

Seventy-fifth Anniversary of the Discovery of the Platiniferous Merensky Reef

THE LARGEST PLATINUM DEPOSITS IN THE WORLD

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The Merensky Reef is a thin layer of igneous rock in the Bushveld Complex in South Africa, which, with an underlying layer, the Upper Group 2 chromitite, contains 75 per cent of the world's known platinum resources. It was discovered in September 1924 by Hans Merensky, and by early 1926 had been traced for about 150 km. However, large-scale mining of the reef did not develop until a proliferation of uses for the platinum group metals in the 1950s increased demand and price. Successful extraction of metal from the Upper Group 2 chromitite had to wait until the 1970s for metallurgical developments.

In 1923 platinum was discovered in the Waterberg region of South Africa, and alerted geologists to its presence there, see Figure 1. At that time world demand for platinum was not great, and the economic slump during the years of the Great Depression, which followed soon afterwards, reduced demand and price still further. Consequently, the discovery in 1924 was almost before its time.

Platinum, like gold and diamonds, has a high density and forms stable minerals, which accumulate at the sandy bottoms of streams and

in rivers. In early June 1924, a white metal was panned in a stream on a small farm called Maandagshoek, 20 km west of Burgersfort, see Figure 2, by a farmer/pro prospector called Andries Lombaard. Suspecting it was platinum, he sent it to Dr Hans Merensky for confirmation. Hans Merensky was a consulting geologist and mining engineer in Johannesburg. Together, Lombaard and Merensky followed the "tail" of platinum in their pan upstream into some hills on Maandagshoek, where they finally found platinum in solid rock on 15th August 1924.

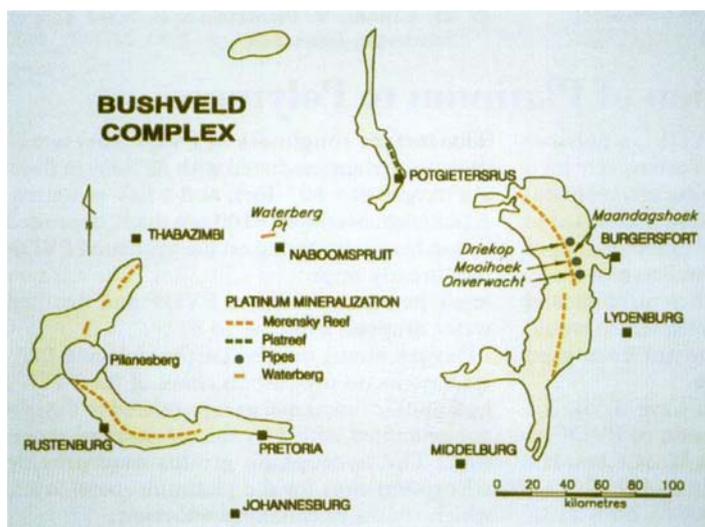


Fig. 1 Geological map showing where the layers of the Bushveld Complex are exposed on the surface, and where platinum is found. The first discovery was in the Waterberg in 1923, followed by the pipes at Mooihoek, Driekop and Onverwacht, and the Merensky Reef on Maandagshoek in 1924. From there Merensky traced the Reef north and south. In 1925 he moved to Potgietersrus where he found a similar layer, the Platreef, and during 1925 and 1926 explored the western arc near Rustenburg

Fig. 2 Panning for platinum in a stream on Mooihoek in the western Bushveld. Dr Hans Merensky, the discoverer of the largest platinum resource in the world, is in the centre of the group

Taken from "Look Beyond the Wind" by Olga Lehmann, published by Howard Timmins, Cape Town



The Bushveld Complex is the huge root of an ancient volcanic region. As the lava inside the earth slowly cooled and crystallised, different minerals formed and accumulated on the floor of the chamber beneath the volcanoes. The layers appear as an 8 km-thick stack of enormous, thin saucers, the edges of which protrude from the surface in two arcs. This basic shape of the Bushveld Complex was already well established by 1924, and in fact, some platinum had been reported in the chromite layers, but at that time it was not economic to mine.

After their Maandagshoek discovery, Lombaard and Merensky found similar platiniferous rocks on Mooihoek and Driekop. They concluded that they were looking at a layer of rock (one of the "saucers") which, because it was more resistant to erosion than those above and below, stood out as a line of prominent hills. They referred to this supposed layer as the Kopje Reef. Not content with one ore body, they searched for other layers, and found one in early

September 1924, only 2 km to the west. This layer proved to be more easily traceable, even though it did not form a prominent topographic feature, but it was more regular in grade. This layer became known as the Merensky Reef, see Figure 3.

Within months of identifying the first outcrop of the Merensky Reef, they had traced it for

Fig. 3 Section through the Merensky Reef mined near Rustenburg. There is a lower, white, poorly mineralised layer. Then follows a thin layer with minute black dots which are chromite and contains abundant platinum. The layer with prominent black and white patches is called pegmatoidal pyroxenite, with yellow nickel and copper sulfides, and contains less platinum. Near the top is another layer of fine black chromite dots also rich in platinum. The vertical scale is 40 cm. However, the minimum mining width is 80 cm, so a considerable thickness of poorly mineralised rock has to be extracted as well as the thin reef

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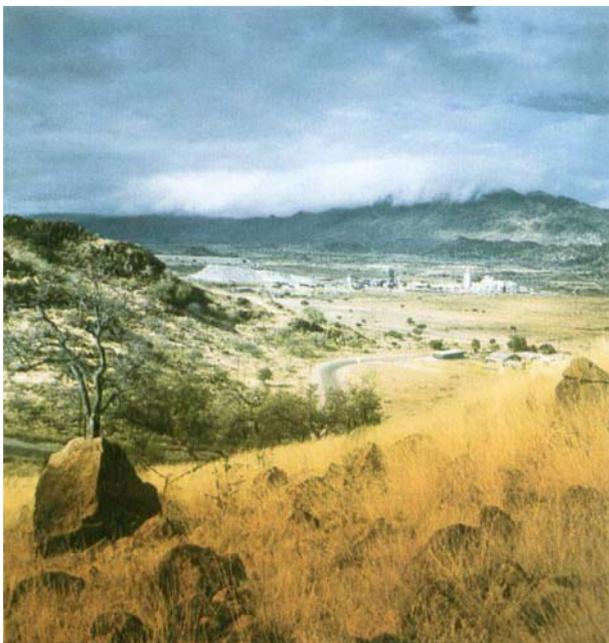


Fig. 4 View of the Atok platinum mine looking north. The mine lies in the Bushveld Complex about 80 km north west of Maandagshoek, the site of the discovery of platinum

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80 km. Still not content, Merensky moved to other places where the Bushveld Complex crops out. In 1925 he identified platinum mineralisation, now called the Platreef, at Potgietersrus, and shortly afterwards traced it from near Pretoria, through Rustenburg, to Thabazimbi – by 1926.

The only other platiniferous ore to be identified in this region is in the Upper Group 2 chromite layer, 40 to 200 metres below the Merensky Reef. However, before this could be successfully exploited – in the 1970s – major metallurgical challenges had to be overcome.

Ironically, towards the end of 1925, further exploration and mining revealed the fact that the Kopje Reef “layer” was not actually a layer, but a series of vertical, conical pipes, totally unconnected near the surface. Hence, Merensky’s discovery of the greatest platiniferous ore body in the world may have been based on an incorrect interpretation of the geometry and geology of the first, small patches of mineralisation.

There may be an alternative explanation for Merensky’s thoughts as his prospecting progressed. In an article in the *South African Mining*

and Engineering Journal, dated 10th January 1925, he reported that the initially panned sample sent to him by Lombaard contained “gold and platinum”, and his description of the mineralisation in the Merensky Reef, in the same article, referred to “gold, and above all, platinum”. Why did Merensky place such emphasis on gold, when it was a relatively small fraction of the total

precious metal content? None of the vertical pipe ore bodies of the Kopje Line contains gold, although the Merensky Reef does in fact have a modest gold content. The panning and sampling of the Kopje Line would have produced plenty of platinum, but no gold. Instead of euphoria at finding platinum mineralisation in the Kopje Line, did Merensky realise the significance of the absence of gold? Did he then realise that these pipes were not the source of the panned gold, and thus perhaps not the source of the platinum either? If so, is this the reason why he immediately extended his search beyond the Kopje Line, until he found the ore body which contained traces of gold? Therefore, using gold traces to identify platinum mineralisations, may be why, four months after his momentous discovery, he writes of gold before platinum in his reports, even though what he had discovered and was describing is the greatest platinum resource in the world.

Merensky died in 1952, before platinum came to be extensively exploited, so he did not live to see the great contribution that his discovery of platinum, in the reef named after him, was to make for the benefit of mankind.