It is difficult to explain this phenomenon except upon the theory that this incrustation is the deposit accumulated upon these low plains in the course of centuries upon centuries, during which the annual melting of the snows upon the mountains and highlands, besides the rainfall and the perennial streams which drain into this basin, have brought down in the water from the strata of salt through which they pass these tremendous quantities of salt in solution. The summer sun has dried up the water by evaporation and left the salt deposit lying upon a soil more or less saturated with moisture, this layer of salt thus deposited has gained in thickness and consistency year by year until it has become a solid homogeneous mass too firmly bound together in the parts distant from the edge, where its thickness was most (owing to the greater depth of water which accumulated there, and consequent larger amount of salt deposited), to be broken by any pressure of water from below. The perennial streams have thus poured their waters underneath this strata. as the accumulation of water would naturally commence at the lowest part of the hollow, which would be about the middle of the salt plain, while the floods of water brought down by the rain and melting snow would overflow on to its surface from the margins. This is the only way by which it occurred to us that we could account for the dead level of the crust which, though covering a space of ground more or less hollow in its nature, as was evident from the run of the water all around, did not appear to us to slope in any direction, and also for the fact that on piercing through this crust water spouted out from below. Though we had no ocular demonstration of this fact, we were satisfied that it was the case from the accounts of a party of our servants whom we sent out the following day, when we had reached the further edge, to bring us a block of salt at a distance of a mile or two from the shore; another fact in support of this theory was that nearer the edge, where the crust was thinner and thus unable to resist the pressnre from below, it had evidently been burst by the rising of the water during the winter and spring, and lay tossed about in fragments.

After this halt we continued our march and arrived at the farther margin about 3 A.M.; it had thus taken us a good eight hours to cross this plain of salt, so that the distance traversed could not have been less than about twenty miles. As we expected, wo found that, as we approached the farther side, the crust of salt got thinner and thinner, till, on one occasion, getting slightly off the track, we quickly found the horses and mules sink through it almost up to the girths in a substance that resembled exactly melting snow, out of which we had to make the best of our way towards the harder material upon which we had been marching for so many hours. At length we hit off the beaten track which had been hardened by constant use during so many centuries, and were thankful indeed when we found ourselves again at last on *terra firma.*

NOTES AND NEWS.

AT the Franklin Institute, Philadelphia, on Friday evening, Dec. 11, a lecture was delivered by Mr. William L. Saunders, the well-known civil engineer of New York, on "The Compressed Air Power of the Future."

— During the summer the third and fourth stories of the south wing of University Hall, Ann Arbor, were fitted up as zoological and botanical laboratories. Each story affords about four thousand square feet of floor space. On each floor there are three principal rooms: a central room about forty-five feet square, a north room about twenty by forty feet, and a south room of the same size. There are also small rooms for the use of instructors. The fourth floor is devoted to botany, the central room being used as a general laboratory, the north room as a herbarium, and the south room as a research-laboratory for advanced students A small conservatory is to be constructed against one of the windows of the south room and will serve for experimental work. The other south window is occupied by an equarium. The third floor is devoted to zoology, the middle room being used as a general laboratory for beginners, and the north room for advanced work in vertebrate morphology. The south room has been divided into three compartments. One of these is lined with galvanized iron and serves to house the small animals required in the daily work of the laboratory. The second is used for alcoholic specimens, and the third is fitted up as a private laboratory for the professor in charge. In the zoological laboratories particular attention has been paid to the provision of means for keeping alive the animals that inhabit our inland waters. There are four large aquaria, and provision has been made for thirty-six smaller ones. There are also cages with running water for crayfish, frogs and other small animals that do not thrive well in ordinary aquaria. Each of these laboratories, the botanical and the zoological, can accommodate about fifty students. Contrary to expectation, they are now filled to nearly their full capacity, and by another year are likely to be crowded.

— Special Agent C. J. Murphy, charged with the introduction of Indian corn as a human food into Europe, has made a report to Secretary Rusk covering his work in Great Britain. In it he reviews the conditions which seem likely to encourage the use of this cereal food in Great Britain and other parts of Europe, and points out the various channels through which he has sought to introduce it, and the necessity for the co-operation of private individuals and commercial bodies in this country to take advantage of the work already done by the Government in this direction. Secretary Rusk has caused to be prepared for publication, in conjunction with Special Agent Murphy's report, a chapter upon the value of maize as food, by Dr. H. W. Wiley, chief chemist of the department, in which are shown the chemical composition of maize and its relative value for food purposes by comparison with other cereals. There is also a chapter, prepared by the assistant statistician, Mr. B. W. Snow, under the direction of the statistician, offering some additional observations as to the possibility of extending the use of this cereal among the people of Europe as a human food, and presenting a number of statistical tables showing the yield and value of our corn crop and the extent of our available resources in supplying home and foreign demand. The report is now in press and will be shortly ready for distribution.

— In a recent paper on the camel (*Zeits. für wissen. Geogr.*) Herr Lehmann refers, among other things, to its relations to temperature and moisture. Neither the most broiling heat, nor the most intense cold, nor extreme daily or yearly variations, according to an abstract in *Nature,* hinder the distribution of the camel. It seems, indeed, that the dromedary of the Sahara has better health there than in more equably warm regions; though, after a day of tropical heat, the thermometer sometimes goes down several degrees below freezing, and daily variations of 33.7° C. occur. In Semipalatinsk again, where the camel is found, the annual variation of temperature sometimes reaches 87.3°. In Eastern Asia, winter is the time the animals are made to work. In very intense cold, they are sewn up in felt covers. Of course each race of camel does best in the temperature conditions of its home: a Soudan camel would not flourish in North-east Asia. Camels are very sensitive to moisture. In the region of tropical rains they are usually absent, and if they come into such with caravans, the results of the rainy season are greatly feared. The great humidity of the air explains the absence of the camel from the northern slopes of the Atlas, and from well-wooded Abyssinia. This sensitiveness expresses itself in the character of different races. The finest, most noble-looking camels, with short silk-like hair, are found in the interior of deserts (as in the Tuarek region, in North Africa), and they cannot be used for journeys to moist regions. Even in Fezzan (south of Tripoli) the animals are shorter and fatter, with long coarse hair; and in Nile lands, and on

coasts, it is the same. These animals, too, are less serviceable as regards speed and endurance. Herr Lehmann states it as a law that the occurrence of the camel finds its limits wherever the monthly average vapor tension in the air exceeds twelve millimetres.

— A hundred years ago the natives of the valley of Chamonix who took travellers up the mountain suffered as much as their employers from physical sensations ascribed, no doubt rightly, to the rarity of the air. They were unable to walk more than a few paces without halting. Last autumn, says the Proceedings of the Royal Geographical Society, travellers who walked in early morning from the hut under the Bosses (14,000 feet) to the top (15,780 feet) had the company of five Chamoniards. They went up at a fair pace without resting. Arrived on the top, without a moment's pause, the men took their spades and shovels and began digging. They asserted that they did only about a third less work in the day than in the valley; and that they suffered no inconvenience from a prolonged stay in the Bosses hut; slept well, and ate largely. Their work was to excavate a tunnel in the summit ridge about thirty feet below the top. The object of this tunnel was to reach rock, in which a shelter-cave might be excavated. No rock had been found up to Sept. 11. The whole summit-ridge seemed to consist of compact opaque snow of exquisite purity. The rocks, a short distance from the top on the Italian side, were not considered available by the Frenchmen who were desirous of erecting the shelter. It was proposed, as no rock had been reached under the top, to carry there a wooden framework, in shape and size not unlike a bathing-machine, and fix it in the mouth of the gallery, in the hope that it might be dug out next summer and serve as a refuge for such scientific observers as might not be satisfied with the commodious hut near the Bosses.

— It has been said of more than one great and sudden sorrow, that it has eclipsed the gayety of nations, and the expression would argue a supposition that nations were, as a rule, naturally mirthful, says the *London Spectator*. Indeed, that seems to be the general idea that the world entertains of itself — namely, that it has a natural bias towards mirth and jolity, and only deviates into melancholy under the stress of untoward circumstances; that it numbers more inhabitants that are glad than those that are sorry; and that *Jean qui rit* predominates largely over *Jean qui pleure*. It is a comforting delusion — if it happens to be a delusion — and one that we should not wish to dissipate. Nevertheless, we cannot but express our doubt of its reality, for, should it ever have been true of the past, we should be driven to the most melancholy belief that the world is growing sadder as it is growing wiser, and that gayety and laughter are gradually decaying and departing from among us. That, evidently, is the opinion of one who has done his best to contribute to the mirth of his fellow-countrymen. Mr. James Payn fears that it is only too certain that people laugh less to-day than they used to do, and, at the same time as he deplores the fact, professes his inability to account for it. Of the two suggestions that he makes towards the solution of the problem, neither seems to us to be sufficient by itself to account for so dismal a change, though we have no doubt that both are factors in it. The idea of the vulgarity of laughter is neither strong enough nor sufficiently widely disseminated to have any real influence in quenching the natural expression of mirth. The innate sadness and dulness of democracy are probably much more powerful factors, in that the undeniable growth of democratic ideas among us must have brought about a corresponding decrease of mirth that provokes to laughter. But that, too, we should think, can hardly be sufficient by itself to have wrought any really perceptible change upon the mirthful spirit of the times; and yet we are fain to confess ourselves at a loss to advance any better reason for the decay of laughter, which we, as well as Mr. Payn, believe to be taking place. "Laughter holding both his sides" is well-nigh dead among us, so rarely is it heard; and the reason for its death, most people will say, is not because such laughter is vulgar and unseemly to the civilized man but because there is really nothing to-day to laugh at. Why there should be nothing now to laugh at, they would find it more difficult to explain. Hardly could they contend that we are less ludicrous than were our ancestors, or less capable of recognizing what is ludicrous. It must be some other source of laughter that is wanting in us.

— Hitherto it has not been possible to get lead to adhere to iron without the aid of tin since lead has little or no affinity for iron, but in a new process this difficult feat is accomplished, the coating being effected with a bath of lead of about 98½ per cent purity. The plates or other articles to be coated, according to *Engineering*, are first pickled in a bath to remove scale. Through this bath a weak current of electricity is passed, which is said to reduce the time required by one-third. From this bath the articles are passed as usual into another of lime water, which neutralizes the acid, and thence into a third of clear water. They are then immersed in a fourth bath consisting of a neutral solution of zinc and stannic chlorides, obtained by dissolving granulated zinc and tin in hydrochloric acid. From this bath they are passed into a drying chamber heated by steam, where the moisture on them from the last bath is evaporated, leaving behind a deposit of the mixed metallic chlorides, which protects the plates from oxidation. When dried these plates are ready to be passed into a bath of molten lead. On issuing from this bath the plates are found to be coated with a uniform and very adherent layer of lead. Though perfectly uniform this layer is nevertheless very thin. The ductility and strength of the iron are not decreased by the process, and a plate can be bent and closed, and again opened out, without breaking the coating. In the case of galvanized iron, bending the plate to a sharp angle causes the coating to crack. Samples of ship-plates have been coated and the riveting afterwards done in the usual way without breaking the coating, which, we may also remark, takes paint very well. The thinness of the coating is remarkable, as 2 oz. per square foot of plate proves sufficient, whereas 3 oz. of spelter are in general required in galvanizing. The inventors claim that an additional economy will be effected by the fact that there is no precipitate or sediment deposit in their melting tanks, as occurs with zinc, while, at the same time, the molten lead has no effect on the material of which the bath is constructed, which may, therefore, last indefinitely.

— Drs. Emmerich and Mastraum have published an interesting article in a German Hygienic journal on the cause of immunity from infectious diseases and their treatment, especially of swine erysipelas, and a new method of protective vaccination for it. Emmerich, according to *Lancet*, published in the year 1886 his doctrine that the cause of immunity from infectious diseases is a modification of the chemical process going on in the cells, so that the new chemical compounds formed act as microbe killers without doing any harm to the cells themselves. In consequence of the results of a series of experiments, Emmerich concluded that this antibacterial poison acts destructively on all the microbes within a few hours after their introduction into the organism. The publication of this doctrine having met with a good deal of opposition, he repeated his experiments, and again arrived at the same result, showing that the explanation of immunity from infectious diseases proposed in 1886 was justified. Granted the correctness of this, it follows that extracts from the tissue of any animal enjoying immunity are remedies against the corresponding infectious disease. Further experiments are now reported by Drs. Emmerich and Mastraum which show that an extract from the various tissues and the blood of rabbits which have been made proof against swine erysipelas is an excellent remedy for the disease, and that a hypodermic injection of the extract can serve as a rational protective inoculation. A rabbit was inoculated by having injected into the posterior auricular vein the fifth of a cubic centimetre of a fresh broth culture of swine erysipelas, diluted with fifty times its volume of distilled water. In the course of the following week or two a series of hypodermic injections of the same liquid was administered. For the purpose of preparing a liquid extract suitable for therapeutic or prophylactic purposes, the organs of the rabbit were cut up and submitted to a pressure of from 300 to 400 atmospheres, and the expressed juice filtered into sterilized bottles. A large number of white mice as well as rabbits were now inoculated with the swine erysipelas, and at the same time, or very shortly afterwards, an injection of the liquid

extract was administered to some of them. These remained alive, while all the others — that is to say, those which had not received an injection of the liquid extract of the organs of the infected rabbit — succumbed. Other experiments were carried out by which it was shown that this same liquid is capable of conferring immunity from the disease. Further experiments were made which showed that the bacilli were destroyed in six hours, and that in eight hours all were dead, or at least incapable of multiplication, but that the liquid extract produced extremely little effect upon the same bacilli outside the organism, so that the presence of living cells is evidently necessary for the destructive effect of the liquid extract to manifest itself. Another interesting result obtained was that bacilli taken fresh from the body were very much more active than their cultures in broth.

— A National Conference on University Extension is to be held in Philadelphia on Dec 29, 30, and 31. Representatives will attend this conference from all the leading colleges and universities of the United States and Canada, and delegates will be present from abroad. An opportunity will be given for the fullest acquaintance with this system of teaching, and discussions will be held on points in connection with its development in America.

— It is known that ozone can be abundantly produced by the electric silent discharge, and many years ago Siemens devised an "ozone-tube" for the purpose, consisting of two thin glass tubes, one within the other; the inner lined, and the outer coated, with metal, to which alternating currents of high tension are brought, acting on the gas to be ozonized within. From recent experiments in Siemens and Halske's laboratory, says *Nature*, it appears that a good result may be had with only one dielectric, and for this not only glass, but mica, celluloid, porcelain, or the like, may be used. Thus the ozone-tube may be arranged with a metallic tube within, and the outer tube a metal-coated dielectric; or the inner metal tube may have a dielectric coat, while a metal tube is the enclosing body. As metals that are little or not at all attacked by ozone, platinum, tin, tinned metals, and aluminium are recommended. Through the inner tube flows cold water, and through the space between the tubes air, dried and freed from carbonic acid. Several such tubes may be combined in a system, and worked with alternate currents (for single tubes the continuous current with commutator is best). An apparatus of this kind is now at work in the laboratory, yielding 2.4 mg. of ozone per second. Experiments are being made in supplying compressed ozone for technical use; and this has been accomplished with a pressure of nine atmospheres. One use of ozone, on which Herr Frölich lays special stress (in the recent lecture from which these data are taken), is the disinfection and sterilization of water. And doubtless with an abundant supply of the substance, the use of it would be greatly extended.

— A statement of the operations of the Missouri Geological Survey during the month of November has been issued by the State geologist, Arthur Winslow. Detailed mapping has been prosecuted in Henry and Benton Counties, and about 135 square miles have been covered. Field work of this kind is now suspended with the approach of winter, and the members of the party will be engaged during the winter months in plotting the results of the past season's work. Inspections of iron ore deposits have been made in Crawford, Dent, Phelps, Butler, Carter, Shannon, and Howell Counties. Inspections of zinc and lead deposits have been made in Crawford, Franklin, Washington, and Jefferson Counties. Inspections of coal deposits have been made in St. Clair County. The crystalline rocks have been mapped over an area of about 300 square miles in Washington, Iron, and Crawford Counties. In Greene County geological mapping has been prosecuted in six townships. Further, a small amount of work has been done in the north-western part of the State, in the study of the glacial deposits of that region. In preparation for the report on the paleontology of the State, collections have been examined in Washington, Ithaca, and New York, and much valuable material has been acquired. In the office the preliminary report on the coal deposits of the State has been finished and is now ready for the printer. The preparation of the reports on the mineral waters of the State and on the paleontology has also steadily progressed. In addition, reports on the Fredericktown and Higginsville sheets have been begun. Proofs of the latter have been received from the engraver and will soon be printed and ready for distribution. Further, much work has been done in the office upon the preparation of maps and models, and material has been collected from various railways in St. Louis for a correct dictionary of altitudes and a hypsometric map of the State. The microscopic studies of the crystalline rocks is still in progress.

— The first news that has reached Europe concerning the new Danish expedition to East Greenland is dated June 29. At that date the "Hekla" was in 71° north latitude, near Jan Mayen, and far from the east coast of Greenland. The condition of the ice this summer has rendered the navigation of the Arctic Seas extremely difficult. The pack extended far to the south, and surrounded Jan Mayen with a circular barrier. The east coast of Greenland was unapproachable, and the "Hekla" was anchored for the time in a bay of the pack. Still Captain Knutsen intended to make for the Greenland coast between 73° and 76° north latitude, the ice, according to the seal-hunters, appearing to be less dense in that quarter.

— The botanic exhibition of the Appalachian Mountain Club is to be held at the club room, 9 Park Street, Dec. 9–12, inclusive, from 10.30 A.M. to 5.30 P.M. Of the specimens of flowering plants, many are foreign; but our own local flora is well represented by collections personally obtained by club members expressly for this exhibition. A good many alpine plants are shown, from the White Mountains, the Catskills, Colorado, and Switzerland. There is a fine California collection, including supplementary flower-studies in water colors; and some excellent specimens have been brought from Alaska and British Columbia. Among the flowerless plants, there is an interesting set of more than three hundred different ferns, many of them from New Zealand, the Canary Islands, Africa, and other distant regions. Fully half of the specimens are gifts to the club, so that a good beginning of a permanent herbarium has been made.

— Some interesting experiments were recently made in Boston by Edward Atkinson, to determine some questions relating to the spontaneous ignition of wood-pulp. According to an exchange the experiments were made in an Alladin oven with a thermometer to indicate the temperature. Two slabs of wood-pulp were tied in the oven, one in contact with a loose iron shelf, the other without any contact. The first ignited at 370°, the last at 430°. In two previous tests the oven was opened when the thermometer reached 425°, but the pulp did not take fire until the introduction of air, when it ignited instantly. In speaking of the matter Mr. Atkinson says: "We have been able heretofore to imitate spontaneous combustion by putting animal or mineral oil on fibrous substances; we have tried experiments by mixing mineral or paraffine oil with animal oil to determine the exact point or proportion at which the paraffine or mineral oil will prevent oxygenation of animal or vegetable oil, but there has been no apparent means of making this oxygenation visible until the present test. This test may explain the causes of many fires. Heretofore there has been no knowledge of the ignition by rapid oxygenation of a highly-heated substance, mainly carbon or almost pure cellulose, without any admixture of grease or chemical. It would appear that finely-divided and moderately heated carbonaceous material, holding air in its pores, may ignite at a relatively lower temperature than ordinary wood. It would seem well, therefore, to avoid the use of sawdust for sweeping floors, and its storage near hot kitchens. Ice-houses are known to be bad risks. A little gudgeon-grease in the sawdust and some fresh air may explain the reason."

— Professor Clarence A. Waldo, recently of the Rose Polytechnic Institute, is now at De Pauw University, Greencastle, Ind.

— Professor M. W. Harrington having been appointed chief of the United States Weather Bureau, the astronomical observatory of the University of Michigan is temporarily in charge of the newly-appointed instructor in astronomy, Mr. W. J Hussey. The former instructor, Mr. W. W. Campbell, has accepted a position as assistant at the Lick Observatory, Mount Hamilton, Cal.