

## EDWARD C. F. DAVIS.

While riding horseback in Central Park, New York, on the evening of August 6, Mr. Edward C. F. Davis, president of the American Society of Mechanical Engineers, and manager of the C. W. Hunt Company iron works, was killed. For our illustration and the accompanying particulars we are indebted to the Railroad Gazette. Mr. Davis was born at Chestertown, Md., in 1847. He was educated at Washington College, Maryland, having been graduated in 1866. His parents intended him for the profession of law, but he had a strong natural preference for mechanical matters, and was so resolute in his determination to become an engineer that he finally secured the consent of his parents to his making an effort in that direction. He went to Philadelphia and entered the employ of Brinton & Henderson, hydraulic engineers, as an apprentice, where he learned the arts of machinist and draughtsman. At the end of his apprenticeship he was employed by Messrs. Hoy, Kennedy & Company, of Newcastle, Del., later of Brooklyn, N. Y. After several years with this firm he went as draughtsman with the Pottsville Iron and Steel Company, and later became draughtsman and assistant to Mr. S. D. Whiting, superintendent of the Colliery Iron Works, at Pottsville, Pa.

In 1878 Mr. Davis entered the service of the Philadelphia & Reading Coal and Iron Company as mechanical draughtsman. A year later, that is at the age of 32, he was made superintendent of the company's shops at Pottsville. These shops were then being established for building and repairing mining machinery. The work of organizing this establishment fell principally upon Mr. Davis. In 1887 he became mechanical engineer for the company, which position he resigned in 1890 to become general manager of the Richmond Locomotive and Machine Works. This position he gave up last spring to take the position which he held at the time of his death.

Mr. Davis was a man who had won the personal regard of a great many of the best mechanical engineers of the country and who had before him the promise of a very useful and influential future.

## Science Notes.

**New Metal for the Electric Industry.**—It may be that before long, says the *Etincelle Electrique*, glucinium will come to assume a genuine importance in the electric industry. Of the atomic weight 91 and specific weight 2, the resistance of traction of glucinium is no greater than that of iron, and its conductivity is equivalent to that of silver. This metal is therefore mechanically more resistant than iron, a better conductor than copper, and besides is lighter than aluminum. If all these data are verified by experiment, there is no doubt that glucinium will soon be employed in electricity, and the more so in that its market value will be about twenty dollars a pound, which is about one hundred and sixty times less than the same volume of platinum and ten times less than the same weight of the latter metal.

**Is Oxygen a Simple Body?**—Mr. E. C. C. Baly, preparator to Prof. Ramsay, of University College (London), has just presented to the Royal Society of London a preliminary note tending to establish the fact that oxygen is not a simple body, as has hitherto been thought, but an association of two distinct gases. The fact that he announces is this: If oxygen be submitted to a silent electric discharge, the gas that goes to the cathode, according to the experiment, while remaining oxygen, exhibits a density sensibly different from that of non-electrified oxygen. In the case of long sparks, the density is less. The opposite is the case when short sparks are made to act. Is this as much as to say that the ordinary density of oxygen represents simply the major part of the densities of the molecules of the gas, and that the silent discharge has the effect of sorting out such molecules in assembling those that are of the same weight?

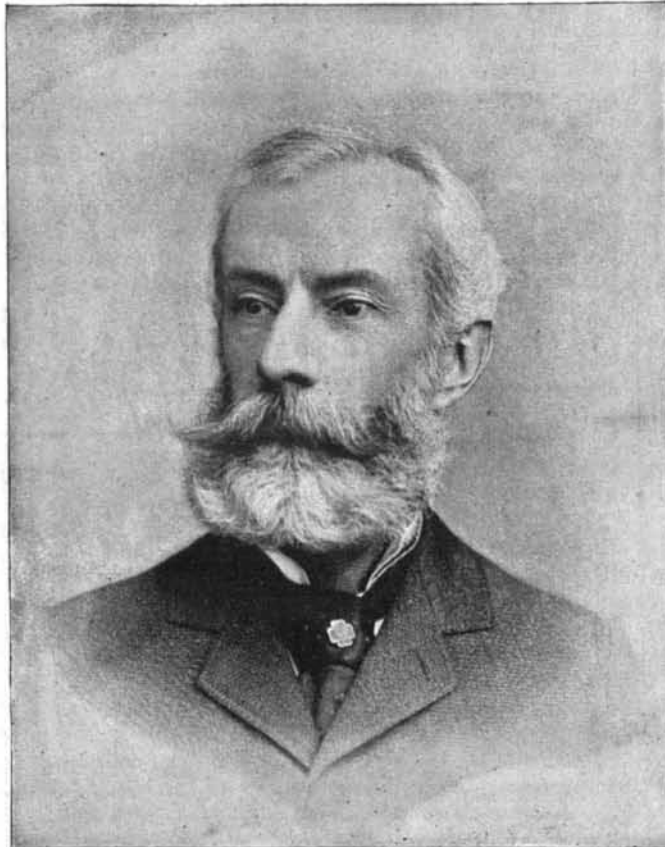
**Substitute for Guttapercha.**—According to a French exchange, a substitute for guttapercha may be prepared as follows: Tar, 1 part; paraffine, 10 parts; dissolve together at 120° and then add caoutchouc, 2 parts. Keep at this temperature until a homogeneous mass results.

**Grape Food.**—On the western edge of the Santa Clara Valley, near Los Gatos, Cal., there is a factory in which white wine grapes are crushed and their juice formed into what is called "grape food," that is, the juice is concentrated without fermentation. Fifty tons of grapes are treated every day. The process of manufacture, according to a correspondent of Harper's Weekly, is as follows: A small, but constant, stream of fresh juice flows into the upper end of a copper cylinder 19 feet long and 2 feet in diameter and inclined at a slight angle. This cylinder revolves slowly in a hot water jacket kept at a temperature of 150 degrees

F. The juice forms a film on the interior of the cylinder, the water evaporates from it under the heat, the vapor is drawn away by rapidly revolving exhaust fans, and the juice, which has taken but sixty seconds to pass through the cylinder, trickles from its lower end in a warm, sirupy stream, reduced to one-quarter of its original bulk, but retaining all its original elements except the water.

**The Aging of Alcohol Artificially.**—As the subject of alcohol is occupying a great deal of attention in France, owing to new measures being passed in the Senate for placing the manufacture under state control, a few remarks may not be out of place on the methods adopted by some firms for artificially aging alcohol, and notably brandy. The ordinary method of spraying the spirit into an atmosphere of oxygen, though improving it, without, however, giving it the qualities of age, has been greatly improved by Mr. Villon, whose process is as follows: The spirit is heated to a temperature of 70 degrees C. Oxygen is then pumped in at a pressure of from five to six atmospheres, and care is taken to maintain the pressure during twelve hours, the liquid being agitated from time to time. The spirit is then drawn off and allowed to rest for a week. The advantages of this method are that all traces of fusel oil are destroyed, without deteriorating the aroma of the spirit, at a trifling cost.

**Gelsoline.**—Speaking of gelsoline, the new fabric or material prepared from the fiber of the bark of the mulberry tree, an exchange remarks upon the singular fact of the existence of three absolutely distinct fibers obtainable from or peculiar to this tree. Thus, in addition to the ordinary silk, a strong and thick fiber for



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certain purposes may be obtained by killing the silk worm and drawing the thread from its interior. In the preparation of gelsoline, the bark is retted and the fiber treated after the manner of flax, and, after purification with soap and soda, is ready for the weaving shed. Some works in Italy, it appears, are already producing thousands of yards of the woven fabric for upholstery purposes. This new material is said to be ten times as strong as middling Orleans cotton, and to be obtainable at one-tenth the price of flax. Being perfectly round, the fiber insures a close fabric.

**The Discharge of Electric Fishes.**—Mr. D'Arsonval has studied the electric discharge of the torpedo for the purpose of determining the intensity of the discharge current and the electromotive force brought into play. He recalls that Mr. Marey has demonstrated that it is a question of a discontinuous phenomenon, and that we are in the presence of a series of discharges. In order to measure the intensity, Mr. D'Arsonval employed a special galvanometer based upon the principle of the galvanometer that he devised in conjunction with Mr. Marey, that is the mobility of a helix traversed by a current in a magnetic field of great intensity. This discharge is very powerful. Thus a torpedo 12 inches in diameter, excited by a pinching of the fin, gives an electric discharge of an intensity of 8 amperes and an electromotive force of 12 volts, which is capable of lighting incandescent lamps and of producing 6 inch sparks in an induction coil. But the discharges continue to decrease. They are from 4 to 15 in number, and succeed each other at intervals of a hundredth of a second, so that the total duration of the

phenomenon is about a tenth of a second. The electromotive force may reach 20 volts. In a second series of experiments, Mr. D'Arsonval isolated the organ that generates electricity and excited the nerves by electricity. In this case, but a single shock is observed. The internal resistance of the organ varies from 1.8 to 2.5 ohms. It increases after the discharge.

**The Rays of the Solar Spectrum.**—The fact is well known that if we examine the spectra furnished by the light emitted by the various points of the sun, the rays that appear are very variable in number. There exist but eleven that are constant, that is to say, that we find in the light derived from all the regions. Among these, five belong to hydrogen, two to calcium, and four to unknown elements. Mr. Ramsay, however, has identified one of these rays, that of helium, with the ray of a terrestrial element. There remained then but three, corresponding to extra-terrestrial substances. Mr. Deslandres has decomposed cleveite by sulphuric acid, and then, on studying the spectrum of the gas disengaged, has ascertained the existence of a ray 447.18 identifiable with one of the three remaining rays. In consequence of this discovery there exist but two unknown rays among the permanent ones of the spectrum.

**Direct Puddling of Iron.**—A new installation for the direct puddling of iron has recently been created at the Bonehill establishment at Hourpes, near Charleroi, Belgium. The iron, on coming from the furnace, flows into a reservoir of about 30 tons capacity, heated by gas, whence it is transferred, by means of a pocket mounted upon a small car, to the puddling furnaces. According to the *Revue Industrielle de Charleroi*, the operation of puddling lasts but 40 or 45 minutes; and a gasogen furnace attended by four men produces 12,000 pounds of iron of excellent quality in twelve hours, with a total consumption of 2,200 pounds of coal. The waste is but 7 per cent.

**A New Explosive.**—Prof. Victor Meyer has obtained an isolated derivative of nitromethane, the detonating power of which seems to exceed anything that has ever hitherto been conceived of. This derivative results from the substitution of one atom of sodium for one of the three atoms of the hydrogen of the methane. In order to prepare it, Prof. Meyer dilutes a certain quantity of nitromethane with sulphuric ether and then adds, in alcoholic solution, the body resulting from the action of the sodium upon the alcohol. The precipitate formed is washed with ether and then dried by means of concentrated sulphuric acid. The compound is anhydrous and its explosive force is terrific. The potassic derivative of the nitromethane is likewise possessed of explosive qualities of extreme energy. It is prepared in the same way as the sodic derivative.

**Solders for Glass.**—Mr. Chas. Margot finds that an alloy composed of 95 parts of tin and 5 of zinc melts at 200 degrees, and becomes firmly adherent to glass, and, moreover, is unalterable and possesses a beautiful metallic luster; and, further, that an alloy composed of 90 parts of tin and 10 of aluminum melts at 390 degrees, becomes strongly soldered to glass and is possessed of a very stable brilliancy. With these two alloys it is possible to solder glass as easily as it is to solder two pieces of metal. It is possible to operate in two different manners. The two pieces of glass to be soldered can

either be heated in a furnace and their surface be rubbed with a rod of the solder, when the alloy as it flows can be evenly distributed with a tampon of paper or a strip of aluminum, or an ordinary soldering iron can be used for melting the solder. In either case, it only remains to unite the two pieces of glass and press them strongly against each other and allow them to cool slowly.

## Massachusetts Street Cars Must Have Fenders.

After November 14 next, according to an order recently issued by the Railroad Commissioners of Massachusetts, the cars of every street railway in the State must be equipped with fenders and wheel guards capable of saving life. Horse cars and trailers are excepted, and a temporary exception is made of cars run wholly within the limits of towns having a population of less than 7,500. No special form of fender is indicated, but when the fender is designed to serve also as a wheel guard, it must not only pick up a person run into while standing, but prevent a person who has fallen or been thrown down from getting under the car and being run over by the wheels. The commissioners say, "No one form of fender or wheel guard has as yet been proved to be so unquestionably superior to all others, tried and untried, as to justify the prescription of its sole and its exclusive use;" and the several street railway companies are therefore left free to deal with patentees and inventors, for the selection of such fenders as will in practice prove most efficient.