The Electro-Osteotome.

Dr. Milton J. Roberts, of this city, a distinguished surgeon, is the author of the new mode of examining diseased bones, which consists in boring into and lighting up their interior surfaces with the electric lamp. He describes his devices as follows: My aim has been to make as nearly a universal osteotome as possible; that is, an instrument with which the surgeon can cut bone with ease, safety, and accuracy in any desired direction. The instrument which I have elaborated is called the electro-osteotome.

As it is now constructed, it is provided with two headpieces, one for the carrying of various sizes of circular saws, and the other for the holding of drills and burrs of various shapes and sizes. By means of this instrument, a bone may be perforated with any size drill up to a quarter of an inch in diameter, or a cross or longitudinal section of it made with as much facility as a similar wound could be made in the soft parts by means of a sharp scalpel.

For the early positive diagnosis of the existence of diseased bone, the instrument is provided with very fine drills, from the one sixteenth to the one thirty-second of an inch in diameter. These drills are constructed, not after the form of the ordinary twist drill, but upon the principle of a cheese tester; that is, they have a longitudinal groove on one side. By means of such a drill, a plug or sample can be removed from any suspected area of bone. No incision through the soft parts is necessary. The drills revolve at a very high rate of speed, and readily penetrate the soft parts and bone. Upon removal of the drill, the debris lodged in the groove is placed upon a glass slide and examined under a microscope. If there be commencing ostitis, the characteristic findings will be manifest. Of course, when drilling into the head of a bone, and a cavity or soft spot is reached, the sensation communicated to the hand will be all that is desired to establish the fact. The use of the drill in this manner is analogous to the use of the hypodermic needle in the soft parts for diagnostic purposes. If no disease exists, no harm is done by means of the puncture.

Once having thus positively determined the existence, site, and probable extent of disease, an incision is made down to the bone, and a large drill or trephine, from a quarter of an inch to half an inch in diameter, is carried through the bone into the diseased area or cavity. Upon removing this, smaller drills or burrs may be passed in through the opening thus made, and used to excavate the affected bone.

For the thorough inspection of the parts, I have had constructed a miniature incandescent lamp, so small as to readily pass through a quarter inch drill hole. These lamps (half candle) furnish sufficient light to thoroughly illuminate the interior of any bone cavity.

DOUBLE DREDGER.

The engraving below represents one of Priestman Brothers' double self-contained dredgers, and is taken from a photograph, in South American waters. The dredger is somewhat novel in its construction, being the first of the kind which has been made. A large steam hopper dredger has been fitted with four of Priestman's machines, made to the order of the Mersey Docks Board, and can be seen working in Liverpool or Birkenhead docks; but this particular dredger, although suitable for all kinds of dock and harbor work, was specially designed for exportation. It forms part of an order for the Brazilian Government for carrying out harbor improvements in the port of Maranham, where it is required to deepen the channel and deposit the dredgings behind the breakwater for reclamation purposes. The two dredgers shown are each capable of lifting from fifty to eighty tons of material per hour, in accordance with the nature thereof, being fitted with strong interlocking steel-faced grabs—see Figs. 1 and 2—suitable for hard sand, clay, or mud, gravel, etc., each of which, when filled, holds about 40 cwt. of deposit. The steam is taken from a multitubular boiler, 9 feet long by 8 feet diameter, having a heating surface of 386 feet, and is conveyed to the engines through steam passages up the center columns of the respective machines. The barge is constructed to facilitate transit and erection abroad, and is made in eight longitudinal sections, being plated, riveted, and calked in the makers' yard in Hull; each end of each several

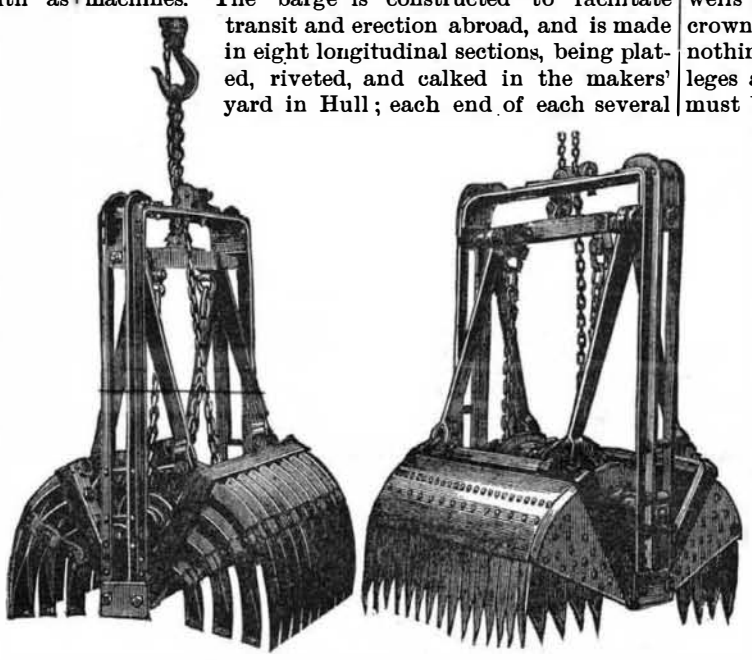


Fig. 1.

Fig. 2.

section being supplied with strong angle iron frames, forming at the same time flanges for bolting or riveting the several sections together. The decks are of timber. The rubbing belt, deck planking, stringer plate, and keelsons are made to cross the joints of the several sections, to increase stability. The dimensions of the barge are 60 feet in length by 22 feet beam, and 6 feet deep, with flat bottom, rounded ends and bilges, to increase buoyancy in the water when the dredgers are at work. The rest of the order comprised four iron barges, constructed in a very similar manner to the above, 48 feet long by 15 feet beam, and 6 feet deep, to carry the deposit raised by the dredgers, and two of Priestman's portable bucket elevators, each capable of lifting about fifty tons per hour, with wheels for running upon the quay for discharging the barges of their dredgings, and placing the same behind the breakwater.—*The Engineer.*

A Russian Petroleum Pipe Line.

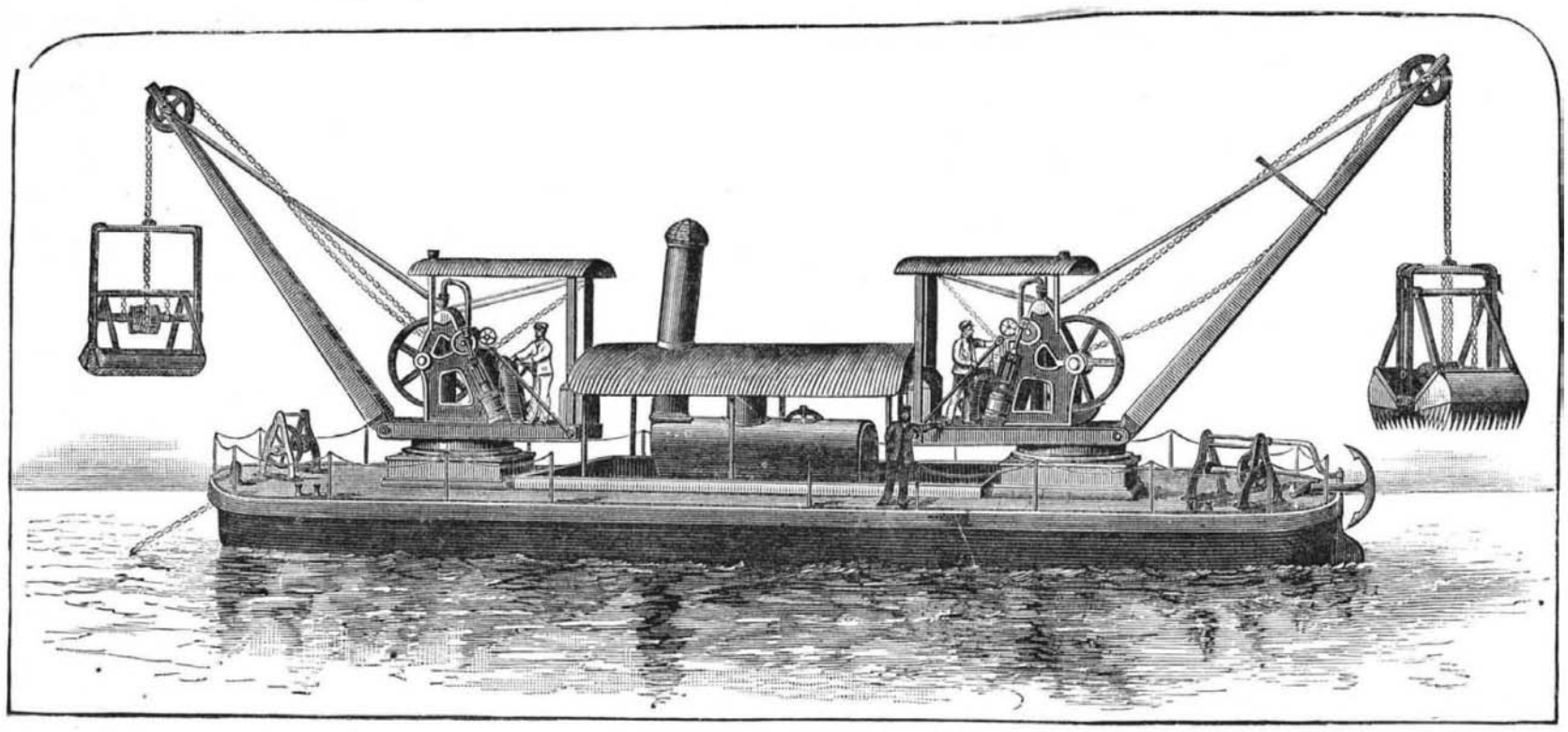
In the London *Pall Mall Gazette* of October 8, Mr. Charles Marvin, who has written much concerning the Russian petroleum wells and refineries, has the following concerning the long contemplated project of a pipe line across the Caucasus, whereby petroleum is to be carried to the shore of the Black Sea at a very low cost:

The Russian government has completed at last the scheme for the petroleum pipe line from Baku to the Black Sea, a distance of nearly 600 miles. The capital required for the scheme is £2,000,000.

The pipe must be large enough to allow of the passage of 160,000,000 gallons of oil a year, and the stoppages for repairs must not exceed on an average one a month, or last longer than three days. As soon as the traffic reaches 90 per cent of the full working power of the line, the company must proceed to lay down a second oleoduct, and have it ready for traffic in two years. The time allowed for laying down the first pipe line is three years. The concession will last twenty years, but no guarantee will be given by the state, nor will the company be allowed to own oil wells and refineries. Where the pipe line traverses crown estates, the land will be given the company for nothing, and elsewhere it will enjoy the same privileges as railway corporations. One-third of the pipes must be obtained in Russia, but this clause will not be insisted upon should the supply be inadequate. The tariff to be charged for the oil pumped through the line is 10 or 11 copecks the pood, or 12s. or 13s. a ton. This will amount to a little more than a halfpenny (1 c.) a gallon. The engineering obstacles to the enterprise are of a very trifling character, with the exception of the passage of the pipe line over the Lesser Caucasus. The ascent to the Suram Pass, 3,200 feet above the sea level, is somewhat sharp, but an extra number of powerful pumping stations will overcome this obstacle, while on the Batoum side of the range fewer stations will be needed, owing to the force with which the oil will flow, by its own gravity, to the Black Sea coast. There is, therefore, no reason for fearing that the pipe line will not be laid down in three years' time, perhaps considerably earlier. As for the distance, it is a mere trifle compared with the American pipe lines, which collectively extend to a length of 9,000 miles. When it is open for traffic, the export of Russian petroleum *via* the Black Sea will increase tenfold, and there will be a terrible tumble in the price of American oil in Europe. At present, tens of millions of gallons of refined petroleum can be had at Baku for a penny a gallon. The projected pipe line will run it across to the Black Sea for another halfpenny, and for very little more than that sum it will be possible to bring it to London in tank steamers. In this manner, whether England makes the pipe line or not, she will derive a substantial benefit by its completion.

Comstock Deep Mining.

"Orders have been received from San Francisco to stop all work in the Chollar mine, and to immediately strip all levels below 2,400 feet. The orders also necessitate the immediate suspension of all operations in the lower levels of the Hale & Norcross mine. This action is the result of the flat refusal on the part of the trustees of the Savage mine to pay their one-third proportion for keeping the pumps in motion at the combination shaft. The lower levels in both mines will be abandoned and flooded as soon as the ponderous pumps are shut down. The stoppage of work in these mines throws several hundred men out of employment and, it is believed, sounds the death knell of deep mining on the Comstock."



IMPROVED DOUBLE DREDGER.