SCIENCE:

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Communications will be welcomed from any quarter. Abstracts of scientific papers are solicited, and twenty copies of the issue containing such will be mailed the author on request in advance. Rejected manuscripts will be returned to the authors only when the requisite amount of postage accompanies the manuscript. Whatever is intended for insertion must be authenticated by the name and address of the writer: not necessarily for publication but as a guaranty of good faith. We do not hold ourselves responsible for any view or opinions expressed in the communications of our correspondents.

Attention is called to the "Wants" column. All are invited to use it in soliciting information or seeking new positions. The name and address of applicants should be given in full, so that answers will go direct to them. The "Exchange" column is likewise open.

THE CHEMICAL LABORATORY OF THE CASE SCHOOL.

THE "First Annual Report of the Chemical Laboratory of Case School of Applied Science," Cleveland, Ohio, which is under the directorship of Professor C. F. Mabery, contains a brief review of its development since the school was opened in 1881. The liberal expenditure at first granted by the trustees for chemical supplies, and for equipment of the temporary laboratory, laid the foundation for immediate arrangement of the course of study, which became necessary to meet the demand for instruction in chemistry. Upon the removal of the school to the new building on Euclid Avenue, in September, 1885, the commodious, well-lighted rooms on the third story were assigned to chemistry, and they were occupied until the building was burned in October, 1886. In promptly providing for the continuance of instruction after the fire, in a separate building, the trustees made it possible to resume laboratory work with a delay of less than four months. This building has served an excellent purpose during the four years it has been occupied, and the great amount of labor that has been expended in developing the course of study will be apparent when they are expanded in the more spacious rooms of the new laboratory. The first graduates in chemistry were of the class of 1886, and fifteen now fill responsible positions as chemists and professors of chemistry. Two of the graduates have received the degree of doctor of philosophy from the University at Berlin, and two others have nearly completed an advanced course of study, one at the University at Heidelberg, Germany, and the other at Zurich, Switzerland.

For the best development of chemical training, the beneficial influence of original research or study of special problems upon students as well as instructors, is recognized; and while it may be possible to include very little of this work in a course of study for undergraduates, the general effect of such an atmosphere is stimulating to their ambition. Then, too, questions constantly arise in professional pursuits that can only be determined by the application of knowledge independent of routine methods. The investigations carried on were on subjects of considerable practical importance. An exhaustive study by Mr. A. W. Smith of the composition of the water of the lake at different points along the shore, and the influence of varying currents in causing contamination, indicated the direction that an extension of the inlet tunnel should take to provide the best supply for the city. A paper on salt brines led to the perfection by Dr. Dow of a process now in operation for the extraction of bromine from brines that promises to replace the older methods. Although many methods have been proposed and protected by patents for the removal of sulphur from Ohio petroleums, the results of investigations made at Case School gave the first information concerning the forms of the sulphur compounds in these oils. The examination of oils from other localities promises interesting results. Since 1884 investigations have been constantly in progress in the laboratory on the metallurgy and uses of metallic alluminum and its alloys, and they have contributed to the great reduction in price of the metal and to its more general use in the arts.

THE AMERICAN SOCIETY OF MICROSCOPISTS.

THIS association, now in the thirteenth year of its existence, will hold its fourteenth annual meeting in Washington, D.C., beginning Aug. 10, and continuing in session five days. Its roll of active members contains about three hundred and fifty names, embracing nearly every person in the United States who is at all prominent as a microscopist. Its membership consists of two distinct classes; viz., professional men and students of the natural sciences, who use the microscope in their daily avocations as an instrument of research, diagnosis, or precision; and amateurs, or those who find pleasure and profit in the revelations of the instrument. Many of the latter class, from having early chosen special lines of study and investigation, have acquired high reputations in their respective departments of microscopical research. In its earlier years this class predominated in the membership of the society, but at present the professional element is largely in excess.

The qualifications for membership are very simple. The applicant must be a respectable person socially, and interested in the use of the microscope.

The advantages of membership are dual in their nature; i.e., general and social, or those which accrue to the individual from association with others engaged or interested in the same pursuits in any and all walks of life; and special, in that the meetings of the society are to a certain extent educational in their nature. In the "working sessions" experts in every department of microscopical technology are engaged in giving manual demonstrations of the details of their lines of work: in the informal evening *conversaziones* the room of every worker who has anything special to exhibit or demonstrate is open for the reception of all those who wish to witness the demonstration; finally, the *soirée* affords an opportunity of displaying for the benefit of the members, as well as the public generally, all that is most beautiful, interesting, and instructive in the cabinets or laboratories of the exhibitors. Of late years the *soirées* have been attended by many thousands of visitors in every city in which the society has met, and have been regarded as distinguished social as well as scientific events.

The dues are only two dollars per annum, and in return the member gets a volume of the "Annual Proceedings," which costs very nearly this amount. All persons, professional or amateur, interested in microscopy and not already on the rolls, are invited to send in their applications for membership to the secretary, Dr. W. H. Seaman, 1424 Eleventh Street, Washington, D.C. The application should be accompanied by three dollars, which is the initiation fee and one year's dues. Any further information concerning the society or the approaching meeting may be obtained by addressing Frank L. James, president, Box 568, St. Louis, Mo.; W. H. Seaman, secretary, 1424 Eleventh Street, Washington, D.C.; or C. C. Mellor, treasurer, 77 Fifth Avenue, Pittsburgh, Penn.

INTERNATIONAL CONGRESS OF GEOLOGISTS.

THE Committee of Organization of the International Congress of Geologists announces the following details with regard to the meetings of the Fifth Geological Congress, to be held in Washington from Aug. 26 to Sept. 2, and for excursions which will follow.

The meetings will be held in the rooms of the Columbian University, at the corner of Fifteenth and H Streets. A large lecture-room, and smaller rooms for meetings of the council, exhibition of maps, rocks, minerals, etc., have been set apart for this purpose. Special postal, telegraph, and messenger service will be arranged in the building during the week of the meeting, and a bureau of information, where members will register. Those who arrive before the opening of the congress are requested to register their names at the secretary's office, 1330 F Street.

The meetings of the American Association for the Advancement of Science, and of the Geological Society of America, which will take place during the week preceding that of the meeting of the congress, will be held in the same building. The daily programme of the several meetings is as follows.

Aug. 19 to 22. — Meetings of the various sections of the American Association for the Advancement of Science. The foreign members of the congress have been made honorary associate members of the association by its council, and are thereby entitled to take part in its geological and archæological excursions in the vicinity of Washington, and to avail themselves of the reduced rates of fare on railroads which are accorded to its members. American members of the congress who are not already members of the association are invited to join it at the present meeting.

Aug. 24 and 25. — Meetings of the Geological Society of America. The foreign members of the congress are likewise invited to attend the meetings of this society, to contribute papers, and to take part in the present meeting.

Aug. 26 to Sept. 2. — Meetings of the International Congress of Geologists.

Besides the regular subjects of discussion, such as unfinished business of the former congress, reports of committees, etc., the Committee on Organization recommends that the following subjects be made special topics for the consideration of the congress at this meeting: (I) Time correlation of the clastic rocks; (1) correlation by structural data; (*a*) by stratigraphical data, (*b*) by lithological data, (*c*) by physiographical data; (2) correlation by paleontological data; (*a*) by fossil plants, (*b*) by fossil animals; or (*a*) by marine fossils, (*b*) by terrestrial fossils: (II) General geological color schemes and other graphic conventions: (III) Genetic classification of the pleistocene rocks.

The Committee of Organization has arranged with Thomas Cook & Son for reduced rates on certain lines of ocean steamships, for members coming from Europe. On all the principal railroads of the United States, members can obtain a reduction of one-third on regular rates from all main points to Washington and return, if they are members of the American Association for the Advancement of Science, or become so during the meeting. For this purpose it is only necessary in buying a ticket for Washington to obtain from the agent a receipt for the amount paid, on a particular form furnished him for this purpose. When the member leaves Washington, the presentation of this receipt, together with the membership card of the association, will entitle him to a return ticket over the same route for one-third the regular fare.

The long excursion will be made on special trains, carrying seventy-five persons, and fitted with all the latest appliances for the comfort of travellers. It will constitute a moving hotel, permitting free and safe passage from one end to the other at all times, and will take the party wherever the rails are laid in the regions visited, and stop wherever desired. As at present planned the excursion will occupy twenty-five days, and cost $265 per person, which will cover every necessary expense. The route laid out covers thirty-eight degrees of latitute and twelve of longitude, and enables the traveler to see the finest scenery and most important geological phenomena of the Eastern States, the Mississippi Valley, and of the Rocky Mountain region, passing a week among the wonders of the Yellowstone Park.

The following shorter excursions are suggested, and American geologists familiar with the regions stand ready to conduct parties. If a sufficient number agree to go on these excursions, concessions may be obtained from the railroads to reduce the expenses to a minimum: (1) Through the Southern Appalachian regions, examining the peculiarly appressed folds in paleozoic rocks, and viewing the newly opened mines of coal, iron, manganese, tin, and gold; (2) to the copper and iron regions of Lake Superior, and the great developments of Pre-Cambrian or Algolkian rocks; (3) through the coal and oil regions of Pennsylvania to Niagara Falls, down the St. Lawrence River to Montreal and Quebec, and return through the classic paleozoic and taconic regions of New York and Vermont.

Members who desire to examine particular localities or geological horizons are requested to correspond with the secretaries as early as possible, and all efforts will be made to arrange so that their wishes may be complied with. Already a short excursion has been planned by Professor H. S. Williams for the week preceding the meeting of the geologists to see the typical development of paleozoic beds (especially Devonian) in the State of New York, in which a number of European geologists have already signified their desire to participate. Correspondence should be addressed to S. F. Emmons, 1330 F Street, Washington, D.C.

BACTERIA.

THE first of a series of lectures on the nature and functions of bacteria was recently delivered at the Royal Institution, London, by Dr. E. Klein, F.R.S. According to the *Lancet*, to which we are indebted for a brief report of the lecture, Dr. Klein said that perhaps in no branch of biological science had advances in the methods of research within the last twenty-five or thirty years been so enormous as in this subject. In 1828 Ehrenberg recognized the existence in water of minute mobile organisms, which he considered to belong to the group of animalculæ known as infusoria, an assumption which was now known to be erroneous. In 1837 Schwann demonstrated the presence in atmospheric air and in dust of living microscopic beings, which he showed by direct experiment to be endowed with the power of producing in certain fluids those chemical changes termed alcoholic fermentation or putrefaction.

Pasteur fully established the proposition that the different fermentations, such as alcoholic, butyric, acetous, mucous, and lactous fermentations, and also the decomposition of putrescible matter, were caused by definite and different species of such minute living beings, microbes, and that without them such changes did not occur. This proposition implied that these changes were dependent on and ultimately bound up with the life and growth of these microbes, and if these were prevented from gaining access to such fermentative matters, they would remain unchanged or sterile. This was the principle which Sir Joseph Lister had applied in surgery, with the well-known brilliant results. The *rôle* of these microbes in atmospheric air had been minutely worked out and beautifully illustrated by Professor Tyndall, who shared in finally establishing that with these simple organisms, belonging almost to the world of the infinitely small, the same fundamental principle obtains as in other living organisms of plant and animal life, be they ever so large and complex, namely, that each organism had descended from an antecedent parent organism, and that no such thing as their origin from non-living matter occurred.

Within comparatively recent times it has been shown that a variety of the most important and extensive processes of oxidation and reduction which occur in nature, — such as the oxidation and resolution of dead animal and vegetable matter, the breaking up of complex nitrogenous materials and their ultimate change into nitrites and nitrates, and the specific fermentation so important in foodstuffs and articles of diet, and many other processes, — are caused by and intimately connected with the growth and life of microbes. Though the importance of some species as useful agencies in nature is recognized, the importance of other species, as being the cause of disease affecting plants, animals, and man, is not less. The term micro-parasite is given to this latter group.

Amongst the microbes there is one great group to be dealt with in particular, called "bacteria," because it possesses more or less the shape of a minute rod. Like the true or higher fungi, they are free from chlorophyll, and are composed of cells, a cellular membrane with living matter or protoplasm within, and they multiply by fission, for which reason they are called "fission fungi." Bacteria can then be defined as microscopic elementary organisms, composed of a cellulose investment of the protoplasmic contents, and which multiply by simple fission. They are classified into micrococci or cocci, bacilli, and spiral vibriones, according to whether they are spherical, cylindrical, or curved and spiral.

All these organisms, when they have found suitable nidus, multiply with enormous rapidity. It has, for example, been found from observation — all conditions of moisture, medium, and