This method of running lines and grades was found to be very satisfactory, as the engineers were enabled to do their work without feeling hurried, as they would have felt if they knew that they were causing the contractor a serious delay. The writer is indebted to C. W. Alexander for his able assistance in perfecting this method of tunnel survey.

COST OF GARBAGE REMOVAL AND STREET CLEANING AT SASKATOON

According to the annual report of C. J. Yorath, A.M.Can.Soc.C.E., city commissioner of Saskatoon, Sask., during the first ten months of this year the cleansing department removed 14,526 loads of refuse, garbage, ashes, etc., as compared with 15,679 loads for the corresponding period of last year.

The cost of removing this material, on account of the long haul to the nuisance ground, is excessive. The total cost for the ten months has amounted to \$26,981 or at the rate of \$1.79 per load. An up-to-date Packard refuse truck has been purchased to be used for the collection of house refuse, and which it is estimated will replace at least four teams.

The following is a comparative statement showing the estimated annual saving which will be effected by the use of two motor trucks for the collection of house refuse :—

	Operating	Costs
	per day.	per year.
Cost of 2 trucks at \$4,825 each	ı,	
\$9,650; sinking fund and interes	t	
based upon a lifetime of 5 years	. \$ 7.48	\$ 2,336.00
Two drivers at \$3 per day	. 6.00	1,872.00
Insurance	бі	192.00
Insurance liability limit, \$5,000 for	r	
one accident	29	90.00
Tires	. 2.56	800.00
Gasoline, 14 gals. per day	. 5.00	1,560.00
Oil and grease, 69c. per day	69	218.00
Helpers, 2 on each truck, 4 men	9	
hours per day at 30c. per hour.	. 10.79	3,369.00
Total	. \$33.42	\$10,437.00
Cost of operating eight teams a	t	
\$5.50 per day	. \$44.00	\$13,728.00
Net annual saving by operating	z · · ·	5.4
motor trucks for garbage collec	1 2012 1 19	
tion in lieu of horses	and a firm sta	\$ 3,291.00

A Welsh inventor has designed a combined piston and rotary pump, with no valves that can be easily clogged, for pumping heavy liquids.

Baron Megata, head of the special Japanese Finance Commission, declared in a recent address at a dinner given in his honor by Japanese bankers in New York that Japan could not continue much longer to aid the Entente Allies with shipping unless permitted to import steel plates from the United States. "Japan has increased the number and the size of her shipvards since the war began," he said, "and has sold and chartered to the Allies many ships, while others have been and are engaged in transporting munitions and supplies for them. The need for bottoms to-day is very great, and she is doing her utmost to fill it. She cannot continue her present help much longer, however, unless she is permitted to import steel plates from the United States. Her ability to contribute in this economic way toward the early and successful termination of the war should be taken advantage of. She has the yards, she has the skilled labor, she has the will to do. With America's aid and co-operation, she will have the essentials with which to do."

PRODUCTION OF IRON AND STEEL IN CANADA

The Mines Branch of the Department of Mines, Ottawa, has received from the producers complete returns of the production of pig iron in Canada and with the exception of two small plants, complete returns of the production of steel ingots and direct steel castings during the first nine months of 1917.

The total production of pig iron during the first nine months was 895,307 short tons, as against 844,717 tons during the first nine months of 1916. The average monthly production in 1917 was 99,478 tons, as against an average monthly production throughout 1916 of 97,438 tons.

Furnaces were in blast at Sydney and North Sydney, N.S., Hamilton, Port Colborne, Sault Ste. Marie, and Deseronto, Ont. Small quantities of pig iron were also produced in electric furnaces from scrap steel at Orillia, Collingwood, St. Catharines, Toronto, Ont., and at Montreal, Que. The total quantity of pig iron thus produced in electric furnaces during the nine months was 9,983 short tons.

The total production of steel ingots and direct castings during the first nine months was 1,265,183 short tons, as against 911,054 tons during the first nine months of 1916. The average monthly production during the first nine months of 1917 was 140,576 tons as against an average monthly production throughout 1916 of 106,268 tons.

The production of steel in electric furnaces included above was 30,960 tons during the first nine months of 1917 as against a total of 19,639 tons produced throughout 1916. The production of steel in electric furnaces in September was over 5,000 tons or at the rate of over 60,000 tons per annum.

UNITED STATES FEDERAL SHIPBUILDING YARDS

It is reported that the yards of the United States Federal Shipbuilding Corporation on the Hackensack Meadows will be the largest in the world. The company will start out with ten shipways of from 450 to 500 feet in length, but they will be extended later to permit the construction of giant ocean boats of 1,000 feet in length, which will compare favorably with the ocean-going palaces turned out in the famous ship-building yards of England and Scotland. The plant will cover nearly too acres of ground. Steel buildings will be erected to cover practically the entire acreage, including a plate mill of nearly ,000 feet in length. Almost every essential in the manufacture of great ships will be turned out even to marine boilers and engines and electric fittings. Next to the machine, structural and fabricating plants will be located a large wood joining shop which will turn out wood fittings used in the ships. For the present the corporation will turn out standard size ships of 9,000 tons. The first two keels will be laid late in November, and the initial launchings will take place about April 1, 1918. The two completed boats will be ready for ocean service about June 1.

Remembering that 1879 was the first year of the incandescent electric lamp, references show that the number of establishments listed in 1914 was 1,030, employing 144,712 persons, a capital of \$355,724,756, and with a value of product equal to a third of a billion dollars. The industry increased rapidly in that thirty-five years; and the reason was that the world was adopting electric light, owing to the successful pioneering of Thomas A. Edison with his incandescent bulb. For whatever has followed in the train of that first successful glowing filament is all directly due to Thomas A. Edison and his fight for what his genius knew to be possible in spite of the jeers of most of the practical and scientific men of the time. He followed his lamp with developments of the utmost importance in motor construction and the not less valuable device of the three-wire electric circuit, whereby very important economies of copper are secured.