bert's which is entitled "Foundations of Geometry," which bears then the same title as his "Festschrift," but where he takes, however, a wholly different point of view. In his "Festschrift," in fact, as we have seen by the preceding analysis, the relations of the notion of space and the notion of group resulting from the works of Lie are laid aside or relegated to an inferior place. The general properties of groups do not appear in the list of fundamental assumptions. Not so in the memoir of which we are to speak.

As regards the ideas of Lie, the progress made is considerable. Lie supposed his groups defined by analytic equations. Hilbert's hypotheses are far more general. Without doubt this is still not entirely satisfactory, since though the *form* of the group is supposed any whatever, its *matter,* that is to say, the plane which undergoes the transformations, is still subjected to being a *number-manifold* in Lie's sense. Nevertheless, this is a step in advance, and besides Hilbert analyzes better than any one before him the idea of *number-manifold* and gives outlines which may become the germ of an assumptional theory of analysis situs.

It is impossible not to be struck by the contrast between the point of view here taken by Hilbert and that adopted in his "Festschrift." In this "Festschrift" the continuity assumptions took lowest rank and the great thing was to know what geometry became when they were put aside. Here, on the contrary, continuity is the point of departure and Hilbert is above all anxious to see what we get from continuity alone, joined to the notion of group.

It remains for us to speak of a memoir entitled "Surfaces of Constant Curvature."

We know that Beltrami has shown that there are in ordinary space surfaces which image the non-euclidean plane; these are the surfaces of constant negative curvature; we know what an impulse this discovery gave to the non-euclidean geometry. But is it possible to represent the non-euclidean plane entire on a Beltrami surface without singular point? Hilbert has proved that it is not.

As to the surfaces of constant positive curvature, to which Riemann's geometry corresponds, Hilbert proves that besides the sphere there is no other closed surface of this sort.

(*To be concluded*)

SCIENTIFIC NOTES AND NEWS

DR. DAVID STARR JORDAN has tendered to President Taft his resignation as international commissioner of fisheries, this position having been created three years ago under the treaty of April 11, 1908, with Great Britain. Under the terms of the appointment, the work of the commissioner ceases on the completion of the series of fishery regulations of the boundary waters, and the technical investigations necessary for their completion. This work being finished, the administration of the treaty passes to the Bureau of Fisheries.

DR. WILLY KUKENTHAL, professor of zoology at Breslau, has been appointed exchange professor at Harvard University during the academic year of 1911–12.

DR. EDWARD MINER GALLAUDET has retired from the presidency of Gallaudet College, which he has held for fifty-four years.

DR. OSCAR RIDDLE, of the University of Chicago, has returned from a year of study and travel in Europe. He spent the past six months at the Zoological Station at Naples, whence he now returns to Chicago to take charge of the preparation for publication of the manuscripts left by the late Professor C. O. Whitman. He will also continue certain features of Professor Whitman's investigations.

PROFESSOR GEORGE E. SEVER has been elected president of the Columbia Chapter of

Sigma Xi as successor to Professor William H. Burr.

DR. F. E. CLEMENTS, professor of botany in the University of Minnesota, has been elected president of the Chapter of Sigma Xi in that university.

MR. W. C. COX, of the U. S. Forest Service, has been appointed to the newly created post of state forester of Minnesota.

AT a meeting of the Royal Dublin Society held on April 25, the Boyle medal of the society was presented to Professor John Joly, F.R.S., whose researches deal with physics, geology, mineralogy, botany and biological theory.

PROFESSOR A. C. SEWARD, F.R.S., has been elected president of a newly established Cambridge University Eugenics Society.

THE council of the Institution of Civil Engineers has made the following awards for papers read and discussed during the session 1910–11: Telford gold medals to Mr. W. J. Wilgus (New York) and Mr. J. Walker Smith (Edinburgh); a George Stephenson gold medal to Mr. Philip Dawson (London); Telford premiums to Messrs. G. W. Humphreys (London), H. K. G. Bamber (Greenhithe), A. E. Carey (London), William Dawson (Crewe) and C. S. R. Palmer (London); and the Trevithick premium to Mr. A. T. Blackall (Reading).

JOSIAH ROYCE, professor of the history of philosophy at Harvard, will be the university delegate at the celebration of the five hundredth anniversary of the University of St. Andrews.

THE American Philosophical Society has made the following appointments of delegates to represent it: At the jubilee of Professor Giovanni Copellini, to be held at Bologna on June 12 next, Professor Dott. Guglielmo Mengairni, of Rome. At the tenth International Congress of Geography to be held at Rome from October 15 to 22, 1911, Mr. Henry G. Bryant. At the thirtieth Congres National des Sociétés Françaises de Géographie to be held at Roubaix, France, from July 29 to August 5, 1911, Mr. Julius F. Sachse.

MR. C. W. BEEBE, curator of ornithology of the N. Y. Zoological Society, and Mrs. Beebe have returned from an extended expedition for the study and collection of pheasants in eastern countries.

IT is stated in *Nature* that Professor Hans Meyer will undertake in May his fourth journey in East Africa. Starting from Bukoba, on the west shore of Lake Victoria, he proposes to march to Lake Kiva and the Kirunga group of volcanoes, in order to study the relations of the volcanic phenomena to the tectonic structure of the western rift system at this point. From Kiva the expedition will travel by Lake Tanganyika and, if time permits, also to Lake Nyassa. Besides geological studies, the botany, zoology and ethnology of the region traversed will also be investigated.

ON the evening of April 28 Professor Edward L. Nichols, of Cornell University, delivered the annual address before the Iowa Academy of Science on the subject, "The Ends of the Spectrum." Professor Nichols visited the State University of Iowa on April 29, April 30 and May 1. He delivered lectures in the department of physics on recent work in luminescence, and one open to the public on "Daylight."

DR. JOHN M. CLARKE, state geologist and director of science in the New York State Education Department, gave an illustrated lecture before the departments of geology and biology of Colgate University on the evening of May 3. His subject was "The Magdalen Islands and the Bird Rocks."

ON April 13, Professor Heinrich Ries, professor of economic geology, Cornell University, lectured at the University of Alabama on the economic geology of the Canadian northwest.

MR. F. E. MATTHES, of the U. S. Geological Survey, is delivering a course of twelve illustrated lectures with accompanying laboratory work before the students of the University of Michigan, the subject of the lectures being, "Topographic Mapping." On May 3, by invitation of the Michigan Chapter of Sigma Xi, Mr. Matthes told in a popular lecture

"How the Map of the Grand Canyon was made." The maps of the Grand Canyon, Yosemite Valley and the new Glacier National Park have all been prepared by Mr. Matthes, who is now engaged upon the map of the new Mt. Ranier National Park.

SAMUEL CALVIN, professor and head of the department of geology, State University of Iowa, and state geologist of Iowa, died at Iowa City on April 17. He was 71 years of age and had been connected with the University of Iowa for thirty-seven years.

PROFESSOR J. BOSSCHA, the Dutch physicist, died on April 15, aged seventy-nine years.

DR. J. T. THOMPSON, the author of valuable contributions to ophthalmology, died at Cardiff on April 28. He was a brother of Professor Sylvanus T. Thompson.

THE directors of the New York Public Library announce a gift of $375,000 by Mr. Andrew Carnegie to be used for establishing and maintaining a library school.

A BILL has been introduced into the legislature of New Jersey providing for the appointment of a state plant pathologist.

DR. CHARLES A. OLIVER, of Philadelphia, has bequeathed his property valued at $15,000 to the Wills Eye Hospital, the University of Pennsylvania and the College of Physicians of Philadelphia.

THE Gray Herbarium, Harvard University, is to have new quarters for its library. The structure will be a two-story addition to the present building and will extend to the west, taking the place of the old library wing, and covering part of the site recently occupied by the Asa Gray House, which was removed some weeks ago. The addition will be of similar construction to the Kidder wing. The library, which will be placed in the new building, is devoted to the classification of flowering plants and ferns. It contains more than 20,000 volumes and pamphlets. The gift which makes possible the erection of the new building amounts to $25,000; it comes from an anonymous friend of the university.

THE research committee of the National Geographic Society of Washington has made an appropriation of $5,000 for continuing the glacier studies of the two previous years in Alaska. The work, beginning in June, 1911, will be done by Professor R. S. Tarr, of Cornell University, and Professor Lawrence Martin, of the University of Wisconsin, who have directed the National Geographic Society's Alaskan expeditions of 1909 and 1910 in the Yakutat Bay, Prince William Sound, and lower Copper River regions. The 1911 expedition will study briefly a number of regions of glaciers not previously investigated by the National Geographic Society, although partially mapped by the Alaska Division of the U. S. Geological Survey, the Boundary Commissions, etc. Work will be done on the present ice tongues and the results of glaciation in the mountains and plateaus of parts of the interior and some of the fiords of southeastern Alaska, the former having lighter rainfall and smaller ice tongues than the Yakutat Bay and Prince William Sound regions.

THE Rome correspondent of the London *Times* calls attention to the fact that for some time past Herr Immanuel Friedländer, of Naples, has been working for the establishment in that city of an International Institute to carry on a continuous and systematic investigation of volcanic phenomena. An observatory has existed on Vesuvius for many years, but from the insufficient means at its disposal no extended and systematic work has hitherto been possible. Such an institute as Herr Friedländer contemplates will be provided with the necessary laboratories and instruments for the regular measurement of temperatures on Vesuvius, for the periodical collection and analysis of the gases, and for the registration and observation of local earthquakes of a volcanic character, not only during the eruptive phases of the volcano, but also throughout its periods of comparative calm. It would form a training school for volcanologists, as well as give opportunity for other scientific persons to make observations. Herr Friedländer's idea is not a new one. An International Institute on Vesuvius was advocated some time ago by Professor Johnston Lavis; Mr. Cool, a

Dutch engineer, and Professor Gaetano Platania have also supported the same idea. In the opinion of Herr Friedländer, however, it would be better to place the institute in Naples itself, where there would be less danger to the costly laboratories and apparatus, and where the vicinity of the university and other scientific institutes would facilitate the work. After communicating his plan to the last International Geological Congress, held in Stockholm, and obtaining the approval of the congress Herr Friedländer set to work to canvass among the scientific societies of every nation for supporters. He has now secured 62 eminent names, among them 25 Italians, 19 Germans and three Englishmen, Sir Archibald Geikie, the president of the Royal Society, Professor H. L. Tempest Anderson, of York and Professor H. L. Bowman, of Oxford. The Royal Academy of Naples and the Geological Committee of Italy have given their adherence to the scheme, some 60 of the most prominent scientific and political personages of Italy are forming a committee to promote it, and the Italian government will shortly decide as to what official support can be given also. Herr Friedländer has himself generously subscribed £4,000 for the building fund, and another £4,000 to be spread over a term of ten years in ten annual payments. The success of the scheme only depends now upon the amount of the subscriptions which will answer Herr Friedländer's appeal to the general public of every country. As far as Italy is concerned the scheme has already obtained the full approval of the most important members of the scientific world.

IT is stated in the London *Times* that the regulations issued by the Belgian government for the prevention and cure of sleeping sickness in the Congo provide heavy penalties for neglect of the prescribed precautions. All employers of native labor must take measures to discover any cases of sleeping sickness among their staff and report them at once to the authorities. Those aiding others to neglect the treatment prescribed will be punished; as well as those who try to pass from infected to uninfected districts or *vice versa*. It is noted that in order to combat the disease effectively it is all-important to discover those victims who have not yet reached the second stage—somnolence. Such a measure would tend not only to decrease the mortality but also to limit the dissemination of the germs. All suspects, therefore, are to be examined by the heads of trading posts or sent for inspection to the nearest doctor, who will carry out a thorough examination. Inspection posts are to be established on the main lines of communication in order to prevent suspects from carrying the disease into provinces which are as yet untouched. Natives from the surrounding countries will only be permitted to enter the unaffected regions of the Belgian colony after undergoing a searching medical examination at Ala or Jakoma.

A CONFERENCE on Sleeping Sickness has been held at the British Foreign Office as a result of representations made of the danger of the spread of sleeping sickness in consequence of the construction of the Rhodesia-Katanga Railway, which runs from the north of Broken Hill to the Congo frontier and beyond. The delegates to the conference were M. Melot, representing the Belgian government, Dr. van Campenhout, of the Colonial Office in Brussels, Dr. Sheffield Neave, representing the Rhodesia-Katanga Railway, Dr. Aylmer May, representing the Chartered Company, Dr. Bagshawe, of the Sleeping Sickness Bureau, and representatives of the British Foreign and Colonial Offices.

A COMMITTEE for the study of the sea was appointed in 1909 by the Italian Society for Advancement of Science. *Nature* states that its work was so active and promising that the committee was converted by an act of parliament into an institution of the Italian kingdom. The Regio Comitato Talassografico Italiano is to be concerned with investigations of the Italian seas from the physical and chemical points of view as well as from the biological. Great importance will be attached to practical questions concerning the navigation and the fisheries. Investigations of the

high atmosphere will also be made in connection with aviation. The president of the committee is the marine minister, and representatives of the chief institutes, academies and societies which take interest in sea investigations have been appointed as members. In addition the committee has a scientific staff of its own; it receives a yearly grant from the Italian government of 60,000 lira; and the ships for the cruises are supplied by the Italian navy. Four cruises in the Adriatic Sea have taken place already, the program of which was agreed upon with the delegates of the Austrian government, and a fifth cruise will soon start.

THE report of the departmental committee appointed to report on the present condition and the future development of the collections comprised in the Science Museum at South Kensington and the Geological Museum in Jermyn-street, has been issued as a parliamentary white paper. According to an abstract in the London *Times* the committee finds that the objects now exhibited are so much crowded that their due classification and utilization are impossible. Buildings twice the size of those now used would be fully utilized by the existing collections without the addition of a single specimen. The committee states that the physics section is hopelessly overcrowded. In the motor car and aeronautical groups, both early construction and later developments will require further illustration. The electrical engineering section requires to be increased by five or six times its present dimensions. In no section is there more urgent need of early action to secure for the museum examples of instruments and appliances that have marked the opening of a new era in invention and industry. A conference room, where scientific or technical societies might meet, a large lecture theatre, public demonstrations in the galleries, and the exhibition of temporary collections are also suggested. It is recommended that the geological survey offices and library and the Museum of Practical Geology, which are now cramped by the limitations of the building in Jermyn-street, should be grouped, as at present, in a single building, and it would be of great advantage to have that building erected as part of the general scheme at South Kensington. If the collections in the Science Museum and in the Jermyn-street Museum were brought together they would provide the basis of a collection that would be complete as regards stratigraphical and economic geology. Such a collection in the new buildings, with the systematic collection of minerals and the paleontological collections in the British Museum (Natural History), would represent at a single center the whole field of geological science. In most of the departments of science and its applications, the committee concludes, the museums contain much that is of great historical interest and value. They are rich in specimens, instruments, machines and models selected and exhibited in such a manner as to repay systematic examination by the student. In many sections, however, the collections are now far below the standard which it is clear they ought to reach in these matters, and their proper organization is impossible in the existing accommodation. A science museum in which all branches of physical science, pure and applied, and the scientific and economic work of the geological survey shall be adequately illustrated in close proximity to the other great museums at South Kensington would be of incalculable benefit alike to intellectual progress and to industrial development.

UNIVERSITY AND EDUCATIONAL NEWS

AT the recent session of the Alabama legislature the University of Alabama was given an additional appropriation of $300,000, to be expended during the next quadrennium for maintenance and new buildings.

Two gifts from Mr. Carnegie to the Carnegie Technical Schools were announced last week. On his recent visit to Pittsburgh he presented the schools with a valuable 725-acre tract of land that he had owned for some years at Garver's Ferry, twenty-five miles up the Allegheny River from Pittsburgh. It will be converted at once into an experimental