

of the ore to a size where the gold particles are freed from enclosing rock; this is carried to a point where the ore is ground about as fine as cement; (2) the dissolving of the gold in sodium cyanide solution; (3) the separation of the solution containing the dissolved gold from the leached ore; (4) the precipitation of the gold from the solution by zinc dust; and (5) the refining of the precipitates.

Kirkland Lake Area.—Of the other gold-producing localities, Kirkland Lake, in Timiskaming district, has been the most important. The first gold discovery in the vicinity of Kirkland lake was made in 1911 on a claim now forming part of the Wright-Hargreaves mine. The geological formation is similar, as regards age relationship, to that of the Porcupine district. The rocks are Precambrian, the Keewatin predominating. Unlike the Porcupine, most of the productive veins are found within the porphyry, which is a syenitic variety. Three principal zones of mineralization have been indicated by exploration:—(1) the main or central zone, which runs in a northeasterly direction along the southern expanse of the lake and along which is a group of important producing mines; (2) a southerly zone which lies three-quarters of a mile to the south; and (3) a northerly zone known as the Goodfish Lake gold area.

British Columbia.—The production of gold in British Columbia has varied considerably at different periods. Rapid increases took place between 1858 and 1863, when 189,318 fine oz. were obtained by placer mining. Thereafter a decline occurred until 1893, when a low level of 13,360 fine oz. was reached. Then the introduction of lode mining resulted in a rapidly increasing production until 1902, when previous records were surpassed by an output of more than 288,000 fine oz. With the exception of the maximum output of 297,459 fine oz. in 1913, the record of 1902 has not since been equalled. Though the bulk of the gold obtained in the Cordilleran region has been derived from the placer deposits of the central portion of the region from the Klondike on the north almost to the International Boundary on the south, yet a large amount, averaging 178,039 fine oz. between 1913 and 1921, was obtained by lode mining, largely of the copper-gold ores of the Rossland and Yale boundary districts. The copper concentrates of the Britannia mine also contain gold, as does the blister copper made at Anyox. The output of gold in British Columbia has been in part maintained by the successful operation of the Premier mine on the Portland canal, while the Nickel Plate property, operated by the Hedley Gold Mining Co., has been a consistent producer of gold bullion and arsenical gold concentrates, which are exported to the United States for treatment. The Pioneer gold mine in the Lillooet district has reported a substantial production of gold during the past two years and provision is being made to expand production.

World Production.—A sketch of the development of the gold-mining industry since the discovery of America may take the form of a reference to four successive periods. During the first period, extending from 1493 to 1760, the annual production averaged nearly 337,000 fine oz. The placer mining of Brazil and Colombia swelled the average output of the last 60 years of the period to about 606,000 fine oz. per year.

The production of Russia from placer mining was a considerable factor in the next period, extending from 1761 to 1840, that country retaining first rank among the world's producers until 1837. The average annual production during the period was 565,500 fine oz.