very reliable. As an aid to devising some rapid and efficient method of analysis the following experiments were made, which largely speak for themselves:—

Osmiridium.—The separation of the osmiridium group from the noble metals does not present any special difficulty if little silver be present. The ore or black sand is fluxed in a crucible in suitable manner and the lead button cupelled; the resulting bead is rolled out and boiled with dilute sulphuric acid (1 to 10), letting the acid gradually grow stronger; then, after washing, by boiling with nitric acid, again washing and dissolving in *aqua regia*, the osmiridium group alone remains, with perhaps a trace of silver chloride, which may be removed by solution in ammonia. The separation of gold, silver, and platinum presents some difficulty, as the following experiments will show:—

Separation of Platinum from Gold.—Alloys of the composition shown in Table I. were made by wrapping the metals in sheet lead and cupelling. As the experiments gave negative results as far as method of separation was concerned, a series of alloys were made as shown in Table II., gradually decreasing the proportion of platinum to gold.

A number of experiments were made with the alloy, with the same result as that given. After finding that platinum would separate out with this low ratio of platinum to gold, a number of experiments were conducted to ascertain how a higher ratio would separate. The result of one of these experiments is given in Table III.

With 10 mgrms. to the same amount of gold some of the platinum was left in the cornet, so that 7 per cent. of platinum to gold seems to be the highest ratio that can be successfully parted.

400 mgrms. of added silver were found to part as successfully as 500 mgrms., and at the same time to give a more compact cornet, not so liable to break up.

The action of mass seems to play a part in this separation, as 7 mgrms. of platinum, added to 100 mgrms. of gold, parted successfully, but when double the quantity of both metals was taken, as in the alloy of 14 mgrms. of platinum to 200 mgrms. of gold, the cornet did not part; but by increasing the gold to 300 mgrms. it did part. A number of experiments were then made with a view of separating the silver from alloys of gold, platinum, and silver. The results are given in Table V.

A series of alloys of silver and platinum without any gold were also parted, both in nitric and sulphuric acids, but no satisfactory results could be obtained. A separation of platinum from a gold and silver alloy was also attempted by precipitation as potassium chloro-platinite. This, however, presents many difficulties; the alloy is for practical purposes insoluble in *aqua regia* owing to silver chloride being precipitated on the cornet and preventing further action. This difficulty may to a certain extent be overcome by first parting in sulphuric acid and then taking out the last of the silver with nitric acid, washing, and dissolving in *aqua regia*. To precipitate platinum with potassium chloride requires that the solution be fairly concentrated; in doing this it is difficult to prevent the gold chloride from decomposing and precipitating metallic gold. Potassium chloride is to be preferred to ammonium chloride in precipitating platinum, owing to its being slightly less soluble in alcohol.

I desire to express my thanks to Mr. D. E. Whittaker, Government Assistant Assayer, for his aid in carrying out these experiments.

TABLE I.

Alloy.	Result.
Mgrms.	
Gold..... 100 Platinum.. 100 Silver.....1,000	Cupelled, rolled, and boiled in strong HNO_3. Platinum did not part properly.
Gold..... 100 Platinum.. 100 Silver.....1,200	Cupelled, and parted in strong HNO_3: resulting cornet weighed 113·5 mgrms., showing 13·5 mgrms. of platinum retained by cornet. Duplicate, same result.
Gold..... 100 Platinum.. 100 Silver.....1,500	Cupelled, and parted in strong HNO_3: cornet weighed 113·5, showing 13·5 mgrms. of platinum retained by cornet. Duplicate. same result.
Gold..... 100 Platinum.. 100 Silver ...2,000	Cupelled, and parted in strong HNO_3: cornet weighed 112·5 mgrms., showing 12·5 mgrms. of platinum retained by cornet. Duplicate, same result.
Gold..... 100 Platinum.. 100 Silver.....5,000	Cupelled, and parted in strong HNO_3: cornet weighed 95 mgrms., showing that a loss had occurred.

NOTE.—In the last experiment the platinum had not all parted out, giving a dull gray colour to the gold cornet; the cornet was also partly broken up and the particles floated as a fine powder on the parting acid. A loss was occasioned in this manner, and also perhaps by the amount of nitrous oxide evolved in the solution of the large amount of silver.

TABLE II.

Alloy.	Result.
Mgrms.	
Gold..... 100 Platinum.. 20 Silver..... 300	Cupelled and parted first in 21° B. and then in 32° B. HNO_3: resulting cornet weighed 102·7 mgrms., showing 2·7 mgrms. of platinum left in cornet. Duplicate, same result.
Gold..... 100 Platinum.. 15 Silver..... 400	Cupelled, and parted twice in 32° B. HNO_3: resulting cornet weighed 101·2 mgrms. Duplicate weighed 100·2 mgrms.
Gold..... 100 Platinum.. 10 Silver..... 300	Cupelled, and parted first in 21° B., second in 32° B. HNO_3: resulting cornet weighed 100·8 mgms. Duplicate weighed 100·4 mgms.
Gold..... 100 Platinum.. 10 Silver..... 500	Cupelled, and parted in first 21° B., second in 32° B. HNO_3: resulting cornet weigh'd 100·2 mgrms. Duplicate, same result.
Gold..... 100 Platinum.. 5 Silver..... 500	Cupelled, and parted first in 21° B., second in 32° B. HNO_3: resulting cornet weigh'd 100 mgrms., showing that the platinum had all been removed, except perhaps an unweighable trace.