

Engineering Notes.

A petrol motor has been fitted to one of the large boats at Lowestoft, England, employed in the North Sea herring fishing industry. The engine is of 24 nominal horse power, having three cylinders of 6½ inch bore and stroke, and a speed of 300 revolutions per minute. Economy of storage space is a marked feature of this type of motor, which is stowed in the cabin under the crew's table. Propelling the boat is not intended to be the sole use of the motor. It is also employed as a donkey-engine, to heave anchor, to hoist sails, and to work the pumps. The extremely small weight, both of the motor and the fuel to be carried, and the necessity for so few alterations in construction, make the adaptation of petrol motors to existing boats of this class a comparatively simple matter.

Sir William Arrol & Co., the famous bridge building firm of the Dalmarnock Iron Works, Glasgow, have secured the contract for the construction of the huge railway viaduct to be erected over the River Barrow, in the south of Ireland, in the face of strong American and European competition. The erection of this viaduct is a part of the scheme being undertaken by the Fishguard & Rosslare Railway & Harbors Company, for developing the inter-communication between these ports and Milford Haven in the south of Wales. The viaduct is to be 1,980 feet in length, consisting of thirteen fixed spans each of 140 feet, and two opening spans each of 80 feet, through which vessels will be able to pass at high tide. Owing to the peculiar nature of the soil of the bed of the river huge cast iron caissons will be sunk to a considerable depth—to 100 feet from the under side of the superstructure of the bridge to the bottom in some instances. The bridge is to be built of steel throughout. This company also recently secured the contract for the large bridge carrying the Caledonian Railway of Scotland across the Clyde from the central station at Glasgow.

Quartz boulders and pebbles found in placer gravels are frequently reported to carry no quartz gold, according to The Mining and Scientific Press. The condition is not universal, for placers are known in which the quartz boulders and pebbles do contain gold. The barren character of such float quartz is far the more common, however, and has been the foundation of many theories of formation of the gold found in the placers which excluded the idea of its coming originally from the quartz. The explanation of the seeming contradiction is simple. The gold in quartz is originally associated with pyrite and other sulphides. Surface percolating waters oxidize these sulphides and largely remove them, before the quartz, still containing the gold, by erosion of its overburden is itself in turn eroded and becomes placer. The quartz breaks up on its lines of least resistance, which are the lines where sulphides have been removed. The larger part of its original gold content is thus freed and the separated quartz fragments are barren. In addition to the structural weakness of the quartz containing gold, its higher specific gravity constantly increasing as the fragment becomes smaller by abrasion, by retarding its downstream movement relative to quartz containing no gold, keeps it for a longer period of time under abrading influences. There are as well many quartz ledges that are barren of gold, and those ledges that do contain gold have barren portions. Such barren quartz, called "bull quartz" by the miners, is more resistant to disintegration than the gold-bearing quartz. It may thus happen that the quartz found in the gravels with the gold is not the quartz from which the gold was derived.

Death of President Morton.

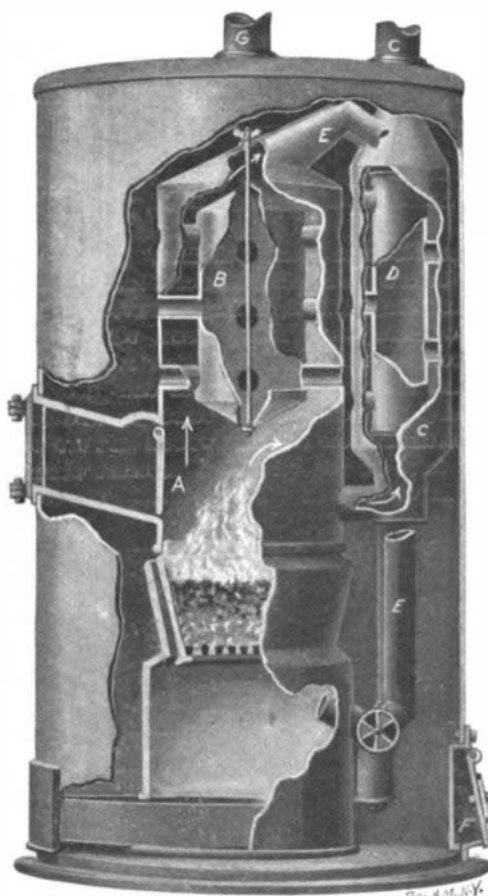
President Henry Morton of Stevens Institute of Technology died on the evening of May 9, at the age of sixty-six. A scientist of world-wide reputation, Professor Morton began his scientific career as an instructor of chemistry and physics at the Protestant Episcopal Academy in Philadelphia. He became a founder of the Philadelphia Dental College in 1863, and was first to hold its chair of chemistry. As an archaeologist, Professor Morton also distinguished himself. In 1859, he published a translation of the text of the Rosetta stone. While Resident Secretary of Franklin Institute and editor of the Institute's "Journal," he organized an expedition to photograph the total eclipse of the sun in Iowa. When Stevens Institute was founded in accordance with the will of Edwin A. Stevens, Professor Morton was made President. He held that position down to the time of his death. To Professor Morton's earnest efforts the success of Stevens Institute and the very high place which it has assumed in the technological schools of this country is largely, if not entirely due. The interest which he took in the Institute is sufficiently manifested by his liberal endowments. He gave the Institute a mechanical laboratory fitted with steam engines and tools. Out of his own purse he furnished apparatus for the study of applied electricity and guaranteed the salary of a professor of electricity. When a chair of engineering practice was established in

1888, Professor Morton endowed it with \$10,000, following this gift four years later with another of \$20,000. In 1897 Dr. Morton received the degree of Doctor of Laws from Princeton.

A NEW HEATER.

A heater of peculiar construction has recently been patented by two Nebraskan inventors. It belongs to the class in which hot air is used as a heating medium, and aims to receive a large amount of air and to provide a large area of radiating surface, thus supplying great heat with an economical use of fuel.

In our illustration the heater is partly broken away to show the peculiar arrangement of outer and inner drums which are designed to superheat the air. Supported on the fire-pot is a drum, A, closed at the top, excepting that it has two flues or pipes, E, leading downward and admitting the air again below the grate. Fresh air enters the outer casing through the damper, F, and a valve on the pipes, E, controls the supply of fresh air to the fire. The projection seen below this valve is provided with a removable bottom, so that soot may be readily cleaned from the pipe. Supported within the drum, A, is a smaller, interior drum, B, which is entirely closed to communication with the gases from the fire, but communicates with the space between the drum, A, and the outer casing through a series of tubes. Similarly, a cylinder, C, is arranged within the

**A PECULIARLY-CONSTRUCTED HEATER.**

enlarged portion of the take-up or smokepipe, C, which communicates at its lower end with the drum, A. If desired, a pipe, G, may lead from the heater to an upper room for the purpose of heating the same.

The following operation is claimed for the heater: Cold air entering the damper, F, at the bottom of the outer casing will pass through the air valve and discharge into the firebox. This air will circulate through the drum, A, with a portion of the smoke, while a portion of the air with a certain amount of smoke will pass through the smokepipe, C. Warm air surrounding the drum, A, will pass through the tubes into the cylinder, B, and warm air will also pass through the tubes into the cylinder, D. The air and smoke passing through the drum, A, will move downward through the pipe, E, and again discharge into the lower portion of the firepot, and during this discharge it will have mixed with it a new supply of pure air or oxygen, thus causing a part of otherwise wasted combustibles to be used. By this great circulation of air the lower portion of the heater will become thoroughly heated, and thus heat the lower stratum of air in a room which is usually cool. The inventors of this heater are W. M. Thomas and L. Van Scoyoc, of Louisville, Neb.

Yale Honors Lord Kelvin.

On May 5 Lord Kelvin received at Yale University the honorary degree of LL.D. at a notable ceremony in which the entire university took part. For the first time in over one hundred years a special assembly has been held at Yale for the conferring of an honorary degree. Lord Kelvin was ushered in the Battell Chapel to the strains of a large symphony orchestra.

In conferring the degree, President Hadley spoke thus:

"William Thomson, Baron Kelvin—To some of the men of science it is given to render practical service by their discoveries; to others it is given to use those discoveries as a means to the profounder understanding of the laws of the universe. Yours has been the rare honor of combining both these results in the work of a single life. You have joined the remotest regions of human activity by your investigations of the submarine telegraph; you have joined the different realms of human thought by your contributions to physical theory. In recognition of this long and glorious service, wherein each achievement which seemed to the world a culmination of your labors was to you only an incentive to labors more arduous, and the stepping stone toward achievements yet higher, we confer upon you the degree of doctor of laws, and admit you to all its rights and privileges."

Electrical Notes.

Madison, Wis., is a university town, and like most university towns it has a campus upon which grow huge trees. In these trees squirrels have made their habitation, to the great delight of the students and townspeople. For a long time the telephone service of the town has been bad. No one knew why. Finally a curious official discovered that the squirrels had nibbled off the insulation of the telephone cables, cut into the wires, and wrought havoc in many other ways. Rather than exterminate the squirrels, the telephone company determined to keep the force of linemen busy repairing the ravages. But the squirrels have eaten away the insulation faster than the linemen could supply it. A crusade against the squirrels will probably be instituted, despite the protest of the university faculty.

A long critical article on the position of wireless telegraphy appeared recently in the Kölnische Zeitung, which, as is well known, is one of the most influential papers in Germany. The agreement between the Marconi Company and Lloyd's is strongly criticised, and our contemporary asks if the Marconi Company and Lloyd's are really so naïve as to think that the States in whose territory the signaling stations would exist would not oppose this "monopoly-greed." Our contemporary further asserts that the communication from the German government on an international agreement on the subject of wireless telegraphy was not due to the refusal of the Nantucket lightship to communicate with the "Deutschland," but that the subject had been mooted some time previously. The article also compares the Marconi, the Slaby-Arco and the Braun systems from a technical point of view, and claims that the two former have both adopted, in their system of transmitting, a method of which Braun is the original inventor and patentee. It suggests a combination of interests between the owners of the Braun and Slaby patents, who should fight the Marconi Company on the patent question. It will be remembered that the Slaby-Arco patents are owned by the Allgemeine Elektrizitäts Gesellschaft, and that the Braun patents are the property of Messrs. Siemens & Halske.

It is well known that high-voltage currents have been in use for years in the United States for long distance transmission of energy. Some of the plants, where the climate is very favorable, have adopted voltages up to 40,000 and even 50,000 volts. On the Continent, where water power in the immediate vicinity of industrial centers is becoming more and more scarce, long distance power transmission with high voltage is being frequently resorted to, as the following will show: A 23-mile transmission at 20,000 volts has been constructed to supply Como with energy. In the vicinity of Zaragoza, in Spain, two plants, of 4,000 horse power and 6,000 horse power respectively, are being installed. The power obtained will be transmitted at 30,000 volts over distances of 28 and 50 miles. The Feurs and Morge installation near Grenoble, in France, is a 7,000 horse power plant, supplying current at 26,000 volts to a number of towns and villages, such as Voiron, Moirans, etc., the distance covered being 32 miles. This plant has been completed and is now working. The Reznau plant near Waldshut provides 10,000 horse power, and the current is sent over distances up to 37.5 miles at a voltage of 25,000. Lastly, an order has recently been placed for the machinery of a 13,000 horse power plant to be erected on the Cellina River in Northern Italy, the energy being supplied, at a tension of 36,000 volts, to the towns of Venice, Udine, Pordenone, etc. Current in this installation is transmitted over distances up to 56 miles. In all the above plants the current is three-phase, and is generated at a comparatively low tension of a few thousand volts, and raised to the transmission voltage by means of stationary transformers.

A company is to be formed in England for the purpose of utilizing Mr. Edison's patent for extracting iron ore and profitably working the deposits on the west coast of Norway. The company is said to be capitalized at \$10,000,000.