a telephone line on the next house, and in one case through an iron crane. In all cases where the pipes were the conductors, the path of the discharge could be clearly traced up to them, and then ceased. One of the cases of discharge through the gas-pipes occurred in an ordinary dwelling-house provided with a lightning-conductor, from which the discharge had passed over a distance of about two metres to the pipes. Subsequent tests showed that the conductor-earth had a resistance of 138 ohms. In no case was any damage done to the pipes by the discharge occurring through them.

NOTES AND NEWS.

THE following is a complete list of the papers presented and read to the National Academy of Science, at its meeting in April: "On Composite Coronagraphy," by D. P. Todd; "Additional Experimental Proof that the Relative Co-efficient of Expansion between Baily's Metal and Steel is Constant between the Limits Zero and 95° F." (read by title), by W. A. Rogers; "Notice on the Method and Results of a Systematic Study of the Action of Definitely Related Chemical Compounds upon Animals," by Wolcott Gibbs and Hobart Hare; "On Sensations of Color" and "Determinations of Gravity," by C. S. Peirce; "On the Pliocene Vertebrate Fauna of Western North America" and "On the North American *Proboscidia*," by E. D. Cope; "On the Mass of Saturn," by A. Hall, jun.; "On the Nature and Composition of Double Halides" (read by title), "On the Rate of Reduction of Nitro-Compounds," and "On Some Connection between Taste and Chemical Composition," by Ira Remsen; "Recent Researches in Atmospheric Electricity," by T. C. Mendenhall; "Measurement by Light-Waves," by A. A. Michelson; "On the Feasibility of the Establishment of a Light-Wave as the Ultimate Standard of Length," by A. A. Michelson and E. W. Morley; "On the General Laws pertaining to Stellar Variation," by S. C. Chandler; "Review of the Trivial Names in Piazzi's Star Catalogue," by C. H. F. Peters; "On Cretaceous Flora of North America," by. J. S. Newberry; "Terrestrial Magnetism" (read by title), Cleveland Abbe; "Spectrum Photography in the Ultra-Violet," by Romyn Hitchcock; "North American *Pelagidæ*" (read by title) and "Development of Crustacea" (read by title), by W. K. Brooks; "The Plane of Demarcation between the Cambrian and Precambrian Rocks," by C. D. Walcott; "Report of the American Eclipse Expedition to Japan, 1887," by D. P. Todd.

— While it will be a long time before compound locomotives will be in extensive use in the United States, the time is not far distant when, in the opinion of the *Railroad Gazette*, they will receive considerable attention and extended trials on our railroads. The demand for decreased operating expenses is becoming too strong, particularly the demand made for a more economical use of fuel, to permit the discouragement of any promising innovation which indicates the possibility of a reduction of fuel-consumption. The saving which is claimed for the double-expansion locomotives in Europe, fifteen or twenty per cent, is sufficient, when applied to the coal-bills of some of our Western roads, to pay a dividend of one per cent; and it is not likely that such a promised saving, offered with so little radical change as that resulting from the introduction of double-expansion engines, will be allowed to pass without notice. It would be well to remember that there is no inherent evil in the compound locomotive which would render it objectionable in American railroad-service. Any representation that it cannot start heavy trains or propel them up steep grades is wholly without foundation. Some of the most powerful locomotives on the face of the earth are compound engines, working on the heavy grades in the mountains of the Eastern Continent.

— Entrance examinations for the Massachusetts Institute of Technology will be held in Boston on May 30 and 31. A second series, for those unable to be present in May, will be held on Sept. 24 and 25. For the convenience of applicants outside New England, entrance examinations will be held on May 30 and 31 in the following cities: New York, at the Fifth Avenue Hotel; Philadelphia, at the Lafayette Hotel; Montreal, at the Windsor Hotel; Chicago, Board of Education rooms, City Hall; St. Louis, office of the superintendent of public schools; Cincinnati, office of the superintendent of public schools; San Francisco, 211 Drumm Street; Washington, United States Geological Survey; St. Paul, High School Building; Pittsburg, at the rooms of the Engineers' Society of Western Pennsylvania; Kansas City, at the office of the Board of Education. Candidates for admission will be allowed, at their option, to divide their entrance examinations between two successive years. The first divided examination will be held only in June; the second, in either June or September of the following year. To be admitted to the first divided examination, the candidate must be at least sixteen years of age, and must have notified the secretary of the faculty, at least two weeks before the date fixed for the examination, of his intention to apply. This notification must be accompanied by a list of the six subjects in which he will submit himself, and by a certificate from his teacher stating that he is qualified in them.

— The Zoölogical Museum at Leyden, one of the most considerable on the Continent, we learn from *Nature*, has narrowly escaped a terrible disaster. On Monday, the 1st of this month, a fire broke out, and all the resources of the officials and of the town were taxed to extinguish it. Indeed, it was not got under until a considerable portion of the collection of specimens of hollow-horned ruminants had been destroyed. Had the accident, which arose from the defect of a flue, taken place at night instead of in the afternoon, when plenty of assistance was promptly at hand, it is believed that the whole museum would have perished. The authorities of other museums, especially those which contain many spirit preparations, should not neglect this warning.

— We have already mentioned that an international meeting of zoölogists will be held in Paris in August. The president, according to *Nature*, will be M. Milne-Edwards, and some important questions will be submitted for consideration. Among them will be the question of the unification of the language of zoölogy in classification and specific denotation. M. R. Blanchard has prepared an important report on the subject, which will be published shortly in the *Revue Scientifique*, and form the basis for the discussions at the congress.

— The Physiological Congress which is to be held in Basle in September will be attended, says *Nature*, by many French physiologists, if all those who propose to go are able to carry out their intention.

— The Eiffel Tower continues to be the hero, so to speak, of various adventures. According to *Le Génie Civil*, which is its official biographer, a story was circulated not long ago in Paris to the effect that it had begun to lean. The outline of the structure makes it very difficult to see whether it is vertical or not; and the rumor spread rapidly, until it came to be asserted that the tower would soon resemble the Leaning Tower of Pisa, to which it was constantly compared. There was no reason whatever to suppose that any movement had taken place; but the public solicitude became serious enough to make it advisable to have the matter tested, and two engineers were sent with theodolites to make a careful survey. As there are no vertical arrises in the tower, the method of observation employed was to trace the intersection of two vertical planes meeting at right angles in the centre of the tower, and bisecting each face. This was done, and the two theoretical planes were found to divide the faces of the tower with almost perfect symmetry, showing that the shaft was not inclined in any way from the vertical. On three of the sides the curvature was found to be exactly as designed, while the fourth side showed a hollow amounting to about an inch of deviation from the intended line. In another affair the tower is the aggressor, instead of being the victim of outside malice. It seems, says the *American Architect*, which is no friend of this structure, that the structure claims to be a work of art, like a picture or a statue, and to be therefore entitled to the benefit of the statutes for the protection of artistic property. Whatever rights of this kind may attach to it have been assigned to a M. Jaluzot, who has undertaken to defend his acquisition by claiming that all persons who sell photographs, models, pictures, or representations of any kind, of the tower, must pay him a royalty on such sales of twenty per cent on the price. As pictures and

photographs, to say nothing of models, large and small, in gold, brass, bronze, and many other materials, are for sale all over Paris, the royalty would amount to a very substantial sum, and some of the dealers interested have refused to pay; so that the whole question of the right of the structure to the protection accorded to pictures and poems is now before the tribunals, and the result will be awaited with some curiosity.

— The *American Architect* calls attention to an improvement recently introduced into the design of boilers, which promises to effect an important economy in the production of steam. An article in *Le Génie Civil*, by M. Lisbonne, a retired director of naval constructions, describes some experiments made with a boiler furnished with tubes having ribs, or flanges, on the inside, so as to present a larger surface for absorbing the heat of the fire. The projection of the flanges is about one-quarter of the diameter of the tube, and eight of them are spaced at equal distances around the inner surface. The tubes, which are the invention of M. Jean Serve of Gisors, are now drawn by special machinery out of brass, so that they require no soldering, and are strong and easily cleaned. The first experiments with them were made in a steamboat on the Rhone. A boat with copper tubes of the ordinary kind was carefully watched, and it was found that the combustion of one pound of coal would evaporate seven pounds of water, while the temperature of the smoke as it issued from the boiler was 680° F. The tubes were then taken out and replaced with M. Serve's tubes, and the evaporation immediately rose to nine and one-third pounds of water for every pound of coal consumed, and the temperature of the escaping gases fell to 460°. These results would seem to indicate an economy of about one-third in consumption of coal; and some other experiments, in which the quantity of coal consumed was observed, showed an actual saving of twenty-four per cent in coal. At the naval arsenal in Brest some further tests were then made by officers of the government, with the result that with natural draught the economy of coal effected by using the flanged tubes in place of smooth ones was, with a given quantity of water evaporated, fourteen per cent, while with forced draught the economy was eighteen per cent.

— *Garden and Forest* states that thousands of acres have this year been planted with fruit-trees in those districts of southern California where the "land-boomer" recently set all the world mad with speculation. In the San Joaquin valley large numbers of new settlers have lately established themselves in colonies for the purpose of fruit-growing, dividing their land into twenty and forty acre tracts. In San Diego County the acreage devoted to this industry is five times as great as it was a year ago, and in Los Angeles and many other counties it is one-third greater; and, moreover, the old "placer-mining" counties are rapidly transferring their attention to fruit, and it is now the richest crop of Tuolumne, for example, once a conspicuous centre of gold-production.

— The next congress and exhibition of the English Sanitary Institute will be held in Worcester, England, at the end of September.

— The Watson gold medal and a hundred dollars in gold, founded by Dr. James C. Watson, for the most important discoveries in astronomy, have been awarded to Dr. Edward Schonfeld of the University of Bonn, Germany. The medal is given to Dr. Schonfeld for his researches concerning the variable stars, and for his work in cataloguing the stars brighter than the tenth magnitude, from the equator to the southern tropic.

— The regents of the Michigan State University have appointed Professor John Dewey, now professor of philosophy in the Minnesota State University, to the chair of philosophy, made vacant by the death of Professor George S. Morris. Professor Dewey was for several years assistant to Professor Morris. The title of assistant professor of mechanical engineering was conferred upon Lieut. L. D. Miner, who was recently detailed for service here by the secretary of the navy. The resignation of Dr. C. H. Stowell, professor of histology, was presented and accepted, to take effect Oct. 1, as was that of Professor J. W. Langley from the chair of general chemistry and metallurgy, to take effect June 30, and Louisa Reed-Stowell, assistant in microscopical botany, to take effect Oct. 1. It is announced that the widow of the late Professor Elisha Jones has established a fellowship with $10,000, to be named after her lamented husband.

— At the business session of the National Academy of Sciences at Washington, D.C., held on the morning of April 18, a home secretary and council, consisting of six members, were elected. Professor Asaph Hall, who has served six years as home secretary, was re-elected. The members of the council elected were Professor George J. Brush of New Haven, Conn.; Gen. Francis A. Walker; Benjamin Apthorp Gould of Cambridge, Mass.; Professor Ira Remsen of Johns Hopkins University, Baltimore; Gen. Montgomery C. Meigs; and Professor Simon Newcomb. The following new members of the academy were elected: Professor Boss of Dudley Observatory, Albany, N.Y.; Professor Sereno Watson of Harvard; Professor C. S. Hastings, Sheffield Scientific School, Yale University; Professor C. A. White, United States Geological Survey; and Professor Michel of Tufts College, Massachusetts. This makes the list of membership number exactly one hundred, — the first time in the history of the academy that this number, which the unwritten law of the academy fixes as a maximum limit, has been reached.

— At a meeting on April 18, of the trustees of Clark University, the Hon. John D. Washburn, recently appointed minister to Switzerland, resigned the office of secretary of the corporation. The work of the university will begin October next in mathematics, physics, chemistry, and physiology, besides the study of languages. The departments will be gradually organized, and on the highest plane possible. While not declining to confer the degree of A.B., the university will for the present give attention to qualifying for higher degrees. Ten fellowships of four hundred dollars, ten of two hundred dollars, and ten scholarships with free tuition, have been provided for.

— From Denver, Col., Mr. J. Wylie Anderson writes to the *American Field* that on a hunt last fall, in company with F. A. Williams, he secured a very rare specimen of clustered antlers, there being thirty-two well-developed spikes, — eighteen on one horn, and fourteen on the other. Another peculiarity about them was that the four main prongs were present on each horn, and extra spikes developed on the outer surfaces of the horns, and that gave them the enormous spread, which at the widest part was thirty-eight and one-half inches. The deer was a very old one, and the beams were very large. The great spread of antlers was almost as great as those of an elk he killed on his trip. Mr. Williams has his specimen mounted, and it adorns his office walls.

— The establishment of the Blue Hill Observatory, and its equipment with means for obtaining meteorological observations of the best class, made it appear probable that the observatory of Harvard College could do more service to science by assisting in the publication of the results obtained at Blue Hill than by enlarging its own field of meteorological work. Accordingly proposals were made for co-operation between the two institutions, which, through the courtesy of Mr. Rotch, the proprietor of the Blue Hill Observatory, have resulted in the arrangement in accordance with which the "Observations at the Blue Hill Observatory" is published as a part of the "Annals of the Observatory of Harvard College." Successive volumes of the Blue Hill observations will appear in the same manner, and the ultimate consolidation of the two institutions is contemplated.

— After having experienced a period of great prosperity, the silk industry in Greece, says the *Journal de la Chambre de Commerce de Constantinople*, is now in a depressed condition. The production of cocoons, which in 1855 amounted to between 1,200,000 and 1,400,000 kilograms, fell, in the period comprised between 1870 and 1880, to about 500,000 kilograms. Since the year 1884, this quantity has still further decreased; and the production, which is centred in the south of the Peloponnesus, in Messenia and Laconia, did not exceed 200,000 kilograms of cocoons, that is to say, a yield in silk of about 18,000 kilograms, of which about 10,000 kilograms are exported. This diminution must be attributed to the disease of the silkworms and to the low price of cocoons. Almost all the cocoons and silks from Greece are shipped to Marseilles, and Calamata is the principal port for shipment.