an aerial gun, projecting a cone of bullets when the bursting charge is fired. The British shell is designed to blow out at a point just outside the threaded opening, at the nose cap. Other designs force the threads.

While a finished surface is not required on the inside of the case, the inner and outer diameters must be accurately concentric to ensure true projection through the air. The outer surface is carefully machined and finished. An annular ring is tooled and knurled to take a copper band, near the base of the shell. This band is fitted to rotate easily, and is indispensable in the firing of the shell.

There is also a protecting cap, which screws into the end of the shell, safeguarding the interior parts from injury while in transit to the arsenal to be loaded.

Thus there are a number of parts, all requiring a fine degree of accuracy in making. The Dominion Shell Committee, which places the contracts in Canada, has distributed the contracts to many firms. The forgings are made by the Nova Scotia Steel and Coal Co., the Canada Forge Co., and others; the brass tubes by the Northern Electric Co., the Canadian Seamless Wire Co., and the John Morrow Screw and Machine Co., and others; the bullets by the Canada Metal Co., the Thos Davidson Co., and others; the tin cups by the Sheet Metal Products Co.; the copper bands by the Canadian Westinghouse Co., the Hamilton Steel Co., and others; the sockets and plugs by the Canada Foundry Co., the Empire Manufacturing Co., the Chadwick Brass Co., and others.

The parts are assembled, sent to the arsenal, where the bursting charge and fuses are added, and packed in wooden crates, six to the crate, for shipment.

CANADA'S STEEL INDUSTRY.

The steel industry in Canada has suffered in recent years from many adverse factors. These include the tariff question, the dumping of United States products here when prices are low in the republic, and trade depression. However, the production of steel here in 1913, the latest year for which official statistics are available, amounted to 1,042,503 gross tons, an increase of 189,472 tons over 1912. Of the 1913 production, 1,006,149 tons were ingots and 36,354 tons were direct steel castings, being respective increases above 1912 of 185,357 and 4,115 tons.

The total productions of steel ingots and castings has increased rapidly in recent years, and the 1913 output was by far the largest in the history of Canada. A table covering the production by both classes, in gross tons, during the last ten years, follows:—

Years.	Ingots.	Castings.	Years.	Ingots.	Castings.
1913	1,006,149	36,354	1908	500,300	9,657
1912	820,792	32,239	1907	629,026	17,728
1911	768,559	22,312	1906	555,913	14,976
1910	723,002	18,922	1905	394,055	9,394
1909	664,789	13,962	1904	142,279	6,505

The production of all kinds of finished rolled iron and steel, in gross tons, by provinces, during the last four years, follows:—

Provinces.	1913.	1912.	1911.	1910.
Nova Scotia	380,488	337,466	336,520	310,460
Quebec	72,439	88,172	65,378	62,605
Ontario	504,900	418,346	367,768	356,645
New Brunswick, Alberta, Manitoba	9,270	17,240	12,358	10,101
Total	967,097	861,224	781,914	739,811

In 1913 there were twenty-one works engaged in rolling finished forms of iron and steel, and also the same number in the previous year. There were five idle rolling mills and steel works in 1913, compared with four in 1912. Three new steel plants were built in 1913, all equipped to make steel castings but not rolled iron or steel products. At the close of 1913 three additional similar plants were in course of being constructed.

SEWAGE DISPOSAL WORKS AT LETHBRIDGE, ALBERTA.

An instructive paper will be presented on March 4th, 1915, to the Canadian Society of Civil Engineers, by A. C. D. Blanchard, Mem.Can.Soc.C.E., dealing with the design, construction, operation and maintenance of the recently completed sewage disposal works for the city of Lethbridge. The novel features which it possesses have been already presented to our readers in an article in which the design was described in detail in our issue of February 4th, 1912. Editorial reference was also made in this issue to the sedimentation tank, which, by virtue of this, the first installation of its kind in Canada, was called the Lethbridge tank.

With the exception of the sedimentation tank, there is nothing unusual about the other parts of the plant. The sewage of the city is being treated by preliminary screening, sedimentation, sprinkling filters and further sedimentation, after which it is subjected to chlorination. The detritus tanks have each a volume of 675 cu. ft., a liquid surface of 120 sq. ft., and a screen area of 52 sq. ft., the screens being of ½-inch wrought iron with ½-inch openings. From a collecting channel the sewage passes through two 18-inch pipes controlled by penstocks into the distributing channels of the duplicate sedimentation tanks. Each tank is 100 ft. long and 32 ft. wide. Twenty-four-inch I-beams support a 6-inch concrete roof, except above the channels, which are roofed by removable creosoted wood plank. Two distributing weirs extend the entire length of each tank, the first with a slope of 2 inches in its 100-ft. length, and the second being level, the intention in the latter instance being to equalize the flow so that the velocity of the liquid across any portion of the tank will be uniform. The sewage is required to pass through 4-inch apertures at intervals of 3 feet in a 6-inch concrete baffling wall, before reaching the collecting weir. The collecting channel averages 15 inches in depth and has a slope from end to end of 6 inches.

The distinctive feature of the Lethbridge tank is an apron of ¼-inch wire glass laid on 4-inch I-beams spaced 5 ft. on centres, upon which apron accumulate the particles capable of settling during the period of flow in the tank. When they have gathered in sufficient mass the solids slide down the slopes and under the glass apron into the sludge compartment. The slope of this apron is 1:3.3. It covers the sludge chamber completely.

For maximum capacity, the period of flow through the tank is practically 2½ hours, and the maximum average velocity of flow is .037 ft. per second. The following are given as the total contents and measurements of the various compartments: Total capacity, 34,000 cu. ft.; sludge capacity, 10,133 cu. ft.; capacity above apron, 16,475 cu. ft.; capacity between sludge line and apron, 8,000 cu. ft.; liquid surface area, 3,200 cu. ft. There is a storage provision for a period of 3½ months, based on the separation of 3½ cu. yds. of liquid sludge to each million gallons of sewage.

Each compartment has 4 hopper-shaped bottoms, a separate sludge valve being provided at the junction of the four slopes in each bottom. Two slopes of each hopper have a pitch of 1:2 and the other two slopes have a pitch of 1:3. The sludge valves open on a 6-inch cast iron pipe line running lengthwise with each tank, and meeting beyond the wall of the tanks, a 9-inch pipe line leading from the detritus tank sludge chamber directly to the sludge beds. The stems operating the sludge valve ex-