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

but not with action of pancreatic extract on starch. Peptic and pancreatic digestions of albuminoids were almost prevented by this agent.

It is obvious from these experiments that the indiscriminate use of these agents in the preservation of food is to be regarded as objectionable and a proper subject of sanitary supervision. Their use is scarcely allowable under any circumstances, and certainly only when the nature of the preservative, and the amount, are distinctly stated. These remarks apply more particularly to salicylic acid, saccharine, and beta-naphthol; but the use of boric acid and sodium acid sulphite may be brought also under the same restrictions, because their actions on the animal functions are not yet thoroughly investigated.

CONTAGIOUSNESS OF LEPROSY. — The contagiousness of leprosy still continues to be a mooted question. Dr. Rake, superintendent of the Trinidad Leper Hospital, has made a report to the British Medical Association which embodies the results of his experiments in the cultivation of the germ of leprosy, the *bacillus lepræ*, which have been under way for the past four years. He says that (1) at a tropical temperature and on the ordinary nutrient media he has failed to grow the *bacillus lepræ;* (2) in all animals yet examined he has failed to find any local growth or general dissemination of the bacillus after inoculation, whether beneath the skin, in the abdominal cavity, or in the anterior chamber; feeding with leprous tissues has also given negative results; (3) he has found no growth of the *bacillus lepræ* when placed in putrid fluids or buried in the earth. He further says that an inquiry of this kind is practically endless, so varied are the conditions of temperature, time, nutrient media, living animal tissues, or putrescent substance, and so many are the observations necessary to avoid or lessen the risk of errors of experiment.

FATAL SEASICKNESS. — It is not often that seasickness proves fatal; and yet that it may do so under aggravated circumstances, can easily be imagined. Such an instance recently occurred on the steamer 'Dunara Castle,' on the trip from Tiree to the Clyde. The patient was a girl, aged eight years, in whom the seasickness terminated in a convulsion, which proved fatal.

MILK. — Dr. S. Henry Dessau, in a letter to the *New York Medical Record*, recommends the use of fresh condensed milk as a substitute for mother's milk. His objections to the use of cow's milk as supplied by the milk-dealers are, that during the summer months it is impossible to obtain it fresh and unadulterated in large cities, unless at a cost beyond the reach of the masses. All of the milk that is delivered in the market of New York is at least from twelve to twenty-four hours old, and has undergone rough transportation of from fifteen to thirty miles in not strictly clean vessels. The cans used in bringing the milk to the city are not cleansed until returned to their owner. By the time that the milk has reached the poorer classes, it has commonly undergone more or less adulteration, often in spite of the closest watching by the health authorities. In the course of its consumption by the average infant, it is still further liable to lactic-acid fermentation, and, even though boiled, it is not unlikely to become scorched or made otherwise unwholesome for the infant. Perhaps the most important objection to cow's milk, notwithstanding the fact that it is regarded as the nearest approach to mother's milk, is the difficult digestion of the caseine by the delicate infant whose stomach has been damaged by an attack of summer diarrhœa. This has necessitated the invention of numerous means and measures for overcoming the obstacle, the most common of which is the addition of some farinaceous substance. Such practice for an infant, previous to the eruption of its teeth, is contrary to the provisions of nature, and, though occasionally successful, cannot be defended as a general usage upon physiological principles. Dr. Dessau thinks it impossible to adulterate condensed milk, and that the caseine of condensed milk is so altered in the condensing process as to be very easily digested. He even prefers it to milk sterilized by Soxhlet's method.

DEATH BY DROWNING. — Dr. Paul Loye, according to the *Lancet*, has published some observations made by him, bearing on the phenomena which precede death by sudden immersion. The first stage of deep inspirations lasts about ten seconds, followed by a re-action caused by the resistance to the entrance of water into the bronchioles. This lasts for a minute, and is succeeded by arrest of respiration and loss of consciousness. Finally the scene closes with four or five respiratory efforts — the last. Immersion causes an immediate rise in the blood-pressure, with slowing of the heart-beats. The action of the heart remains slow but strong till death ensues. The pressure gradually lessens, but rises just before death, to fall to zero immediately afterward. The heart sometimes continues to beat feebly for about twenty minutes. The result is the same in animals which have been tracheotomized: the period of respiratory resistance is therefore due to the respiratory muscles, and not to spasm of the glottis.

INHERITED DEFICIENCY OF A TOOTH. — Dr. Cryer says, in the *Philadelphia Medical Times*, that he has, among his patients, members of the same family, representing five generations, each lacking the left lower lateral incisor tooth. An interesting feature of this remarkable instance of heredity is that one of the members of the same family has a supernumerary lower incisor.

WHOOPING-COUGH. — The value of Mobin's treatment of whooping-cough by sulphurous acid is receiving strong confirmation from many sources. Dr. Manly, in the *Practitioner*, expresses the opinion, that, if it was carried out in every case, at the end of six months the disease would be unknown. The method used by him is as follows: the patient is in the morning put into clean clothes and removed elsewhere. All his clothes and toys, etc., are brought into the bedroom, and sulphur is burnt upon a few live-coals in the middle of the room. The fire is allowed to remain in the room for five hours, and then the windows and doors are thrown open. The child sleeps in the room the same evening. About twenty-five grams (a little under an ounce) of sulphur to every cubic metre may be burnt: this is equivalent to rather more than ten grains per cubic foot. The room is fumigated in a like manner during the night; the patient practically living in an atmosphere of diluted sulphurous-acid gas for some days, while in several cases the process is repeated at the end of a week.

THE POWER OF THE IMAGINATION. — We learn from the *New Orleans Picayune* that Dr. Durand, wishing to test the practical effect of mind-disease, gave a hundred patients a dose of sweetened water. Fifteen minutes after, entering apparently in great excitement, he announced that he had by mistake given a powerful emetic, and preparations must be made accordingly. Eighty out of the hundred patients became thorougly ill, and exhibited the usual result of an emetic: twenty were unaffected. The curious part of it is, that, with very few exceptions, the eighty 'emeticized' subjects were men, while the strong-minded few, who were not to be caught with chaff, were women.

MENTAL SCIENCE.

The Recognition of Sense-Impressions.

WE inherit from so ancient a philosopher as Aristotle the recognition of the process of the association of ideas, as well as of the laws by which it acts. He distinguished association by similarity, by contrast, by simultaneity, and by successiveness. The contrast that binds together is due to an underlying similarity, and the latter term may stand for both processes. So, again, the last pair may be included under association by adjacency. In the hope of deciding which of these two general processes is the more real and generic, or whether, perhaps, the two apply to two different spheres of perceptions, Dr. Alfred Lehmann (*Philosophische Studien*, v. 1) devised a series of experiments, which, aside from their bearing upon this theoretical problem, present many points of interest.

The association of ideas is seen at work in the process of recalling, of recognizing as familiar, former impressions. We may speak of a simple recognition in which the mere identity of the present recollection with the mental impression formerly registered is the point; or of a recognition with details in which the time, place, outward circumstances, are also recalled with the remembrance of the impression, say, that of meeting a friend. To this must be added the recognition by means of these details, they serving as