organisms, and it is possible that one or the other of these is the deadly microbe which he has so long been in search of; but he is not at present in a position to make a definite claim with reference to any one of them. Some of these germs were exhibited to the association; and Dr. Sternberg stated that since his return from Havana he had been continuously engaged in the study of these various microbes, and that the material which he had brought with him would fully occupy his time for some months to come.

Consumption among the Indians.

At the same meeting, Dr. W. Matthews of the Army Medical Museum read a paper entitled 'Further Contributions to the Study of Consumption among the Indians.' Before a meeting of this society, held in Philadelphia two years ago, Dr. Matthews presented a paper on this subject, in which he brought forward statistical evidence to show that consumption increases among Indians under the influence of civilization, i.e., under a compulsory endeavor to accustom themselves to the food and habits of an alien and more advanced race, and that climate has very little to do with this increase. The Indian race, which is native to the climate, suffers more from consumption than the white and colored races, which have only recently appeared on the western continent. As a rule, too (to which there are some exceptions), the tribes that live in the Eastern States, and have been longest under the influence of civilization, suffer most from consumption and allied diseases. In the present paper the author brings out much additional evidence to strengthen the conclusions of his first paper, and endeavors to discover the causes of this consumptive tendency among Indians. He believes that the disease with them is usually complicated with scrofula, in short that it is scrofulous phthisis, and that in studying it we must seek for the causes of scrofula. Chief among these is improper and badly cooked food. Other causes are bad dwellings and insufficient clothing. Still it is strange that the colored population, who are often as badly housed and fed as the Indians, are more healthy. This is partly accounted for by difference of disposition, the Ethiopians being the more light-hearted race. Much of the difference, too, arises from the fact that all Ethiopians, whether rich or poor, fair or dark, are placed by statisticians under the head of 'colored;' while people of Indian descent, who live among whites, and sever their tribal relations, are classed as whites, only the poorer and less prosperous remaining on the Indian census-rolls.

Cerebral Localization.

The most brilliant meeting of the congress proper was that of Wednesday evening, when one of the most interesting subjects in medical science, cerebral localization, was discussed by several of the most distinguished specialists of the world. Dr. Charles K. Mills of Philadelphia, the professor of diseases of the mind and nervous system in the Philadelphia Polyclinic and College for Graduates in Medicine, opened the discussion, the topic being 'Cerebral Localization in its Practical Relations.' He was followed by Dr. Roswell Park, professor of surgery in the Buffalo Medical College. Both of these gentlemen read papers, which were discussed by Dr. David Ferrier and Mr. Victor Horsley of London, England, Dr. W. W. Keen of Philadelphia, and Dr. Robert F. Weir of New York City. Diagrams were displayed on the wall, and by their aid the various speakers pointed out the brain-centres. Dr. Ferrier, one of the original discoverers of brain-centres, claimed that they were distinct areas, while Mr. Horsley was of the opinion that they overlapped. Dr. Mills's paper was an exhaustive one, describing the results of the latest modern discoveries. Dr. Park covered about the same ground, and his paper was regarded as a masterly exposition of the subject.

Distinguished Guests.

The congress was notable for the distinguished guests of several of the constituent societies who were present and participated. Among these guests, Dr. Frederick von Esmarch of Kiel, Germany, was probably the most distinguished. He was accompanied by his wife and son, the former being Princess Caroline Christian Augusta Emily Henrietta Elizabeth of Schleswig-Holstein-Souderburg-Augustenburg. She is aunt of the Empress of Germany. Dr. von Esmarch is director of the surgical clinic in Kiel. During the Franco-Prussian war he was a surgeon on the staff of the Emperor, and is recognized from the leading surgeons of the world. He is a voluminous writer, and nearly all of his works relate to the antiseptic treatment. He has endeavored to ameliorate the horrors of war by the introduction of improved sanitary measures in the treatment of the wounded, and also by suggestions in case of sudden accident. He first suggested the method of artificial bloodless operations, which was generally adopted. He has received honors abroad and at home, and wears decorations of the highest order.

Among the other foreign guests were Dr. David Ferner of London, England, one of the leading medical writers of the day, joint editor of *Guy's Forensic Medicine*, professor in King's College, and physician in King's College Hospital; Dr. Victor Alexander Haden Norsley of University College and Brown Institute, England; Dr. W. M. Graily Hewitt of London, England, a distinguished author and professor; Dr. Lawson Tait of Birmingham, England, president of the Birmingham Philosophical Society, and author of 'Diseases of Women,' a recognized text-book for students and practitioners; Sir Spencer Wells of London, England, surgeon to the Queen's household, and an extensive writer on medical subjects; Sir Andrew Clark, also of London, president of the London Medical Society; Sir William MacCormac, author of 'Notes and Recollections of an Ambulance Surgeon,' which has been translated into several continental languages; Dr. William O. Priestly of London, a voluminous contributor to medical literature; Dr. William Ord of London, a physician and lecturer of high rank; Dr. Thomas Bryant of London, lecturer on surgery in Guy's Hospital; Dr. Reginald Harrison of Liverpool, England; and Dr. Arthur E. Durham of London, England. Several of these distinguished guests, by invitation, read papers or joined in the discussions.

In every respect the congress was successful. It contributed to the advancement of the highest medical science, and has furnished a stimulus for future work.

MAJOR POWELL'S REPORT.

Operations of the National Survey. — Yellowstone Park. — Atlantic Coast Work. — Archæan Geology. — Glacial Geology. — Appalachian Division; Classification of Soils.

Operations of the National Survey during the Year ending June 30, 1888.

DIRECTOR POWELL of the United States Geological Survey has completed his report for the last fiscal year, and Sept. 6 transmitted it to the secretary of the interior. There will probably be several months' delay in the publication of it, owing to the lack of facilities in the Government Printing-Office; but the Washington correspondent of *Science* has been permitted to make the following full extracts and summary from the manuscript copy. This is the first publication of this report.

In the topographic department an area of 52,062 square miles was surveyed during the year. In regard to the scale on which the topographic maps are made, the director says, "In the earlier work of the Geological Survey it was contemplated that a large part of the general topographic map should be projected upon a scale of four miles to the inch. . . . The last two years, however, have brought great improvements in the methods of work, in the instruments and appliances, and, above all, in the skill and efficiency gained by the topographers through experience and zealous emulation. The cost of the work per unit of area upon any given scale has greatly diminished, the quality and accuracy of the work has been much improved, and the rapidity with which a given grade of work may be accomplished has increased. At the same time the demand for maps of greater detail, and upon a larger scale than four miles to the inch, has been rapidly growing, not merely for scientific purposes, but far more for economic purposes.

"The general utility of a map two miles to the inch is, for all purposes, many times greater than that of a map four miles to the inch; and a further increase of utility follows from increasing the scale to one mile to the inch. . . . It has therefore become practically imperative to enlarge the scales in some regions, while the original four-mile scale is still adhered to in the regions of high mountains and arid plains and plateaus. The increased cost which (other things being equal) necessarily attends the production of larger

scale and more accurate more metamorphism great measure been offset by more economic and more efficient service, resulting from constantly growing experience and skill in field and office work."

Yellowstone Park.

"Under the charge of Dr. Arnold Hague," says Director Powell, after treating of several other topics, "the survey of the National Park has made much progress. A topographic map of the Mammoth Hot Springs basin has been made by Mr. Anton Karl of the topographic corps, and maps of the other geyser basins have been completed. Dr. Hague's geologic work has been prosecuted in the eastern portion of the park, in the comparatively little-known area around the northern part of the Wind River Range and the Absaroka Range, which constitute some of the grandest features of the region. His inquiries have thrown much light on the geologic history of the features of the park, and of the volcanic processes which produced such wonderful results. Many instructive studies have been made of the action of the geysers and the hot-springs, and of the mineral deposits to which they have given rise.

"Dr. Hague's attention has been forcibly drawn to the importance of this reservation as a storage-area for the head waters of some of the largest upper tributaries of the Missouri, and also of the Snake River. Yellowstone Lake is the largest natural reservoir of the Rocky Mountain region, and may be made an important factor in the prosperity of future populations of the country adjoining the lower courses of the Yellowstone, who will be dependent upon its waters for irrigation. Dr. Hague has devoted much time to the investigation of this important subject, and has obtained information which cannot fail to be of great value in the future deliberations of Congress upon questions relating to its policy towards the public lands upon this broad watershed of the continent."

Atlantic Coast Work.

"The examination of swamps and marsh-lands," continues Major Powell, "has been continued during the past year under the charge of Prof. N. S. Shaler. The large area of such lands along the Atlantic coast south of New York, and their situation upon the coast-line, make them especially important, and even a subject of solicitude in relation to the future development of the country. Deleterious to health in their natural condition, an obstacle in the way of approach to the sea, repellent to the settler, to agriculture, and to manufacturers, they yet hold out the hope of highly productive utilization through the judicious application of capital. Wherever they are susceptible of effective drainage, they are generally among the most valuable lands for agricultural purposes, and their unhealthful condition is ameliorated, or even wholly remedied. There are over 100,000 square miles of such land in the United States, a large proportion of which, by good engineering, can be rendered highly productive. Much of it abounds in peat or iron ores, and in South Carolina and Georgia it contains the products of phosphates, which are collected and treated in chemical works in steadily increasing quantities. The swamps and overflowed lands of the interior present analogous conditions. Professor Shaler has visited the Everglade region of southern Florida, along the coast, to ascertain the general facts with reference to the possibility of drainage, and with highly encouraging results. He has investigated such evidences as were accessible, bearing upon the origin of the topographic features of the southern part of the peninsula, and especially those which are indicative of elevation or subsidence of the land in recent geologic time. He has also made a preliminary study of the phosphate deposits of South Carolina, and the results have been put in form to be published as a bulletin of the Survey.

"Progress has been made in mapping the swamp districts of Massachusetts, and Professor Shaler has completed the mapping of those occurring in the vicinity of Abington and Newburyport. A large amount of special geologic work, bearing upon particular questions now under investigation, has also been done under Professor Shaler."

Archæan Geology.

"In many parts of the United States extensive exposures of very ancient strata occur, embracing in some cases formations which are older than the oldest fossiliferous rocks of assignable age. In other cases there are formations of the same ages as some of the fossiliferous beds, but in a condition which indicates that they have undergone great changes since their deposition. Not only have their component beds been tilted, bent, folded, dislocated, and distorted to extreme degrees, but their mineralogic contents and their textures have been more or less altered. One effect of this metamorphism has been the obliteration of any fossils they may have contained originally, upon which the geologist mainly relies in determining the ages and relations of strata. The confusion into which these masses have been thrown by the forces which have fractured and distorted them has increased the difficulty.

"The present state of knowledge relating to the origin, relative ages, and former condition of these strata, to the nature of the processes which have wrought these profound changes in their constitution, and to their relation with each other, is very unsatisfactory, although no rocks have been more earnestly studied. While the knowledge which has been gained is vast in amount, and highly useful in its way, it has not been of such a character that it could be grouped and generalized into broad inductions, and it has thrown comparatively little light upon the most important questions.

"There are large areas in the United States where these rocks are exposed. The most extensive are in the New England States, the southern Appalachians, the vicinity of Lake Superior, and many parts of the great mountain region of the West, and especially the ranges upon and near the Pacific coast. It is deemed of importance to the interest of geologic science in general — both of systematic and economic geology — to take up this subject and prosecute investigations of the older crystalline rocks with vigor. The two fields which are regarded as offering the best opportunities and prospects for these investigations are the New England States and the Lake Superior region. In the former field, Prof. R. Pumpelly has been diligently at work with several assistants. Convinced that the Green Mountains of Vermont and Massachusetts are more likely to yield desired results and to clear up the broader questions relating to the geology of New England, he has divided the country into zones across those mountains, and is prosecuting the investigation of their structure in great detail. He has already ascertained the components of the Green Mountain series of strata, has gained considerable knowledge of their lithology and relations, and has made much progress towards unravelling their complicated structure, and learning the processes by which their metamorphism has been effected."

After a brief account of the investigation of corresponding horizons in the Lake Superior region, closing the notice with a deserved tribute to the late Prof. Roland D. Irving, who was in charge of this work, and who died in May last, Major Powell passes to a brief review of the work done during last year in the glacial division.

Glacial Geology.

"The study of the vestiges of glaciation," says the director, "has been conducted by Prof. T. C. Chamberlin. The New England States, New York, a large part of Pennsylvania, and in general the States north of the Ohio River and east and north of the Missouri, constitute a region whose superficial deposits and soils, whose lakes and minor topographic features, have been profoundly modified, and in great part made what they now are, by the action of glaciers. This region, as well as the basins of the Great Lakes and the Canadian Provinces indefinitely northward, was doubtless during a recent geologic period sheeted over with ice in a manner which finds a counterpart in the present condition of Greenland. This conclusion — and a similar one has been reached with respect to certain portions of Europe — rests upon a vast mass of circumstantial evidence so clear and convincing, when fully understood, that it may be regarded as one of the most wonderful and pleasing examples of inductive reasoning, and one of the best established that the whole realm of modern science affords. Professor Chamberlin's work has been the investigation of the extent of this former field of ice and its boundaries, the nature of its action in shaping surface features, the chief incidents of its history, and the geologic and climatic changes which were associated with it, whether as causes or effects.

"Near the close of the glacial period there existed, in the region now embraced in the valley of the Red River of the North and that of the Saskatchewan, a great lake, to which the name of Lake Ag-

assiz has been given. Its former existence was first clearly shown. and its approximate limits roughly defined, by the late Gen. G. K, Warren of the Engineers. A considerable arm or bay of this lake extended up the Red River valley into Dakota and Minnesota. Its ancient beaches are still easily discernible, and its bottom received the deposits of sediment ground from the rocks by the great continental glacier upon whose western margin the lake was situated. These deposits constitute those soils of the Red River valley which have lately become so famous for their fertility. In co-operation with the Canadian Geological Survey, in whose territory the greater part of Lake Agassiz was situated, Professor Chamberlin's assistant, Mr. Warren Upham, has made a study of the portions of this lake-basin and of its branches which lie within the United States. This work has already occupied Mr. Upham during several seasons, and is still in progress, and has brought to light many instructive and important facts. Examinations have also been made of the glacial deposits in the Coteau du Plateau du Missouri of Dakota, by Prof. J. E. Todd; in northern Illinois and adjacent parts of Indiana and Michigan by Mr. Frank Leverett; in Wisconsin by Mr. I. M. Buell; in Indiana by Prof. L. C. Wooster; and in Maine by Prof. George H. Stone. Large and important additions have thus been made to our knowledge of the distribution and action of the ancient ice-sheet, and of the history of the continent during the glacial period."

Appalachian Division. — Classification of Soils.

Probably the most important section of Major Powell's report is that in which he announces a new, scientific, and systematic classification of soils. He has long been engaged in the study of this subject, and has given his classification to some specialists and institutions, but this is the first publication of it. It will attract wide attention on account both of its scientific and its economic importance.

After briefly stating the progress of the geologic work of the year in the Appalachian division, under the direction of Mr. G. K. Gilbert, Major Powell proceeds: "The soils of the region are derived from the rocks. In part they are constituted by disintegrated rock not otherwise disturbed, and holding its original position; but in part they also result from the transportation and sorting of disintegrated rock by streams, waves, glaciers. The complete mapping of the geologic features thus shows the distribution of the soils, and it has been determined to separate the data concerning soils, and prepare a soil-map to accompany each geologic map. The field-parties gather data for both at the same time.

"In planning this work it has been found necessary to adopt a working classification of soils. The following is an exhibit of the scheme. It is held only as a tentative classification, to be enlarged, modified, or reconstructed, as the facts developed in the progress of investigation may demand.

"*Endogenous soils* are those derived from the country rocks, and remaining in place.

"*Exogenous soils* are those derived from other sources than the country rocks proper to the district where the several soils are situated.

"*Endogenous soils* are classed in conformity with the rocks from which they are derived, as,

"I. Sandstone soils.
"II. Limestone soils.
"III. Granite soils, etc.

"*Exogenous soils* are classed as,

"I. Alluvial soils; i.e., those formed from deposits on flood-plains made by running waters.
"II. Lacustrine soils; i.e., those formed from deposits in lakes.
"III. Marine soils; i.e., those formed from deposits made by the action of waves and currents along the shores of the sea.
"IV. Drift soils; i.e., those formed from deposits made by glacial agencies.
"V. Swamp soils; i.e., those formed from deposits made in fresh-water swamps.
"VI. Marsh soils; i.e., those formed from deposits made in marine marshes.
"VII. Dune soils; i.e., those formed from deposits of drifted sands.
"VIII. Volcanic soils; i.e., those formed from volcanic ashes.
"IX. Overplacement soils; i.e., those formed from rocks that have been transported by gravity, as talus soils, landslide soils; also those formed of alluvial cone rocks.

"Under the several species recognized above, important varieties are found.

"The classification thus briefly set forth seems to be natural, simple, and easily applied to the facts presented in field-study."

Passing over a section on correlation of formations, under the review of the work in the division of volcanic geology, Major Powell says, "For nearly two years Captain Dutton has been occupied in the investigation of the Charleston earthquake, and in preparing a monographic report upon it. In many respects the best observed earthquake that has ever occurred, and perhaps the most carefully studied, it has yielded results which undoubtedly add to our knowledge of such phenomena. But Captain Dutton, after two years of laborious investigation, is still of the opinion that the result adds but little to our knowledge of the ultimate causes which produce such catastrophes."

The remainder of Major Powell's report includes a review of geological work in connection with the Potomac formation and in Montana, and of the extensive paleontological investigations that have been carried on. A review is also given of the work done in the division of chemistry and physics, and the report closes with brief notices of the illustrations division and of the library.

HEALTH MATTERS.

Food-Preservatives.

IN a pamphlet on the effects of food-preservatives on digestive agents, by Henry Leffman, M.D., and William Beam, M.A., the authors say that the use of antiseptics in perishable articles of food has become quite general in recent years, and has been to a certain extent the subject of legislation. Salicylic acid has been probably the most used; and while the sanitary authorities in different countries have, as a rule, opposed its use, there has been no positive evidence of its injurious action, even when continued for some time. Lehmann published in Pettenkofer's *Archives of Hygiene* several instances in which healthy male adults had taken for many days considerable doses of this acid without apparent injury. While there may be a legitimate field for the use of these agents in articles of food of a highly perishable character, and especially where the addition is made known, there can be no question that their indiscriminate use is dangerous. Independently, however, of any directly injurious action, it is important to inquire how far they may interfere with the nutritive or medicinal value of any articles with which they may be associated. The matter has been brought prominently to the notice of these chemists, in consequence of some analyses made by them in which the free use of salicylic acid in beers and malt extracts was detected. Similar results in regard to beers were found by various State boards of health and by the Department of Agriculture of the United States Government. It becomes important to inquire how far the presence of the substances may interfere with the diastasic action ascribed to preparations of malt. Of eleven samples tested, including all the extracts widely known in this market, only four had any appreciable effect on starch, and but one of these was strikingly efficient. They have undertaken to determine what retarding effect such preservatives may possess.

The antiseptics selected were salicylic acid, boric acid, sodium acid sulphite, saccharine, beta-naphthol, and alcohol. The sample of beta-naphthol was of the form now sold under the name 'hydronaphthol.'

From the experiments it will be seen that salicylic acid prevents the conversion of starch into sugar under the influence of either diastase or pancreatic extract, but does not very seriously interfere with peptic or pancreatic digestion of albumen. Saccharine holds about the same relation as salicylic acid. Sodium acid sulphite and boric acid are practically without retarding effect. Beta-naphthol interferes decidedly with the formation of sugar by diastase