

PLATINUM.

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USES.

Platinum has become a metal of war importance. Many are apt to think of this rare metal as preeminently adapted to settings for precious stones, and at present 50 per cent or more of the platinum used in this country is consumed in the jewelry trade. But the metal is of vital need to many industries upon which success or failure in war may depend.

Dishes and utensils of platinum are absolutely necessary in all chemical laboratories, and upon their laboratories all great industries are dependent for guidance. Several alloys of cheaper metals and china, glass, nickel, or gold can be used to replace some of the platinum for this purpose, but not all the platinum utensils can be replaced by substitutes.

Alloys have been developed for some parts of the ignition systems of internal-combustion engines, but no substitute for platinum has been found for certain delicate parts of the ignition systems, and to insure the proper operation of the automobiles, motor boats, and airplanes called into national service a large quantity of platinum must be available for this use.

Platinum or allied rare metals have wide application in many instruments of precision used in the physical testing of all kinds of materials.

Probably the use of platinum most closely connected with war is in the contact process of making concentrated sulphuric acid, an essential commodity to a great number of industries aside from the manufacture of munitions. An inquiry made by the United States Geological Survey showed that in 1915 a total of 43,888 ounces of platinum was in use in the contact chambers of domestic sulphuric-acid works, and it is probable that this amount was considerably increased during 1916 and will of necessity be further increased.

SUPPLY.

The world's supply of platinum is limited. Russia has furnished about 95 per cent of all the platinum produced, and Colombia has stood second.

As will be seen from the following table, the world's production of crude platinum has been diminishing since 1912.

Estimated world's production of crude platinum, 1909-1916, in troy ounces.

| Country. | 1909 | 1910 | 1911 | 1912 | 1913 | 1914 | 1915 | 1916 |
|--------------------------------------|---------|---------|---------|---------|---------|---------|---------|--------|
| Borneo and Sumatra.. | 500 | 200 | | | 200 | (a) | (a) | (a) |
| Canada..... | 30 | 30 | 30 | 30 | 50 | 30 | 100 | 60 |
| Colombia..... | 6,000 | 10,000 | 12,000 | 12,000 | 15,000 | 17,500 | 18,000 | 25,000 |
| New South Wales and Tasmania..... | 440 | 332 | 470 | 778 | 1,500 | 1,248 | 303 | (a) |
| Russia..... | 264,000 | 275,000 | 300,000 | 300,000 | 250,000 | 241,200 | 124,000 | 57,860 |
| United States..... | 672 | 390 | 628 | 721 | 483 | 570 | 742 | 750 |
| | 271,642 | 285,952 | 313,128 | 313,529 | 267,233 | 260,548 | 143,145 | 83,670 |

a No basis for estimate.

It will be noted that the normal annual addition of crude platinum to the world's supply has varied between 260,000 and 313,000 ounces. This supply is augmented by the platinum produced by refiners of copper matte and gold bullion. United States refiners of gold and copper produce annually about 1,500 ounces of refined platinum as by-products, chiefly from copper ore, of both foreign and domestic origin.

That the supply of new platinum has not been sufficient to meet the requirements is indicated by the very extensive trade in scrap or used metal. Figures are not available for such trade in foreign countries, but in the United States the yearly sales of secondary platinum normally amount to about 40,000 ounces; in 1916 they increased to 49,400 ounces.

Owing to scarcity of supplies and labor due to the war and to the derangement of the platinum market in Russia, her production during 1916 was much below normal. It seems probable that production after the war will not be materially increased over the normal rate, and it may even not come up to normal for some time. Duparc, an authority on Russian platinum deposits, has recently made the assertion that at the rate of production before the war began the known platinum deposits of Russia would become exhausted in 12 years.

Although the platinum deposits of Colombia have been yielding for many years, they have not been developed by engineering methods until recently. Prior to 1914 most of Colombia's platinum output was won by native miners with bateas (wooden pans), but at present a strong company controlled by Americans is developing its holdings with dredges, and the output for the future seems assured. Most of

the platinum heretofore produced has come from the San Juan River drainage basin, but it is known that platinum occurs in the upper part of the Atrato River basin, and it would seem that systematic prospecting of the whole western slope of the Andes in Colombia should be undertaken with a view of increasing the world's supply.

The platinum production of the Australian provinces and of Borneo has been small. The deposits, to judge from reports, are nearly if not quite exhausted and do not hold much promise of great additions to the supply.

In North America platinum is produced from placers in British Columbia and from the copper ores of Sudbury, Ontario. There is a possibility that new placer deposits may be discovered among the western mountains, and reports have reached the Survey of platiniferous gravels as far north as The Pas, in Manitoba.

In the United States most of the small annual output of crude platinum has been won from the well-known placer deposits in California and southwestern Oregon, but a little has come from a gold-platinum-palladium lode in Nevada and a copper mine in Wyoming. The dredges in the foothills of the Mother Lode country have been the largest producers, but so far none of the stream placers in the serpentine belt that feed the dredge ground have been found to carry platinum in sufficient quantity to be economically important. In the auriferous gravels of Trinity, Salmon, and Klamath rivers, in northwestern California, and Illinois and Rogue rivers, in Oregon, platinum is more or less abundant. Much of this country has been prospected thoroughly for gold, but there is a possibility of finding streams in which the platinum has been overlooked. The beach placers on the Oregon and California coasts have also yielded platinum, and it may be possible to further develop this source of supply. Discoveries of platinum in the placer gravels of certain streams in Alaska have been reported from time to time, and in 1916 some platinum was shipped from the Territory.

POSITION OF THE UNITED STATES.

The United States at present is not supplying 10 per cent of its platinum requirements, and while there is some assurance that by systematic geologic investigation, already planned, new placer deposits that will yield platinum may be found and that by a study of the methods of saving platinum a greater yield from all deposits may be had, yet the issue must be squarely faced that in all probability the domestic supply can not be made adequate to meet the requirements of normal times.

An abnormal situation now exists, and it should be considered what steps are to be taken to assure an adequate stock of platinum for the essential uses of the Government. Early in the war England and

France commandeered all stocks of platinum for Government use, and all dealings in this metal in those countries have been closely controlled by the respective Governments. In the United States it has so far proved almost impossible to collect accurate statistics of supplies or production of this metal. It may prove necessary for the Government to commandeer supplies, but it should be possible to count on the patriotism of domestic platinum dealers and refiners to inform the Government fully of all available reserves of this metal. Fifty per cent or more of the platinum used in the United States has been made into jewelry, the larger part of which is now in private possession. It may be hoped that the whims of fashion will yield to national needs and that purchasers of jewelry will demand gold and silver or a white alloy and so release platinum for its highest use.

Steps should be taken immediately to ascertain the quantity of platinum in the United States that could be considered as an available supply, and to adopt some measures for obtaining an adequate reserve of the metal to meet the Nation's needs for war purposes. The needs of munition makers are at present probably supplied from reserves accumulated during the last two years, but the future demands of a the country are inadequately provided for.