FILTERS. — Dr. Currier of New York has recently been engaged in examining into the efficacy of filters and other means employed to purify drinking-water. His paper on the subject is published in the *Medical News*. He summarizes the result of the investigation as follows: Boiling sterilizes water, and within thirty minutes will have killed harmful bacteria. Drugs and other agents acting chemically, if used in amounts which are commonly safe, do not sterilize water. The prolonged heat which water undergoes in the usual process of distillation destroys all germs which may be in the water undergoing the process. Ordinary filters, even if satisfactory as strainers, fail to remove all bacteria from drinking-water. So far from lessening the number in the original water, the filtering substance may allow a more rapid multiplication than these micro-organisms would ordinarily undergo in the unfiltered water on standing; and the germs of disease, even if held back by the filtering substance, may be harbored in all filters. The finer the substance through which the water passes, and the lower the pressure, the more perfect is the action of the filter in holding back the bacteria. Of all substances thus far furnished for domestic filters, porous rebaked porcelain, carefully selected, has been found to be the best. If thick and strong enough to allow the use of a large surface, and the substance remain perfect (without flaw or break), this may yield a fair flow of clear water, free from all bacteria; yet, under our ordinary Croton pressure of one atmosphere or less, this yield is only in rapid drops, unless the apparatus be complex. To insure the permanency of this action, the filter should be occasionally sterilized throughout, by steaming or by other means; for, under prolonged pressure, various kinds of bacteria can go through, and in the copious organic matter collected on the filter some harmful micro-organisms can retain a high degree of vitality for weeks longer than they have ever been found to live in pure water. Where filtering is really necessary, it is in general best for the community that it be done carefully on a large scale through sand-beds upon which a fine layer of organic and inorganic matter is expressly produced by sedimentation, because of its valuable action in holding back the great majority of the bacteria. A bad water filtered is less desirable than a pure water in its natural state. When, therefore, filtration is employed because of real danger of infection, the filtered water should, as a rule, be furthermore boiled, as the entire absence of sediment and cloudiness does not insure that the bacteria of disease may not have made their way through the filter.

ASPHYXIATION BY ILLUMINATING-GAS. — At a recent meeting of the American Gaslight Association of Toronto, the following rules were given, to be followed when men are overcome by gas: 1. Take the man at once into fresh air. Don't crowd around him. 2. Keep him on his back. Don't raise his head nor turn him on his side. 3. Loosen his clothing at his neck and waist. 4. Give a little brandy and water, — not more than four tablespoonfuls of brandy in all. Give the ammonia mixture (one part aromatic ammonia to sixteen parts water) in small quantities, at short intervals, — a teaspoonful every two or three minutes. 5. Slap the face and chest with the wet end of a towel. 6. Apply warmth and friction if the body and limbs are cold. 7. If the breathing is feeble or irregular, artificial respiration should be used, and kept up until there is no doubt that it can no longer be of use. 8. Administer oxygen.

CANCER CONTAGION. — The contagiousness of cancer is still a mooted question. Dr. Arnaudet, in *La Normandie Médicale*, maintains the affirmative of the question, and gives the following facts to support his views: At Saint-Sylvestre-de-Cormeilles, which has a population of about four hundred persons, there were seventy-four deaths in eight years. Of these, eleven were from cancer. In the neighboring villages of Normandy, although exact figures are wanting, the death-rate from cancer is said to be nearly the same. Of these eleven cases, six occurred within a limited area, and the order of their occurrence was such as to suggest a possible connection between them. The first case was that of a man living in an elevated portion of the hamlet; the next case was a man living on the side of the hill below the first; then three cases occurred almost simultaneously in persons living close together in the valley at the foot of this hill; and the sixth patient was a near neighbor of the first, on the plateau above the valley. In none of these cases could any history of heredity be obtained, and they were all free from the reproach of alcoholic addiction. In five of the cases the cancer was seated in the stomach, and in the sixth the location of the disease was in the neck. Dr. Arnaudet believed that the germ of the disease, microbial in its nature, was carried in the water. None of the patients drank water, but they were all moderate consumers of cider, and that was the beverage that the author accused of being the carrier of the contagion. In making cider, the inhabitants of that region added water taken from the swampy ground; and the darker the color of the water, consequently the more impure, the higher it was esteemed as a diluent of the apple-juice.

NOTES AND NEWS.

THE invention and development of electric welding of solid bodies by Professor Elihu Thomson has been followed by a method of making endless pipes by the adaptation of the discovery to that purpose. This has apparently been done by Mr. Elias E. Ries of Baltimore. The smooth interior of the pipe is secured by the use of a removable refractory core, made of some insulating material, or the same object is attained by subjecting the interior of the pipe while being welded to compressed air or fluid pressure.

— In a description of the Calais harbor works in *Engineering*, occurs the following reference to the use of the water-jet for sinking the piles of the protecting dike or dam of the sluicing-basin: "The engineer in charge of this portion of the work sunk all the piles with the help of water-jets, — a system which has, of course, been in use for many years for sinking cylinders and iron piles, but which, we believe, had never been previously employed in this particular manner. The first trials were made in 1877, and the results obtained were so remarkable that the method was followed throughout nearly the whole of the work. Before this means was tried, the operation of driving a panel of sheet piling 9 feet high and 6 feet wide required 900 blows from a 1,300-pound weight, and the average time occupied was 8½ hours. The sand offered so much resistance, that the thickness of the piling had to be increased from 3-inch to 5-inch, and even then the wood was frequently broken. All these difficulties disappeared with the introduction of the water-jet, which was forced into the sand by hand-pumps through a 1-inch nozzle connected to rubber tubes. Much wider panels could be lowered in this manner, and the time of sinking was reduced to about one hour, while in many cases the operation was completed in 15 minutes. The number of blows from the falling weight never exceeded 50, and were only necessary to overcome the friction between the adjoining panels, which were tongued and grooved so as to make a tight joint. As a rule, the weight of the 1,300-pound tup resting on the head of a 10-foot pile sufficed to drive it almost instantly into its place."

— An international congress of agriculture and forestry will be held in Vienna during the summer of 1890.

— We learn from the *American Lancet* that since its establishment the Minnesota Board of Medical Examiners have had eighty-six applications for examination for a license to practise medicine. Of these, six were refused admission because they had not taken three full courses of lectures of six months each. Of the eighty entering the examination, fifty-one were found able to pass the same, and twenty-nine were rejected as not possessing the knowledge of medicine required by the board. Of those passing, forty-nine are regular, and two are homœopathic. Of those rejected, eighteen were regulars, eight homœopaths, and three eclectics. Students from two-term medical colleges cannot even get a chance to be examined in Minnesota.

— An improved method of producing phosphorus has lately been patented in Paris. It consists, as described in *The Engineering and Mining Journal*, in treating bones or powdered mineral with nitric acid. A large proportion of the calcium is then removed from the solution — on the addition of potassium sulphate to liquid — in the form of calcium sulphate. The liquid then contains phosphoric acid and potassium and calcium nitrates. After removing the precipitated calcium sulphate by means of filtration, sufficient mercurious nitrate is added to precipitate the phosphoric acid as mercury phosphate. The phosphate of mercury so ob-

tained is collected and dried, and afterwards distilled with carbon, when mercury and then phosphorus are distilled over. The mercury may be reconverted into nitrate to serve as a second charge; and the liquors, after removing the mercury phosphate, yield, on adding more potassium sulphate, a solution from which potassium nitrate can be crystallized.

— According to the Rome correspondent of the London *Daily News*, the Pope has decreed, owing to the wishes expressed by Padre Denza more than a year ago, that the works for the Astronomical Observatory, to be erected in the Vatican, are to be begun at once. The site selected is the tower over the rooms occupied by the master of the Sacred College, it being the most elevated building of the Vatican Palace. The cost is estimated at a million of francs.

— It is reported in the Chinese press that the Marquis Tsêng, so well known in Europe as the ambassador of China to this country, has been appointed to the control of the Foreign Science College in Peking.

— The Botanical Gardens at Edinburgh are now for the first time opened to the public on Sundays.

— Dr. John Gibson, who has for some time been engaged in superintending the physical work of the Fishery Board for Scotland, has recently completed a series of investigations which are likely to throw considerable light on the problems connected with ocean-currents. The detailed results will appear in the next annual report of the Fishery Board; but, from a preliminary note communicated to the Royal Society of Edinburgh, *Nature* states that it appears that two chemically distinct kinds of sea-water are present in the North Sea. The difference between these two waters is rendered perfectly distinct by sufficiently accurate determinations of the relation between chlorine and density, and is not due to river-water flowing into the North Sea. Water in which the relative proportion of chlorine is high reaches the North Sea from the surface of the Atlantic, round the north of Scotland and also through the English Channel, while water in which the relative proportion of chlorine is low flows into the North Sea from the north, and has been found on the surface as far north as 79° north latitude. The determinations of chlorine and density in the samples of ocean-water collected during the "Challenger" expedition, as published in the "Challenger" reports, seem to show that similar differences of composition exist in ocean-waters. To judge from these determinations, the mass of ocean-water, especially in southern latitudes, approximates in chemical composition to that flowing, as above mentioned, into the North Sea from the surface of the Atlantic. The water in which the relative proportion of chlorine is less appears to have been met with chiefly to the north of the equator and to the south-west of the principal outlets from the Arctic Ocean. This, as well as its chemical composition, seems to point to an Arctic origin.

— A catalogue of minerals and synonymes alphabetically arranged for the use of museums, by T. Egleston, Ph.D., has been published as Bulletin No. 33 of the United States National Museum. This catalogue was commenced in the year 1867, for use in arranging the collections of the School of Mines of Columbia College; but after many months' labor, when the work was nearly completed up to that date, it was abandoned on account of the press of other duties. In the last year, however, having occasion to make some investigations, and finding it almost impossible to get at the different synonymes of the various minerals on account of the imperfections of the indices of the various works, the work was taken up again and finished. It was found that the progress of the science since 1867 had been so great that the work previously done had to be altogether abandoned, so that all that is left of it is the general plan. It is hardly to be hoped that this catalogue is without errors, or that every name which has been published has been found. There are, however, several thousand more names contained in it than in any other published index.

— In 1885, after peace had been declared between France and China, the viceroy, Li Hung Chang, obtained the imperial sanction for opening military and naval schools at Tien-Tsin, where Chinese pupils could receive instruction in Western sciences. Consul Smithers of Tien-Tsin says that the military school has been in operation five years, and has 150 pupils. It has four German professors, and the instruction is entirely in the German and Chinese languages. The naval school is divided into two departments, — the executive, for the training of naval officers; and the engineering, for the training of engineers. The number of pupils is 120, selected from the different provinces of the empire, and the length of the course is five years. The director of studies is assisted by three English professors, two of whom belong to the English Navy. The director himself, Yen Tsung Kwang, is a graduate of the foreign school at Foochow, and has served in the navy. A school for instruction in telegraphy was organized in 1880, and at present has forty-eight pupils. The instructors in this school are Danes, but the instruction is given in the English language. A local medical school, with a hospital attached, was founded some years ago by the viceroy. This school is now about to be re-organized, with an eminent foreign doctor at its head, the object being to qualify young men for the medical profession, and attach them to the army and navy as well as other branches of the public service. In addition to the schools already mentioned, Consul Smithers, writing under date of the 31st of December last, says that an Anglo-Chinese college was to be opened early in 1889. The building for this college was commenced in 1887. It is a fine Gothic structure situated on the left bank of the Peiho, and has accommodations for 300 students. In conclusion, the United States consul says, "When it is considered that hitherto the officers in the Chinese army and navy below the rank of general and admiral have been taken from the uneducated classes, and have obtained their commissions often by purchase, and that both branches of the service have been without a medical staff, the importance of the educational establishments at Tien-Tsin, promoted and fostered by the viceroy, cannot be overestimated."

— In an article on the Strong locomotive, in the May number of the *Engineering Journal*, it was stated that the run which the Strong engine made from Jersey City to Buffalo on the Erie Railroad was the longest continuous run of which we have any record, with the exception of a trip from Jersey City to Pittsburgh on the Pennsylvania Railroad some years ago. This statement, which was made from memory and without investigating the records, was, it appears, erroneous, and is corrected in the June issue. The train, which was famous at the time as the "Jarrett and Palmer Fast Train," and which ran from Jersey City to San Francisco in 84 hours, was drawn over the Central Pacific Railroad from Ogden to Oakland, 879 miles, by a single locomotive, which, like the Strong locomotive, made stops at several points. The greatest speed attained at any point on the journey was 60 miles an hour; the average speed for the whole distance, 36.8 miles an hour. The engine which made this very unusual run was an ordinary eight-wheel engine, No. 149, built by the Schenectady Locomotive Works, having 16 by 24 inch cylinders and 5-foot drivers. Only the necessary stops were made, and the full time was 23 hours, 59 minutes. As before noted, while neither this run nor the run of the Strong locomotive were continuous in a certain sense, both of the engines having made stops at several points, the run made from Jersey City to Pittsburgh on the Pennsylvania Railroad was really continuous, the engine having gone over the entire distance without stopping, water being taken up from the track-tanks on the way. This, of course, does not detract from the work done by the Strong engine: it only shows that such runs can be made on occasion; but their rarity goes to prove that the making them is too much for the ordinary locomotive.

— The United States steamship "Yantic," Commander C. H. Rockwell, U.S.N., commanding, sailed from New York, May 11, on a cruise off the coast to destroy derelict vessels, information regarding which was supplied by the United States Hydrographic Office. May 18, in latitude 37° 35′ north, longitude 69° 55′ west, she sighted the water-logged schooner "Alice Borda," of Camden, N.J., with deck-houses, hatches, and mizzenmast gone, mainmast out of step and leaning forward. Torpedoes were exploded astern, under the bilge on each side, under the heel of the bowsprit, and inside the port quarter, breaking her up very well. She was then set on fire, and, it is supposed, went down on the night of the

19th, although it was very difficult to destroy her, being lumber-laden. Unfortunately the "Yantic" encountered a hurricane of great violence the afternoon of the 21st, by which she was dismasted and compelled to give up her cruise and return to New York.

— Erastus Wiman, in a letter to the editor of the *Railroad Gazette*, states that the use of mica, ground by the cyclone pulverizer, as a lubricant, is assuming very great importance in connection with railways. The managers of a cyclone plant, which has been erected at Denver for the New Mexico Mica Mining Company, have ground mica to such an excessive fineness that the tests of the material as a lubricant have been very successful. A letter just received from Denver states that on the Rock Island Road the mica experiment was very satisfactory. They cooled off journals that came in heated, by applying mica, and the agent reports that one which came in very hot was sent forward as soon as the mica lubricant had been applied. The train despatcher received reports from different stations on the road, that it had cooled off, and was running all right. The experiments that have been made with mica lubricant and mica dope have been successful. The one was made with crude oil and mica, and the other with mica and the residuum from the wells, being a very much cheaper grade of oil. The officials of the Union Pacific and of the Denver and Fort Worth Roads have applied for the privilege of a test. It will be curious if this singular mineral should be found to be a lubricant, to serve so useful a purpose as that of a substitute for that crudest of devices, a huge clot of waste saturated with oil.

— The American steamship "Santiago," Captain Allen, passed through the centre of a water-spout on April 29, latitude 25° 38′ north, longitude 76° 47′ west. The detailed report forwarded by Chief Officer Calloway is one of the best ever received by the United States Hydrographic Office.

—Professor J. Burkitt Webb of Stevens Institute, Hoboken, N.J., is conducting a series of experiments with graphic reproduction processes, there being quite a need of some method whereby he can distribute diagrams and plates on graphical statics of a nature that cannot be set up in type, and yet would not repay the cost of engraving. Notwithstanding all the efforts of inventors, this problem does not seem to be solved, as the processes in vogue either yield poor results or involve much labor or cost.

—Recent analyses of commercial fertilizers and manurial substances sent to the Massachusetts State Agricultural Experiment Station for examination show that both cottonseed-meal and linseed-meal must be counted among our cheapest concentrated fodder ingredients, on account of the high commercial value of the fertilizing constituents they contain, varying from $22.70 to $25 per ton in the former, and from $21.76 to $24.04 in the latter. The samples of linseed-meal differed somewhat in their mechanical condition, which may be merely incidental. Their variation in composition, if obtained from the same lot of seed, is mainly due to the particular mode used to secure the oil of the seed. The old process consists in the use of a powerful press; the new process, in the abstraction of the oil by means of benzine or bisulphide of carbon. The latter mode of treatment aims, for enonomical reasons, at a more complete abstraction of the oil than the press can accomplish. To this circumstance it is mainly due that, as a rule, the meal obtained by the use of the old process contains in the same quantity more oil and less nitrogen containing organic constituents than that obtained by the new process.

— William Wallace, the chimney-repairer, is never out of work. He sets up his own peculiar device for staging, which enables him to complete a job in about the time that it takes to erect an ordinary staging. "Steeple Jack," as he is called, first places a long light ladder against the chimney that is to be operated on. Then, mounting it, he drives a peculiarly shaped iron pin into the brickwork, and binds the top of the ladder fast to this pin. Standing on the top round of this ladder, he drives another pin into the chimney as high above his head as he can reach. A rope is then passed over this pin, and made fast to a round in a second ladder about three feet from its bottom round. This ladder is then hoisted up until it rests on top of the first ladder. It is then made fast to the lower pin; and then "Steeple Jack" mounts to the top of it, and, driving in another pin, secures the top round to that. From this ladder a third is hoisted as before; and Jack and the ladders, as many of them as may be necessary, continue to rise as far as may be desired. It is estimated that he has climbed about fifteen miles up into the air in this way. The only accident he ever met with was at Mansfield, Mass., when he fell from a chimney with a ladder. He landed in a tree, however, and escaped injury. His set of ladders is his only staging, and he can mount a 180-foot chimney in three hours. He raises his own brick and mortar by standing on top of the chimney and pulling them up. He learned his trade with the original "Steeple Jack Davis," in England, and has travelled extensively through Europe with his ladders, besides working in most of the large cities in this country.

— The Astley-Cooper prize, of a value of $1,500, will be awarded in 1892. The question proposed is "The Influence of Micro-organisms upon Inflammation." The papers of those contesting for the prize should be written in English or accompanied by an English translation, and should be addressed before the 1st of January, 1892, to the Guy Hospital, London. The prize will not be awarded to two or three working together.

— The ship "Hvidjörnen" arrived at Copenhagen on May 21 from Greenland, having on board Dr. Fridtjof Nansen and his companions, who succeeded in crossing Greenland from east to west on snow-shoes. The members of the expedition received an enthusiastic welcome from a large crowd. Dr. Nansen has made further report of the experiences of his party in their journey across the Greenland ice. Before they got a landing on the east coast, they drifted for twelve days in the ice in the boats in which they had been left by a Norwegian sealer. They strove hard to reach the shore, but thrice, when on the point of succeeding, were carried out again to sea. For a whole day and night they expected to perish in the tremendous breakers of the sea against the ice rim. Dr. Nansen's account of his adventures, as it appears in the London *Daily News*, contains the following: "After two days, near the dreaded glacier of Puisortok, we met a native camp of about seventy men, part of whom were bound for the north. We were glad of the meeting, and counted on valuable help from their knowledge of the currents on the coast. We were, however, disappointed, for, instead of taking the lead, they let us break the ice, and contented themselves with following in our wake. Some days after, having reached latitude 63¼°, some other natives who saw us took to flight, thinking us supernatural beings, though we made signs that we wished to be good friends. We took no brandy. At first it was warm in the daytime, and we walked at night; later we reversed the proceeding. At first there were plenty of wide crevices, and we had to be constantly on the alert to prevent an accident. On the third day a downpour of rain commenced, which kept us in our tent for three days. When we proceeded, no drinking-water was to be had: we were forced to melt the snow for cooking purposes and for our tin bottles. When we had altered our course, we got a side wind, and rigged masts and sails on the sledges, made of the tent flooring and tarpaulins. The wind abating, we had to give up sailing, and used our snow-shoes and skates. The drifting snow hampered our progress, but the surface was still even like a floor, and the ground still rose, till, at the beginning of September, we had climbed to a height of 9,000 feet. We were now on an extensive plateau like a frozen sea. We were more than two weeks passing over it. The cold was most severe, the thermometer falling below the scale, and, as I calculate, no less than 50° below zero Centigrade. One morning I found that in the thermometer under my pillow the spirit had receded below 40° into the ball. On Sept. 7 a severe snow-storm nearly overturned our tent, and on the next day we were overtaken by an awful drift. The tent was completely buried, and we had to dig it out. On the 19th there was again a favorable wind, and we lashed the sledges together, and, as we used the sails, it was unnecessary to pull. We held on to the sledges, standing on our snow-shoes as we rattled down the slope at a splendid rate. It was the pleasantest skating I ever had in my life. The same afternoon we sighted the first hilltop on the western coast. It was already dusk when we noticed a dark object ahead, and, rushing on, we discovered a fearful

crevice, which brought us to a sudden stop. It was high time: we were already on the very edge, and in two seconds more we should have been swallowed up in the bottomless abyss. We came across several more, and, in spite of the greatest care, we had other hair-breadth escapes. Once we were within an ace of destruction through a snow-bridge falling."

— The *Journal de la Chambre de Commerce de Constantinople* says that the cultivation of the red-pepper plant occupies a very important place among the several branches of cultivation practised in Turkey. This cultivation is chiefly making progress in the cantons of Karadja Abad, in the districts of Vardar Yenidje and of Védine, vilayet of Salonica. Formerly the production of red pepper was unimportant, for it was limited to the requirements of local consumption in the vilayet; but, since foreign countries have bought these peppers, cultivation has rapidly extended. The plant itself prefers a sandy and humid soil, where it grows sometimes almost in the water. It is estimated that the plant produces from 120 to 400 okes (oke = 2.84 pounds) of pepper per deunum (deunum = 40 square paces), according to quality. On an average, the expenses do not exceed 300 gold piastres for the cultivation of each deunum; and an oke of this pepper costs from 30 paras up to 5½ piastres, according to quality. The profit realized on the average is from 300 to 350 piastres per deunum. Harvesting only commences when the plants are entirely red. The produce of the first gathering is of superior quality; but that of the last is bad, as the pepper-plant reddens imperfectly in the autumn. This year the yield of red pepper has reached, in the canton of Yenidje Karadja Abad, the figure of 350,000 okes, and in that of Védine Karadja Abad, about the same amount. Of this yield, 45 per cent is exported to Europe; 30 per cent to Bulgaria, Servia, and Austria-Hungary; the remainder being sent to different parts of the Turkish Empire.

— The seed-trade appears to be destined to a very great expansion in California at a not very distant period. In the single county of Santa Clara, not less than 1,200 acres are now devoted to the production of garden-seeds. Over 60,000 pounds of lettuce-seed, and 120,000 pounds of onion-seed, have been shipped east from these grounds in a single season. In other counties a quite important business has been developed in the production of clover-seed, beans, and peas, for the supply of distant markets. While that State may not secure the monopoly of the seed-business, because good seeds are grown in the Atlantic States, the rapid increase of business in California indicates that one, at least, of the great centres of the seed-business, is to be in that State. The quality of many small seeds produced there, such as onion and lettuce, will have much to do in bringing the seed interest into greater prominence.

— The June *Magazine of American History*, with which its twenty-first volume is completed, opens with a sketch of "The Historic Capital of Iowa," now the seat of the State University, written by Mrs. Eva Emery Dye of Iowa City. The second contribution is an account of "The Ancient and Honorable Artillery Company of Massachusetts," by C. E. S. Rasay, M.A., the romantic story beginning with the first settlers of New England, and closing with the recent interchange of civilities between the Ancient and Honorable London and American Artillery Companies, the two oldest military organizations in the world. Following these, Georgia divides the honors of the number with Iowa and Massachusetts in an able article by T. K. Oglesby, on "Georgia and the Constitution." "The Last Twelve Days of Major John André," by Hon. J. O. Dykman, unfolds a suggestive field of study, and is to be continued through two future issues of the magazine. "A Boston Writing School before the Revolution," by William C. Bates, gives a picturesque picture of men and scenes in that early period. No feature of the June number, however, will be likely to attract more attention than the "Evolution of the Constitution," by C. Oscar Beasley. "The Study of the Mental Life of Nations," by Franklin A. Beecher; a hymn, "The Washington Centennial," by J. R. Barnes; "A Hundred Years to Come," by an unknown author; and three letters of Hon. Roger Griswold to his wife, contributed by Mrs. J. Osborne Moss, — may be noted.

— Since salicylic acid has been prohibited for the preservation of drinks and foods, some brewers have undertaken to use benzoic acid for the preservation of beers. In doses of five to six grams to the hectolitre, benzoic acid, if not especially poisonous, is at least active in preventing to a noticeable extent the assimilation of the albuminoids, and in modifying the mucous secretions. From this result digestive troubles in those persons who continue to use it for any length of time. Notwithstanding the small amount used industrially, it is probable that this use should be prohibited, as is that of salicylic acid. All antiseptics interfere with the normal digestive powers of the human system, and consequently with proper nutrition, and it is necessary that their use in the industries should come to an end.

— Professor F. E. Nipher made a verbal report at a meeting of the Engineers' Club of St. Louis, May 15, on a recent investigation into the performance of an engine working at a fixed cut-off without governor. Measuring the brake horse-power, the pressure of the supply-steam, and speed, he finds that the performance of the engine is represented by an hyperbolic paraboloid, in which the lines of constant load and the lines of constant speed are rectilinear elements. At any fixed pressure, the relation between output and speed is represented by a parabola, the vertex of which represents a condition of maximum output. The condition of maximum output at any pressure is, that the moment of the force on the brake-arm must be one-half that moment, M', which will bring the engine to rest, while the speed must be one-half that speed, N', which the engine would have if the load were entirely removed. The maximum output is then in horse-power, $\frac{\frac{1}{2}\pi}{33000} M'N'$. Professor Nipher stated that he should proceed to determine whether mean effective pressure might be substituted for pressure of supply-steam. His present opinion was that it could. In that case, indicated horse-power could be represented as a function of the same coördinates, P and N. The equation for indicated horse-power is $PN = \frac{33000}{\frac{1}{2}\pi R^2 L}$ (indicated horse-power), where R is piston radius, and L is stroke. This is also an equation of the hyperbolic parabola, the axes of which are in an entirely different position from those of the surface of brake horse-power. Both surfaces contain the pressure axis. The difference between the two horse-power ordinates will give the real engine friction for any load and speed. It follows from these equations that the work consumed in the friction of an engine is constant for all loads if the speed is constant.

— Two naturalists, the one a Hollander, and the other a German, — Messrs. Kannegieter and Fruhstörfer, — have just started on a zoölogical exploration to Borneo, Java, and Sumatra.

— At the meeting of the Royal Meteorological Society, London, May 15, Mr. W. H. Dines gave an account of some experiments made to investigate the connection between the pressure and velocity of the wind. These experiments were made for the purpose of determining the relation between the velocity of the wind and the pressure it exerts upon obstacles of various kinds exposed to it. The pressure-plates were placed at the end of the long arm of a whirling-machine which was rotated by steam-power. The author gives the results of experiments with about twenty-five different kinds of pressure-plates. The pressure upon a plane area of fairly compact form is about a pound and a half per square foot, at a velocity of twenty-one miles per hour; or, in other words, a pressure of one pound per square foot is caused by a wind of a little more than seventeen miles per hour. The pressure upon the same area is increased by increasing the perimeter. The pressure upon a ¼-foot plate is proportionally less than that upon a plate either half or double its size. The pressure upon any surface is but slightly altered by a cone or rim projecting at the back; a cone seeming to cause a slight increase, but a rim having apparently no effect. At the same meeting Dr. C. H. Blackley told of an improved method of preparing ozone paper, and other forms of the test, with starch and potassium iodide. Some years ago the author made some experiments with the ordinary ozone test papers, but found that the papers did not always give the same result when

two or more were exposed under precisely the same conditions. He subsequently tried what re-action would take place between unboiled starch and potassium iodide when exposed to the influence of ozone; but the difficulty of getting this spread evenly upon paper by hand, so as to insure a perfectly even tint after being acted upon by ozone, led him to devise a new method of accomplishing this. Briefly described, it may be said to be a method by which the starch is deposited on the surface of the paper by precipitation; and, for delicacy and precision in regulating the quantity on any given surface, it leaves very little to be desired.

— A large number of experiments have been carried out at Innsbruck by Professor Peyritsch, and are recorded in the "Transactions of the Imperial Academy of Vienna," vol. xcvii. i. p. 597, tending to show that double flowers may be artificially produced by the agency of a mite (*Phytoptus*). It seems that the professor was examining a wild double flower of *Valeriana tripteris*, and discovered that it was infested with the mites in question. He transferred these mites to other plants, chiefly of the orders *Valerianaceæ* and *Cruciferæ*, and a few *Scrophularineæ*, *Commelynaceæ*, and even others; but the best results were obtained in the first named. Various kinds of doubling were produced, such as petalody of the stamens and pistil, prolification and duplication of the corolla, etc., as well as torsions and fasciations of the shoot. The leaves were also affected, the margin showing teeth like those of a comb. By infecting the plant at different times, either the leaves or the flowers may be influenced, and it appears that the parasite must attack the organ in its earliest stages. Professor Peyritsch thinks that there are certain mites which produce double flowers in certain plants, as the mites in which he was particularly interested were always most abundant in certain species, and less so in others.

— The introduction of *Phylloxera* into Asia Minor appears to have been the result of a deliberate importation of the vines from a country where the disease was known to exist.

— An interesting note, by Mr. Arthur A. Rambaut, on some Japanese clocks lately purchased for the Dublin Science and Art Museum, has been reprinted from the "Proceedings of the Royal Dublin Society." These clocks, though differing in other respects, agree in this particular: that the time is recorded, not by a hand rotating about an axis, but by a pointer attached to the weight, which projects through a slit in the front of the clock-case. This pointer travels down a scale attached to the front of the clock, and thus points out the hour. Mr. Rambaut has consulted several persons who have been resident for some time in Japan, but none of them has ever seen clocks of like construction in actual use. A young Japanese gentleman to whom the specimens have been shown, says that he has heard of such clocks being used in rural parts of Japan about twenty or thirty years ago, but that they have been almost completely superseded by clocks made on the European plan.

— An international congress of chronometry will be opened at the National Observatory, Paris, on Sept. 7. An influential organizing committee has been formed, of which Vice-Admiral de Fauque de Jonquières has accepted the presidency. Those who wish to become members should communicate with the secretary, M. E. Caspari.

— *Engineering* reports that arrangements have been made for the despatch of another exploring and prospecting expedition for the Australian interior. The funds for the undertaking are to be chiefly provided by the Central Australian Exploring Association, which is an offshoot of the South Australian branch of the Geographical Society. Baron von Muller of Melbourne has taken an interest in the enterprise, and it is hoped that a portion of the funds available for exploration in the hands of the Geographical Society in Victoria will be placed at the disposal of the expedition. The leadership of the party has been undertaken by Mr. W. H. Tietkens, an experienced Australian explorer. The party will probably consist, in addition to the leader (upon whom will also devolve the duties of botanist, prospector, mineralogist, and surveyor), of three men and a black boy, with twelve camels, two horses, and provisions for six months. The starting-point will be Alice Springs, and the expedition, travelling ordinarily at the rate of one hundred miles per week, except when engaged in the work of prospecting, will proceed to Lake Amadens with a view to examining carefully the surrounding country.

— The Paris correspondent of the London *Daily News* says the Zoölogical Society of France has warned the French Government that a great ornithological calamity is impending. The Department of the Bouches du Rhône has hitherto been one of the chief landing-places for swallows coming from Africa. Engines for killing them, formed of wires connected with electrical batteries, have been laid in hundreds along the coast. When fatigued by their over-sea flight, the birds perch on the wires, and are struck dead. The bodies are then prepared for the milliner, and crates containing thousands of them are sent on to Paris. This has been going on for some years, and it has been noticed this spring that swallows have not landed on the low-lying coast, but have gone farther west or east, and that they go in larger numbers than formerly to other parts of Europe. There are places, says the Zoölogical Society in its petition, where they used to be very numerous, but which they have now deserted, although there has been no falling-off in the gnats and other flying insects on which they live.

— A sub-committee of the Royal Agricultural Society of South Australia has undertaken to raise subscriptions in aid of the destruction of sparrows in South Australia, and it is proposed to have monthly competitions in the production of sparrows' heads and sparrows' eggs. These competitions will take place after the next autumn show in Adelaide. At the autumn show there will be a grand prize competition, when prizes of £2, £1 10s., 10s., and 5s. will be offered for the largest numbers of sparrows' heads, and the same value in prize-money will also be offered for the largest numbers of sparrows' eggs. Additionally to this, every competitor who fails to secure a prize, and yet brings in one hundred or more heads or eggs, will receive a bonus of 2s. 6d., and any one producing under one hundred and not less than fifty heads or eggs will receive a bonus of 1s.

— A report comes to the Entomological Museum, Washington, from Mr. J. W. Beach of Batavia, Boone County, Ark., to the effect that a general alarm prevails in that section of the country for many miles around in regard to the chinch-bug. They did a considerable amount of damage there last year, and those that wintered over have already destroyed many fields of grain this spring. The wooded country in places is reported full of them; so much so, that the people are contemplating setting fire to their woodlands.

— The weight of the smoke-cloud which daily hangs over London has been estimated by Professor Chandler Roberts, says the *Engineering Times*, to amount to about 50 tons of solid carbon and 250 tons of carbon in the form of hydrocarbon and carbonic-oxide gases. Calculated from the actual result of tests made by the Smoke Abatement Committee, the value of coal wasted in smoke from domestic grates amounts, upon the annual consumption of 5,000,000 of people, to £2,256,500. The cost of cartage on this wasted coal is calculated to be £268,750, while the unnecessary passage of about 1,500,000 horses through the streets in drawing it, adds seriously to the cost of street cleaning and repairing. Then there is the cost of taking away the extra ashes, £43,000 per year. Summing it all up, the direct and indirect cost of waste coal may be set down at £2,600,000, plus the additional loss from the damage done to property caused by the smoky atmosphere, estimated by Mr. Chadwick at £2,000,000, the whole aggregating £4,600,000.

— "The Summer Care of Children" is made the subject of a timely paper in the June number of *Babyhood*, by Dr. H. D. Chapin. Equally practical is the article on "Nursery Cookery," by Dr. Sarah E. Post. Other articles of interest to parents are, "The Musical Education," "Where shall we spend the Summer?" "Botany for the Little Ones," etc. Much valuable advice is offered concerning earache, the promotion of the suckling power, and the many questions of food, dress, etc., asked by correspondents.