens rapidly on drying, covers the fibers and imparts great strength to the paper. An amorphous colloidal cellulose hydrate, as supposed, is produced, being set free from the cells, and acting as an agglutinating substance. This is also the theory of the fabrication of vegetable parchment.

In parchmenting paper by means of sulphuric acid, the cellulose is transformed into amyloid, which yields, with an excess of water, a gelatinous precipitate, uniting the remaining fibers, and forming a translucent sheet. The cellulith is prepared by a process exclusively mechanical—the beating of the pulp for a much longer time than is necessary for the production merely of paper. According to the properties of the pulp and the velocity of the revolving cylinder, the duration of the operation varies from 40 to 150 hours, until all the contents of the vat are transformed into a homogenous mass having no trace of fibers. In the state of extreme division the material still contains a good deal of air, which may destroy its regularity. So it is submitted to a new beating for about two hours.

If the cellulith is to be colored, the colors, soluble or otherwise, are added before the heating. The hot cellulose liquor is received into a reservoir perforated at the bottom, from which it drips. With 96 per cent of water the consistence is that of thick honey. The water is evaporated either in the open air or in a stove at 40°. The pulp hardens gradually and finally reaches the consistence of horn. Its specific weight is then about 4·5. The cellulith may be worked like horn, ebonite and other similar substances. and is, as compared with celluloid, uninflammable. In mixing the cellulith, at the moment of trituration, with sawdust and 30 per cent of lamp black, a kind of very dark ebonite is obtained, dense and susceptible of a polish.

The new material, says La Revue de Produits Chemiques, is adapted to a variety of purposes for which horn and other similar substances have been hitherto used.