

Perhaps the most remarkable instance of the nicety of calculation employed in modern manufacturing is that of the Cambria Steel Company, of Johnstown, Pa., which recently completed 800 steel cars for the West Virginia Central Railway without having a single piece of material left over.

The *Geschäftsstelle Vereinigter Carbidiabriken*, of Nuremberg, Germany, has opened a competition for the best method of packing calcium carbide. Two prizes of £50 and £25, respectively, are being offered, and the competition will remain open until March 1st next. The packing method to be selected must comply with existing railway and shipping regulations, cheap, simple, water and air-tight, etc.

Muskkrats burrowing beneath a dam in Connecticut caused a flood in the village of Shelton, and did damage to the extent of \$50,000. The reservoir had been built over twenty years, and was believed to be as solid as rock. The heavy granite wall is still standing, and all the water passed beneath it.

An Italian invention is announced by Signor Turchi, an engineer, and Prof. Brune, by which telegraphic and telephonic messages can be sent simultaneously on the same wire. Similar inventions in Belgium, Austria and Germany did not fulfil what was claimed for them, but the present one is so successful that Signor Galimberti, Minister of Posts and Telegraphs, is about to test it on the public wires. If the result is satisfactory, the invention will be adopted forthwith.

A new osmium lamp has been invented, which may have possibilities for carriage lighting. Osmium is a metal of the platinum tribe, and is one of the heaviest known. It is harder than glass and will not melt at a temperature under 2,500 deg. C. When used in incandescent lamps it affords a very strong, white, lasting and steady light. There are two types of this lamp—the 10 to 15 candle-power with a current of 20 volts, and the 16 candle-power with a current of 25 volts. Both stand vibration well.

Otto Klotz and F. W. O. Werry, Canadians, are to make scientific observations for the determination of longitudes along the line of the Pacific cable. In 1892 the work was continued from Greenwich to Montreal, and since then carried across the continent along the line of the C.P.R. to Vancouver, and now the observations are to be continued to Australia, where connection with the previously determined telegraph longitudes will make a circuit around the world, in addition to determining the longitudes of all the cable stations.

The metal radium is sold at a price equivalent to \$900,000 a pound. Scientists are the only purchasers. Referring to its properties, Sir William Crookes says: "If half a kilogram (one and one-tenth pound), were in a bottle on that table it would probably kill us both. It would almost certainly blind us and burn our skin to such an extent that we would not survive. The smallest bit placed on one's skin will raise a blister that will take months to heal. Radium emits electrons at such enormous velocity that the energy of one gram (one-twentieth of an ounce), of electrons is sufficient to lift the whole of the British fleet on to the top of Ben Nevis and possibly the French fleet, too. The metal must always be a laboratory subject, but experiments with it may lead to important discoveries."

A new method of brazing cast iron has been found, which has changed the methods of European foundries. The patterns are now cut into two or more parts, so that each is a simple piece to mould, and the parts are brazed together, so that when the brazing operation is complete, the pieces are as one entire casting, and the cost of production is reduced. Flaws are eliminated by drilling them out if small, and brazing in a plug made to fit the hole. If large and in the nature of a crack, and if the crack is wide, a piece of iron is fitted into the space and brazed in. If narrow, the crack is cleaned out and brazed up. If necessary, the fracture may be extended by hammering, even if this involved breaking the piece entirely in two. The cost of the ferrofix involved is about half a cent per square inch of surface brazed.

Freezing the earth by artificial process, in order to cut tunnels through it, is a development of modern engineering. It is to be employed on the Pennsylvania tunnels into New York. It has been employed in various places, among others, in sinking a shaft at the Chapin mine, at Iron Mountain, where a cylinder of water-bearing strata, fifty-four feet in diameter, and extending 100 feet below water level, was first frozen and the perpendicular tunnel then excavated through it. The freezing was accomplished by sinking vertical pipes arranged in a circle around the site of the shaft. Through a smaller pipe in each of these was circulated brine, cooled in an ice machine to zero temperature until the mass was frozen.

The mechanical force of the sound emitted from 5,000,000 to 10,000,000 cornets, would equal but one horse-power.

A smokeless stack has been invented, with collars and drip plates, and having water forced about half way up. The smoke, in attempting to pass through the flowing water, sheets, is turned into soot, which falls to the bottom. Another device has been tried on the Michigan Central Railway. A smoke consumer is situated near the fire-box, and is so arranged that with proper firing no smoke issues from the stack, but is used again for fuel. This little concern has proved to be very economical, and if the results are satisfactory, after a thorough test, they will be used on all engines. Still another smoke preventive, which also acts as a fuel economizer, is made by inserting a pipe in the top of a stack, leaving an annular space of three inches between itself and the inside of the stack, extending eight feet down into the stack and projecting seven feet above it.

Marine News.

The steamer *Hamilton* has been rebuilt and lengthened 40 feet at Sorel.

It is alleged that the *Gulf Stream* has diverged two degrees further north than formerly.

Goderich is asking for the construction of a breakwater outside the harbor. It would cost about \$100,000.

The Thunder Bay Harbor Improvement Co. has the contract for piling for the new dock at Port Arthur, which the C.N.R. will construct this summer.

The C.P.R. SS. *Alberta* will go on the dry dock at either Port Huron or Detroit for inspection this spring. The steamers of this line go on the dock once every three years, and it is the *Alberta's* turn.

S. Maximoff, engineer to the Russian Imperial Government, is on a tour of inspection of all the greatest engineering works of the world. He recently visited the Trent Valley Canal lift lock, near Peterboro.

A strange craft is being built at Davidson's shipyard, West Bay City. It is a huge fuel ship, having 16 compartments, capable of holding fifty tons of coal each. A trough runs through the centre of the craft and, by means of a new patent bucket process, 300 tons of coal per hour can be discharged from the collier to any other craft. It is owned by the Pittsburg Mining Co., and will cost \$45,000.

F. S. Henning, president of the Marine Engineers' Association, has been in Ottawa urging the amendments to the Steamboat Inspection Act suggested by the engineers at the last meeting of that association. The engineers ask that every vessel coming under the Steamboat Inspection Act be compelled to carry a certificated engineer, that all temporary certificates be abolished, that candidates for fourth-class certificates must have 36 months' service in a machine shop on the making and repairing of steam engines, also 12 months' service in the engine room as an oiler or fireman, or in lieu of this service he must serve 48 months as fireman or oiler on the watch. The engineers also want the responsibility for the use and care of the deck hose transferred to the deck officer.