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South Africa—Neutrinos in a Gold Mine Title 173

Perhaps because of its somewhat dangerous nature, I shall never forget my descent to a depth of 3287 meter into one of South Africa's deepest gold mines, the East Rand Proprietary Mine. I had come to see where the first naturally occurring neutrino had been found. I was accompanied by Professor J.P.S. Sellschop, the discoverer of the neutrinos, and hence we were given all necessary priority on our descent, supervised by the General Manager of the mine. The first 1200 meter were in a standard mine hoist down a vertical shaft, but then we had to transfer to three consecutive small cages, rattling down inclined slopes in total darkness and sinking at a breath-taking speed.

At every transfer, a crowd of waiting black miners were pushed aside to give us an empty cage—'whites only' was the policy here as everywhere else in South Africa. It was not stated in the mine, it was natural for our VIP party. With all our priority it took us more than 30 minutes to reach the bottom. A normal miner takes one hour for the descent, a time for which he is not paid.

At the lowest level, where it was relatively quiet after the very noisy cages, Professor Sellschop told me that he had there measured a temperature of 60 °C at which any human labour would be impossible without refrigeration of the ambient air which brought it down to a comfortable 33 °C. This I measured myself on my own small portable thermometer. A long tunnel, hewn out of solid rock especially for the neutrino experiments, housed a small wooden hut for conventional electronic equipment to monitor and count the neutrinos. This hut had additional air-conditioning equipment, reducing the temperature again to only 22 °C, cold for me, but essential for the electronic instruments.

In the tunnel I saw the 4 meter long glass scintillation counters, arranged in various geometrical patterns, occupying most of the tunnel. I cannot remember now if I was told how these long glass cylinders had been transported to their position, but it could not have been an easy task. In these tubes, filled with carbon tetrachloride, neutrinos filtered from other radiation particles by the 3 km thick rock above, produced muons which can be counted and it was thus that on 23 February 1965, as a bronze plaque on the wall reminded one, the first neutrino in nature was discovered at this very spot.

After inspecting the neutrino experiment, I crawled to the one-meter high rock-face, where African miners free the gold containing conglomerate from the rock for a 6 shilling daily pay— a miserable wage indeed at whatever currency conversion rate was applied at the time of my visit. At these great depths, there is also the constant danger of pressure bursts which kill each year 25 to 30 miners in this one mine alone. However, smoking is permitted and I could puff my cigar in the deepest laboratory of the world! My story was published a few days later in London.

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