

Sewer pipe	166,421
Slate	40,791
Terra cotta	167,902
Tripolite, tons	1,017 16,600
Building material, including bricks, building stone, lime, sands and gravels and tiles (estimated as for previous year)	3,600,000
Total structural materials and clay products	4,602,177
All other non-metallic	11,282,419
Total non-metallic	15,884,590
Total metallic	21,622,001
Estimated value of mineral products not returned	250,000
1898 total	37,757,107
1897 total	28,661,470
1896 total	22,584,513
1895 total	20,758,450
1894 total	19,933,857
1893 total	20,035,082
1892 total	16,628,417
1891 total	18,976,616
1890 total	16,703,353
1889 total	14,013,913
1888 total	12,518,894
1887 total	11,321,331
1886 total	10,221,255

*Partly estimated.

(a) Quantity or value of product marketed. The ton used is that of 2,000 lbs.

(b) Copper contents of ore, matte, etc., at 12.03 cents per lb.

(c) Lead contents of ores, etc., at 3.78 cents per lb.

(d) Nickel contents of ore, matte, etc., at 33 cents per lb.

(e) Silver contents of ore at 58.26 cents per oz.

(f) Oven coke, all the production of Nova Scotia and British Columbia.

(g) Gross return from sale of gas.

(h) Calculated from inspection returns at 100 gals. crude to 42 refined oil, and computed at \$1.40 per bbl. of 35 imp. gals. The barrel of refined oil is assumed to contain 42 imp. gals.

In studying the figures given in the above general table, many interesting and gratifying features will be noticed. In the grand total an increase is shown of over \$9,000,000 or nearly 32 per cent. as compared with 1897. This is a still larger proportional increase than that of 1897 over 1896 which amounted to nearly 27 per cent. Compared with 1886, the first year for which statistics were issued, we find an increase in the value of mineral products in thirteen years of nearly 270 per cent. When it is remembered that during the same period the increase in the population has been only about 14 per cent., it will be evident that the proportional importance of the mining industry to the country is very much greater than it was at the beginning of the period dealt with. Thus the per capita value of the mineral production of the country has increased from about \$2.20 to \$7.20. Whilst these large increases of late years have of course been partly due to the discovery and working of the rich gold-placers of the Yukon, other important mineral industries have also contributed to them, and there is every reason to expect a continued rapid growth in many of them for some years to come, especially as the province of British Columbia continues to develop. The following table shows the principal changes in the production and values for the year 1898 as compared with the revised figures for 1897:

Product.	—Quantity—		—Value—	
	Increase. Per cent.	Decrease. Per cent.	Increase. Per cent.	Decrease. Per cent.
Metallic—				
Copper.....	34.96	.....	43.81	.....
Gold.....	.....	.....	127.31	.....
Iron ore.....	14.70	.....	17.05	.....
Lead.....	.....	18.20	.....	13.63
Nickel.....	38.02	.....	30.14	.....
Silver.....	.....	20.23	.....	22.27

Non-Metallic—

Asbestos and asbestic..	21.87	9.17	.....
Coal	10.21	.....	12.66
Gypsum	8.52	.....	5.76
Natural gas.....	.....	.....	1.80
Petroleum	1.28	.....	3.00
Cement	21.93	.....	44.43

It will be observed that most of the large increase in the total is to be credited to the metals, gold, copper, nickel, the non-metallic materials, coal, asbestos and cement also contributing. Beginning with the most important, the increases in these products were as follows, viz.: Gold, about \$7,673,000; coal, over \$924,000; copper, nearly \$658,000; nickel, nearly \$422,000; asbestos, iron ore and cement aggregating about \$185,000. Of the gold output the main feature was the very large increase in that of the Yukon. This accounts for \$7,500,000 of the enlargement, which is three times as great an estimated output as that for last year. With the exception of the gold washings of the Saskatchewan River in the Northwest Territories, there were also increases in all the other districts of the Dominion. There were increased outputs of coal in all the different districts. In copper the largest increase was in Ontario, which amounted to over 50 per cent. of the previous year's output. British Columbia showed also a considerable enlargement, whilst in Quebec a small falling off was apparent. A rise in the price of the metal makes the proportional increase in value greater than that for quantity. In nickel, the increase in the quantity is greater than that in the value, owing to a fall in the average price of the metal for the year.

The falling away in the production of both lead and silver is, in the former case, partly offset by the rise in the average price, whilst in the latter case a lower price for the year has aggravated the proportional decrease in the value as compared with the quantity. Whilst there was a decrease in the actual quantity of the product of the asbestos mines of Quebec, the value shows a large percentage increase, which is explained by the lesser proportion of asbestic and low grade fiber in the output. The proportional contributions of the chief products to the grand total of value are set forth in the following table both for 1897 and 1898:

PRODUCT AND PER CENT. OF TOTAL PRODUCTION			
	1897.		1898.
Coal.....	26.57	Gold	36.28
Gold	21.02	Coal	21.79
Building material.....	12.56	Building material.....	9.53
Silver.....	11.59	Silver	6.84
Copper	5.24	Copper	5.72
Nickel	4.88	Nickel	4.82
Lead	4.87	Lead	3.19
Petroleum	3.53	Petroleum	2.60
Asbestos	1.55	Asbestos	1.29
Natural gas.....	1.14	Cement	1.05
Cement .....	.96	Natural gas.....	.85
Gypsum .....	.85	Salt .....	.66
Salt .....	.79	Gypsum .....	.61
Coke .....	.62	Coke .....	.58

With the exception of the transposition of the positions of gold and coal, of natural gas and cement, and of gypsum and salt, the items stand in the same order as before. The feature mainly noticeable is of course the assumption of the first place by gold, and its large predominance over the rest. To this is largely due the fact that the metallic minerals as a class contributed in 1898 over 57 per cent. of the whole, as compared with about 48 per cent. last year. The structural materials amounted to about 12 per cent., and the other non-metallic minerals to about 30 per cent.

BOSTON SEWAGE OUTFALL.

BY CHARLES E. TROUT.

For THE CANADIAN ENGINEER.

More than one-half the sewage of Boston and vicinity is discharged into tide water at Moon Island, about six miles from the main water front of the city. To reach this point the sewage flows by gravity to a pumping station on the harbor front near Moon Island, where it is raised about thirty-five feet and forced through a tunnel under an arm of the harbor to the outfall works. These consist of a storage reservoir, together with the necessary gate houses and machinery for filling and dis-