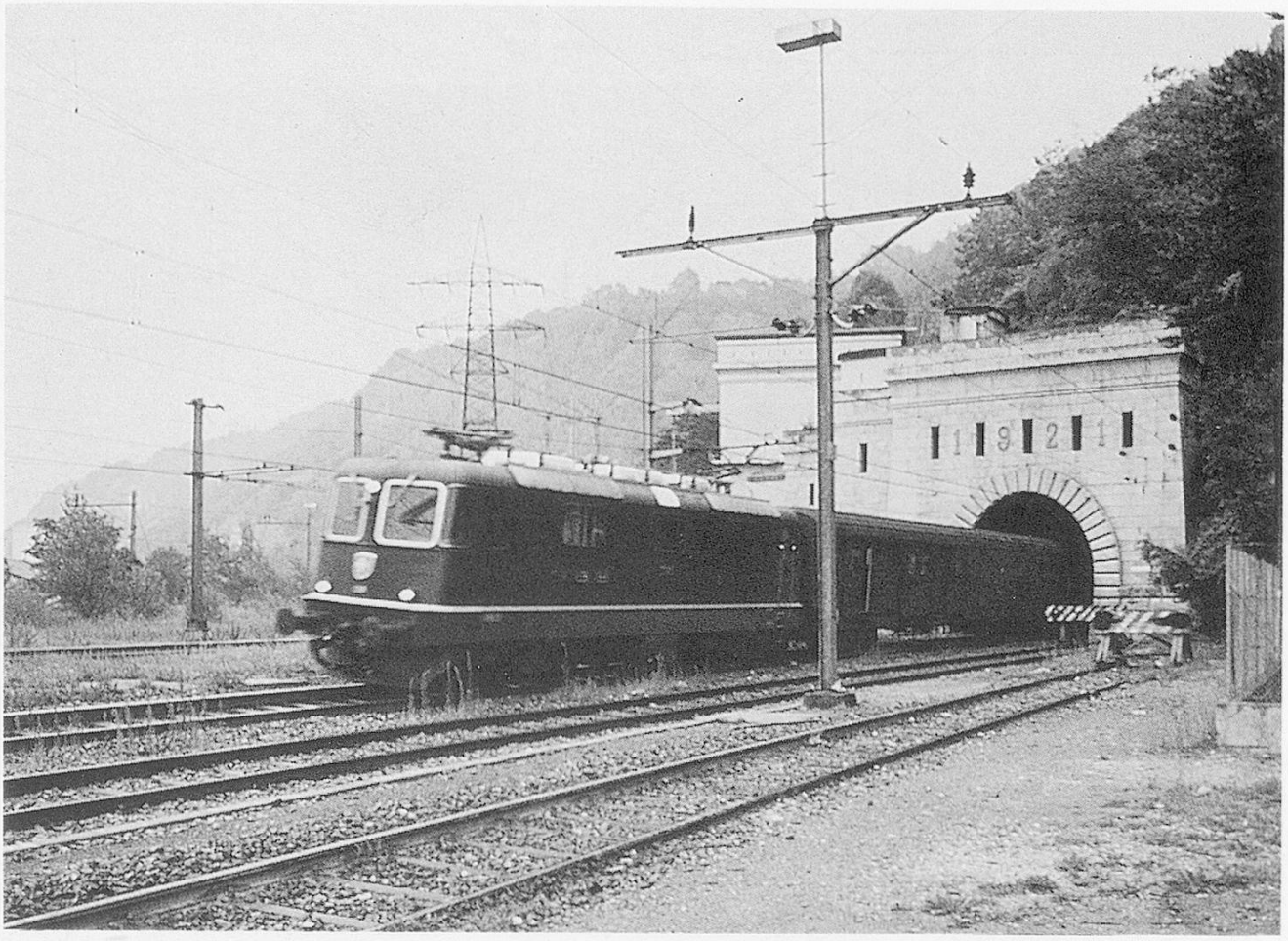
The Simplon Tunnel. Part 1, The first bore



In miserable weather, an Re4/4^{II} emerges from the second (Northbound) bore of the Simplon tunnel. Beyond the locomotive is the Southbound track, leading to the original tunnel.

The Simplon Tunnel Part 1

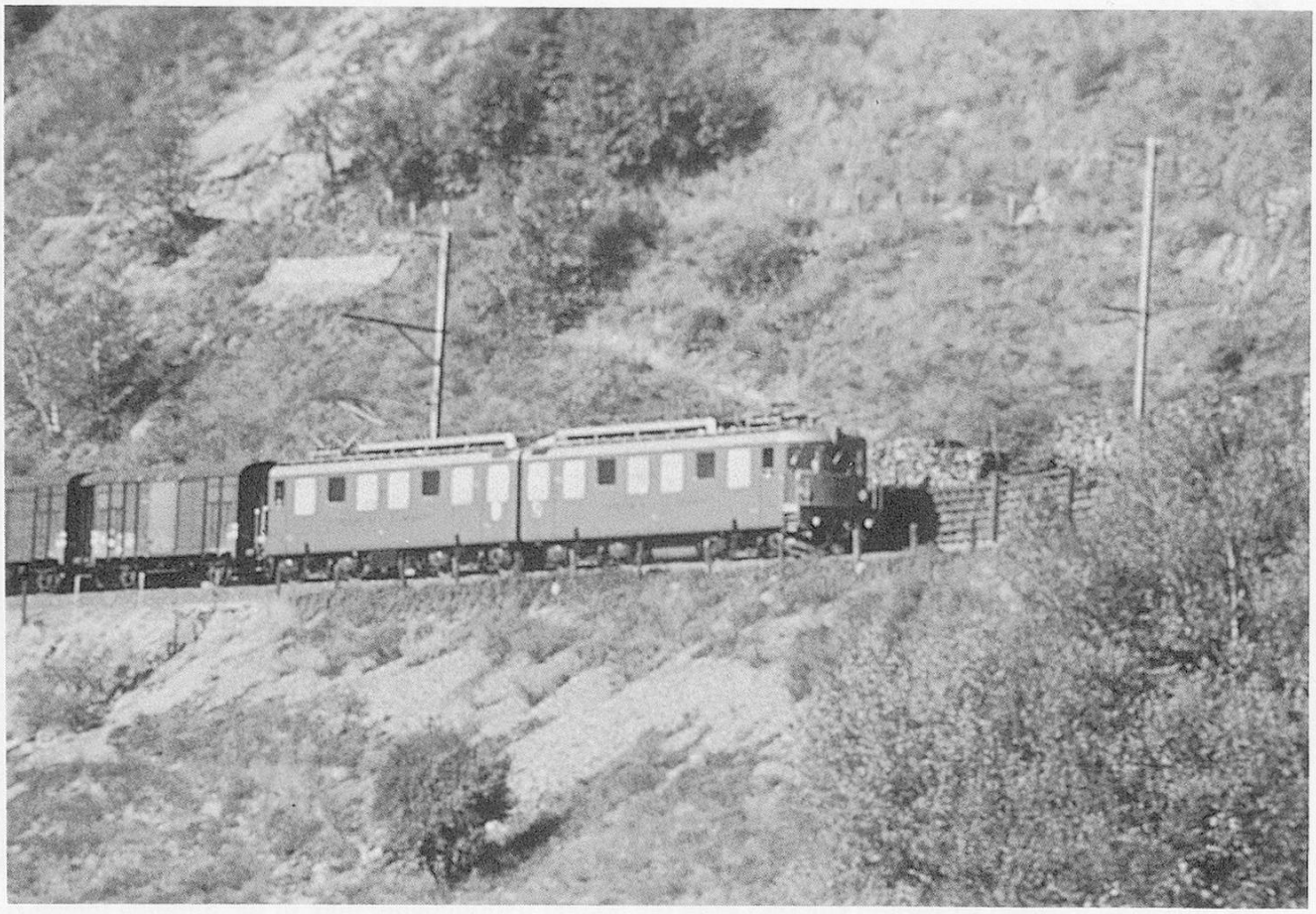
The First Bore.

by John Jesson

All photographs by the author

The piercing of the Simplon Massif was first suggested in 1857, following the proposal to build the Mont Cenis tunnel. This initial scheme fell by the wayside, and Western Switzerland had to be content with the construction of access lines towards the Simplon. These commenced in 1859 with a railway from Bouveret, on Lac Léman, to Martigny. This line was extended, reaching Sion in 1860 and Siders in 1868. This was as far as the route had progressed when the Simplon Railway Company, founded in 1875, took over the lines and extended them to reach Brig on 1st July 1878. The incorporation of the JS (Compagnie de Chemin du Fer du Jura et Simplon) in 1889, by which time the Gotthard tunnel had been completed for seven years, led finally to serious consideration being given to plans for a Simplon tunnel. The history of the approach lines has been covered by Giles Della Gana in the September 1992 issue of *Swiss Express.*

The scheme finally adopted attracted world-wide attention, eclipsing the Gotthard and Mont Cenis tunnels, while it was to be nearly twice as long as the Arlberg tunnel. The designs called for a tunnel having a maximum clear width of 4.5 metres at rail level, enlarging to 5.0 metres at a height of 2.0 metres above rail level, and with a maximum height of 5.5 metres. The tunnel was to be single track, but with provision for driving a second bore at a later date, the cost of this second bore being fixed in the original contract. Alongside the main tunnel, at a distance of 17 metres from it, was to be a 2.5 metre auxiliary tunnel. Connected to the main tunnel at intervals of 200 metres, it was to provide ventilation and assist in the construction. This auxiliary tunnel would be, at a later date, opened out to form the second bore. It was contended that widening



BLS Ae8/8 on the last stage of the journey to Brig

the bore to full dimensions would be a simpler task than cutting a completely new tunnel, hence the fixed price in the contract.

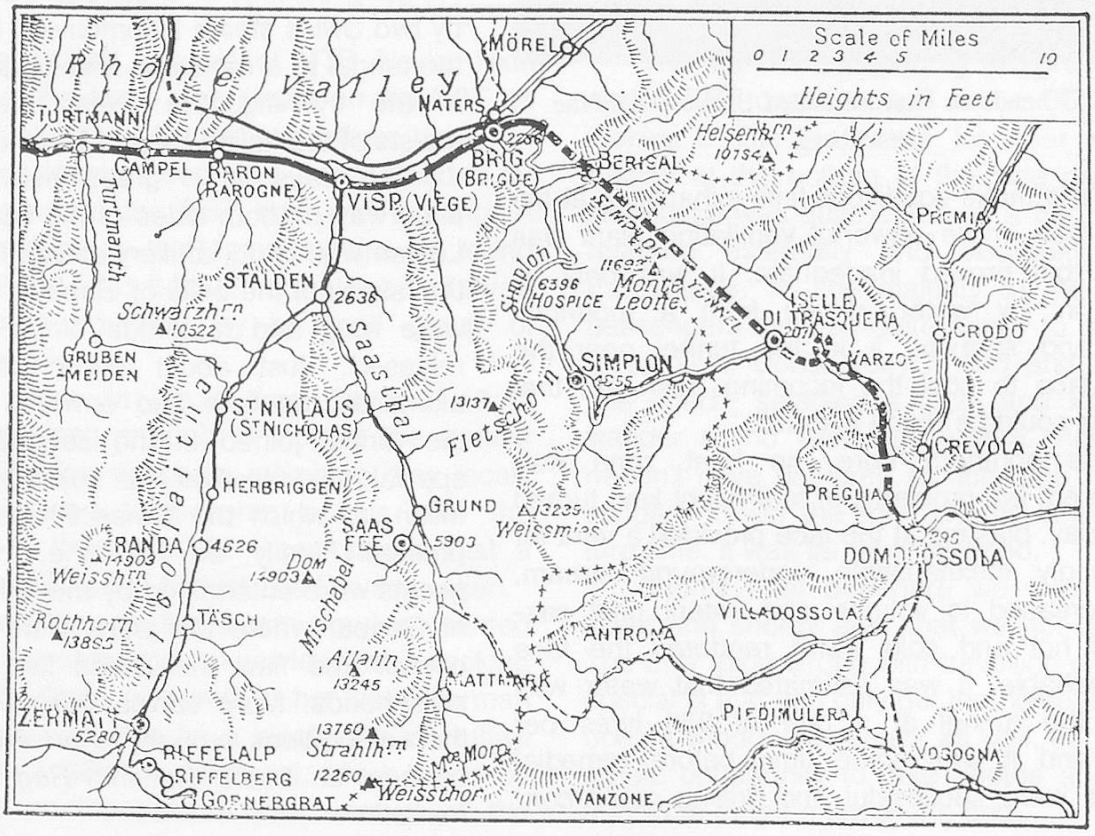
The Swiss portal, about 1.5 km beyond Brig station, is at an altitude of 686 metres. A rising gradient in the tunnel, for drainage, takes the elevation to 705 metres before dropping to 633 metres at the Italian portal, just under 1 km from Iselle di Trasquera station.

The contract for this immense undertaking was signed with the specially - formed firm of Brandt, Brandau & Company, of Hamburg, on 15th April 1898. Later that year boring commenced, on the Swiss side on 13th August and on the Italian side on 16th August. The auxiliary tunnel was driven slightly in advance of the main tunnel, and considerable use was made of it to ease construction. Narrow-gauge tracks were laid in both tunnels, with men and materials being brought to the heading along them. After the wagons had been off-loaded, they were filled with the spoil from the blasting. Water which entered the works was diverted to the auxiliary bore, from where it ran to the entrance. A large fan at the tunnel entrance drove a continuous stream of fresh air into the auxiliary bore. The air was directed through the transverse gallery nearest the face, the other galleries being closed by doors. Foul air, dust and gases from the blasting were driven down the main tunnel by the fresh air flow, to be expelled into the open at the tunnel mouth.

It was planned that the final breakthrough would be in November 1903 and, at first, progress was so rapid as to lead to expectations that the tunnel would be completed well ahead of time. It was not to be.

Naturally, it was expected that temperatures would rise as progress was made into the heart of the mountain, with a maximum of about 36°C expected at the eighth kilometre from the entrance. However, 6.4 kilometres in, the temperature had already started to soar at an alarming rate, reaching 45°. Thinking that this must be a local phenomenon, the workmen were urged to greater effort, to get through the high-temperature zone. To everyone's surprise, the temperature continued to rise until, at a point 8.5 km from the entrance, it reached a maximum of 52°C.

Re4/4^{IV} 10101 *Vallée de Joux* awaits its next duty at Brig



Map of the Simplon tunnel

BLS 163 heads an express out of Brig towards the Lötschberg.

To try to make conditions less exhausting at the working face, more powerful ventilating plant was installed, but proved inadequate. It was only by bringing in icy water, drawn from a mountain stream, and spraying it in the tunnel near the working face to cool the incoming fresh air, that conditions could be made tolerable.

In the southern bore, no heat zone was encountered, but problems of a different kind turned up. One day, blasting at the face provided a vent for a seemingly inexhaustible underground stream, which increased in volume and extent until cascades of hot and cold water rendered the face unapproachable. It was estimated that water was entering the tunnel at a rate of 950 litres per second, and it was some time before remedial measures were successful and drilling could continue.

Water was not the only problem in the southern bore. In one area, "living rock" was encountered, where it seemed that the dense granite was imbedded in a thick, viscous substance, allowing the rock to move. In reality, the movement was due to the intense pressure. Timber baulks were snapped and splintered by the rock, and even iron supports were badly bent. The movement of the rock was only stopped by the use of huge concrete blocks and the toughest steel that could be made.

In the face of such difficulties did the workmen struggle forward, and it was not until 24 February 1905 that the two bores met, with a difference of 20 cm in the horizontal plane and 9 cm in the vertical. In completing their task, the 4,000 men had removed nearly one million cubic metres of rock. Four million shot holes had been bored, and 1.37 million kg of dynamite and 5,250 km of fuse used. The undertaking had cost a round £3 million.

The ceremonial opening took place on 17 May 1906 in the presence of King Victor Emmanuel III and the Swiss President, Ludwig Forrer. On a cold, miserable day, the King of Italy, in a special train hauled by two Swiss steam locomotives, traversed the tunnel to a reception and lunch at Brig. In the evening, the Swiss party were guests of the Italian King at Domodossola.

Ten days later, great festivities got underway on both sides of the border. Lac Léman was lit up, artillery salvos fired from the lakeside, the bells of Genéva cathedral were rung and hundreds of air balloons released. Just about every community alongside the lake and onwards towards the tunnel joined in the celebrations. A special music festival was held at la Scala, Milan, at which the Swiss President was present. Finally, on 1st June, the Swiss guests were entertained by the Italian Navy at Genoa, where the ships were dressed overall and flew the Swiss flag at their mast-heads. More salvos were fired, and the celebrations brought to an end with a banquet on board the ship *Regina Margherita*.