Rail and Road Traffic in swiss Mountains [to be concluded in next Issue]

RAIL AND ROAD TRAFFIC IN THE SWISS MOUNTAINS

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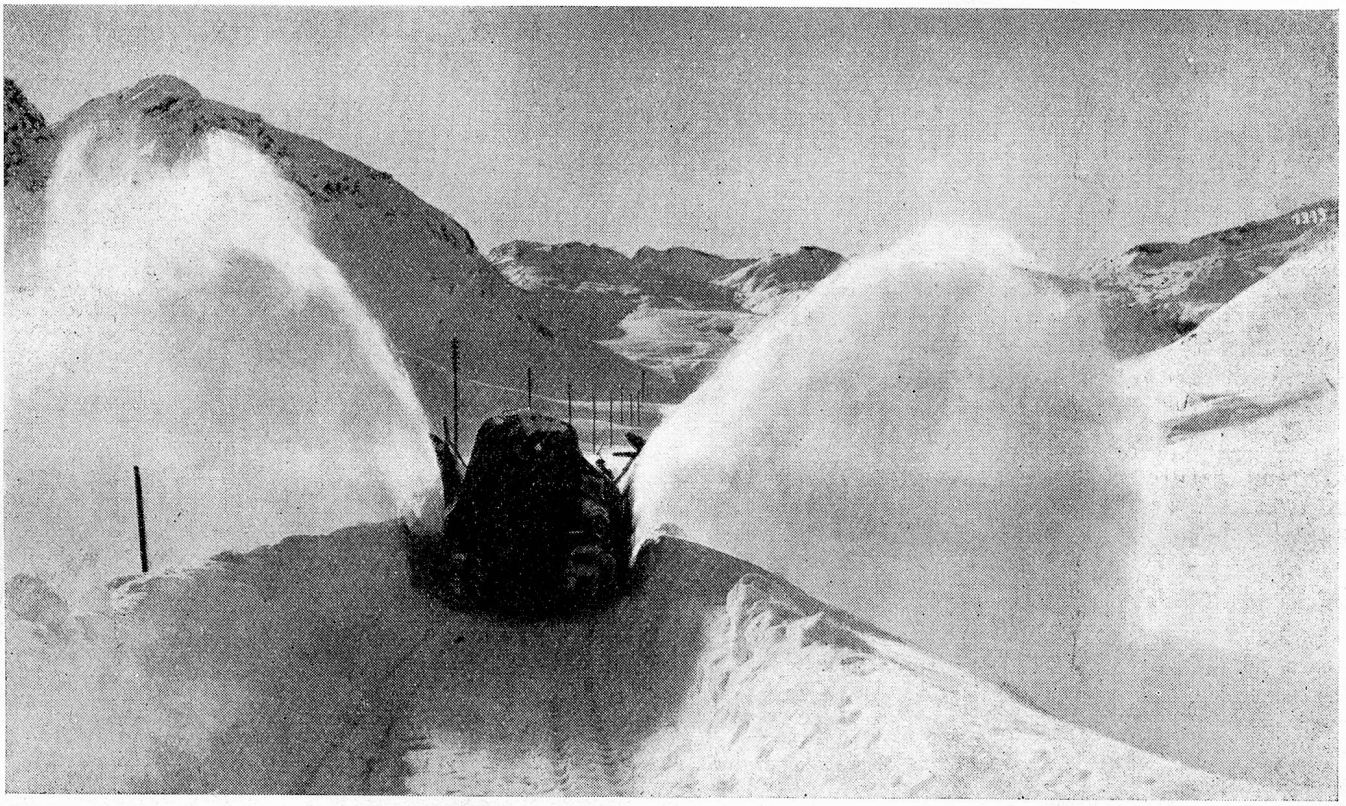
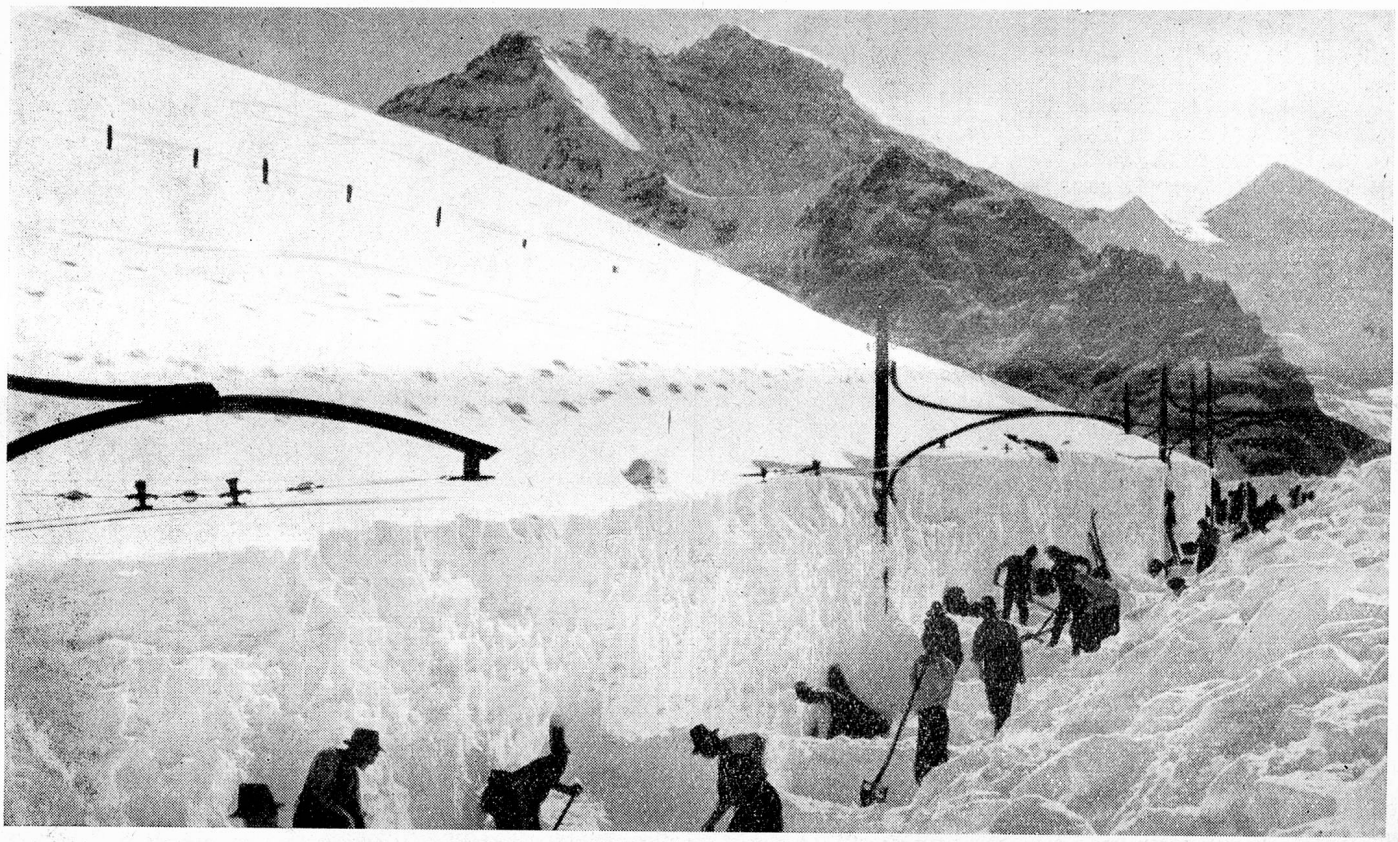
It may truthfully be said that both road and rail transport all over the world have, as far as regularity of service and comfort are concerned, reached a very high standard. Equipment and rolling stock have been adapted to the configuration of the country and, as far as possible, to the physical operating conditions. Transport both by road and rail at low altitudes and in comparatively flat country presents few difficulties. It is seldom and even then to a small extent affected by the forces of nature, especially unpredictable and often sudden changes in weather conditions. When we come to a mountainous country like Switzerland, these conditions alter or rather worsen with every 1,000 feet elevation. It is evident that both rail and road follow the course of least resistance. They keep as far as possible to the bottom of valleys and often run parallel with mountain torrents which, when in spate, are as much a danger to transport as ice, snow and avalanches in the winter. In the British Isles there is generally-speaking, little to fear in this respect. In Switzerland, and for that matter in all countries of the alpine region, conditions are quite different. The danger of blocked or cut railway lines and roads is present from November until the late spring. Furthermore, heavy frost and especially ice tend to impede the normal working of signal installations and track points. Operational safety is thereby greatly reduced. Signal box, gantry — and carriage steps and platforms are slippery with ice or frozen snow and are a danger to life and limb. Shunting is considerably slowed down. Road surfaces are covered with a coating of ice and are sometimes impracticable even for large vehicles with heavy chains. But the most serious traffic impediment is snow in its various forms and effects.

A heavy blizzard will reduce visibility to a few yards and cover signal lights in no time. Falls of snow to a depth of 5 to 6 feet in 12 hours are by no means uncommon. Strong winds either with, or following, a heavy fall often cause, especially in cuttings, an accumulation which takes heroic efforts to clear. All this may happen at comparatively low altitudes where there is little danger from avalanches. In the mountains, however, nature adds this new handicap. How real and terrible in its effect this can be was shown during the winter 1950/51 when an avalanche disaster of great magnitude overtook Switzerland, with grievous loss of life, extensive material damage and disorganisation of rail and road traffic. Avalanches are common in the alpine region. They are a natural phenomena there, but almost unknown in this Country. You will, therefore, perhaps allow me to give you a rough idea how they happen and behave. I should perhaps start by mentioning that snow varies a great deal in consistency, weight and texture. Freshly fallen dry powder snow weighs roughly 30 kilos per m3. Wet snow which generally falls in large flakes may weigh as much as



Clearing the Julier Pass by means of a Rotary Snow Plough of the Swiss General Post Office.



Snow Clearing by hand — Jungfrau Railway near Kl. Scheidegg.

120 kilos per m3. Snow is not a static material. It so to speak breathes and changes in consistency, in weight and crystalline texture under the influence of varying temperatures and other factors. This causes in any snow field interior strains and stresses. The adhesional force which makes it adhere to its base, that is to say to a grassy or rocky slop, alters constantly . Therein lies the danger.

Needless to say, and this applies both to road and rail transport in the mountains, certain precautions are taken to guard against avalanches long before the winter sets in. Some of them are permanent. Of these I shall speak later. They are, however, in themselves not sufficient.

As soon as the snow season starts, in the mountains as early as October, a very careful watch is kept on danger areas, and especially on weather conditions, variation in temperature, type and direction of the wind, etc. Nature's whims are often unpredictable, but it is possible to classify the various degrees of danger, roughly as follows :—

— Air temperature under freezing-point, powder snow up to 2 feet, light wind, clear or nearly clear sky means safety.
— Air temperature above freezing-point for some time, wet snow to the depth of 2 to 5 feet, light warm wind, called " Föhn ", or light rain, constitute a warning.
— Air temperature consistently above 32°F., heavy snow fall followed by rain or persistent Föhn gales, spell great danger.

Late winter, early spring and, at very altitudes, early summer are therefore especially dangerous periods.

Avalanches are of two main types : " Staublawinen " and " Grundlawinen." Literally translated the former means " dust avalanche ". It is so to speak airborne and consists of loose dry snow which travels with ever increasing speed more or less parallel to the ground. Its main destructive power lies in the tremendous air pressure created by its downward swoop. This force is sufficient to flatten whole forests, carry away buildings, road vehicles and to derail trains. The " Grundlawine " or " ground avalanche " consists of a mass of solid snow which has accumulated high up on a slope. Through interior strains and stresses caused by changes in temperature, rain or warm winds, it starts first to " creep " and cracks appear on its surface. As the adhesional force to the base diminishes, the movement increases and the whole weight, in many cases thousands of tons, is precariously balanced on the slope. At this stage a shout, a sound of a shot, or an animal, human or otherwise, walking or skiing in the vicinity, will start the avalanche. With tremendous force, preceded by a roaring gale of compressed air, it rushes valleywards, gathering not only speed but large rocks, tree trunks and almost anything else in its way. Torrents and rivers on its course are dammed and overflow. Roads and rail tracks are either carried away or buried under a huge pile of snow and debris. Some of the worst features of these avalanches are the suddenness with which they occur and the havoc and human misery they create. They are by no means infrequent, as the following figures show : In January last year Switzerland suffered the following avalanche casualties :

98 people lost their lives,
162 heads of cattle destroyed,
368 sheep and goats perished,
919 houses destroyed.

It is, by the way, a remarkable fact that at the height of the winter sport season there were no victims amongst our guests from abroad.

To give you an idea of the paralysing effect avalanches can have on railway traffic, I would mention that on January 20th, 1951, 56% of the Rhaetian Railway system in the Grisons was out of commission. Similar disasters occurred in other parts of Switzerland, notably at Andermatt and Zermatt.

The winter 1950/51 was, however, exceptional. Unusually heavy falls of snow and adverse weather conditions generally were responsible for these disasters. In normal years the danger is less acute, although always present. But the normal precautions against the adverse effect of heavy snow falls are sufficient to keep communications open. Avalanches do occur every winter, but their courses are known and each of them has a tendency to come down at a certain time, so much so that they have their names like for instance crack trains. This facilitates measures to harness or to deviate them. It is therefore the avalanches in unexpected places and at unpredicted times which are so dangerous.

It is evident that the Railway Companies, the Swiss Federal Post who run their own coach lines, and Motoring Organisations do their utmost to protect their installations and the lives of their passengers against the special dangers to traffic at high altitudes. I would ,therefore, now like to give you an idea of what has been done to achieve this aim. Measures vary according to the type of transport and locality. Let me begin at home by telling you how state-owned Swiss Federal Railways guard against these contingencies.

Most of the standard gauge system of the Swiss Federal Railways, except the Gotthard Line, lies at a fairly low altitude, in the foothill of the alps and the central Swiss plain. There, winter weather and other operational difficulties peculiar to the mountains do not call for extraordinary measures. Nevertheless, even at less than 2,000 feet above sea level, mist, frost and snow can be very troublesome. Precautions are therefore taken long before the onset of the winter, and plans are made to assure smooth running under all conditions. All outdoor signal installations are kept clean and well oiled. Special tools for snow and ice clearance are reconditioned and made available in sufficient quantities. A supply of dry sand for use on platforms, running boards, etc., is kept ready. Water pipes and tanks are protected against frost and bursts with insulating material. High and low tension electrical installations are carefully examined. Motive Power Sections check the good working order of snow ploughs and centrifugal rotary snow sweepers. Alarm rotas for additional personnel required day or night in case of emergency are prepared.

The winter season's first traffic handicap is dense mist, followed later by frost and snow. Each presents its own problem. Fog will reduce visibility to less than a few yards and deaden sound. Special care is therefore required in shunting yards where accidents and great delays are not infrequent. Ofter frost adds to the difficulty by rendering brakes less effective. Snow in small quantities will not seriously interfere with railway operation provided track points are kept free and in working order. The latest type of electrically operated points are now provided with heating elements. Salt is not used, as it creates rust. A naked flame is also inadvisable for defrosting electrically operated gear, as it is likely to burn through the cables. In the stations snow can be cleared by means of brooms or hand-operated snow ploughs. Falls to the depth of 3 to 4 feet in 12 hours are, however, often met with, even in the lowlands, and call for a sustained effort to keep trains running. Of first importance is a sufficient number of additional workers for the task of

CITY SWISS CLUB

ANNUAL GENERAL MEETING

on **Tuesday, April 22nd, 1952,** at **6.30** for **7 p.m.,** at **Brown's Hotel, Dover Street, W.1.**

Agenda: Minutes of last meeting.
Admissions.
Resignations.
President's Report.
Treasurer's Report.
Elections.

Members wishing to be present should send their card to the Manager of Brown's Hotel, Dover Street, W.1, to reach him not later than, Saturday, April 19th, 1952.

THE COMMITTEE.

snow clearing. This is where the emergency staff rota I mentioned earlier comes into operation. As a first task, points and signal installations have to be cleared and put back into working order. In the meantime Motive Power will have made arrangements to free the line itself by running a wedge-shaped snow plough or, if necessary, a powerful rotary snow sweeper pushed by an electric locomotive. Other workers will clear the station approaches, platforms, etc. They will also shake the snow from telephone and telegraph wires or, if broken by the weight of snow, repair them. Speed is important in order to avoid late trains and ensure the prompt delivery of goods.

Earlier I mentioned the Gotthard Line, the main international rail highway through Switzerland from North to South. Between the shores of Lake Lucerne and Göschenen at the entrance of the main tunnel, a distance of 24 miles, there is a difference of altitude of 2,172 feet. On the north side, the track runs more or less parallel with the river Reuss, partly in the open, partly in tunnels. Elaborate precautions are taken throughout the year to protect the track against falling rock and in the winter against avalanches. Rockfaces become unsafe through erosion by frost. Especially after the spring thaws and periodically throughout the year, likely spots are examined and made safe. When it rains in the lowlands, it snows in the mountains. Therefore the likelihood of severe frost and heavy falls of snow increases as the line gains altitude. At Göschenen depths of several meters are not uncommon. On such occasions up to a hundred extra men are needed to clear the station and keep the line open. Avalanches do occur every winter in the Reuss-Valley, but the Gotthard Railway and the road are so well protected by stone and wood barriers placed at strategic points that the masses of snow seldom reach the traffic lanes. For the same purpose pine trees are planted across gullies and dangerous slopes. These forests are protected by Law, and to fell a tree is a serious offence.

The only narrow gauge line owned and operated by the Swiss Federal Railways runs from Lucerne over the Brünig to Interlaken via Meiringen and Brienz. As its culminating point lies at an altitude of 3,314 feet, is can for our purpose be classified as a mountain railway. I mention this line to show that in this case the configuration of the terrain it serves, and not the altitude alone, is responsible for avalanche disasters. The whole of the mountain tracé — roughly between Sarnen and Meiringen — is fairly free from this danger. The vulnerable area lies between Brienz and Interlaken at the level of Lake Brienz (1,873 feet), where the lateral valleys and gullies from the steep Brienzer-Grat collect masses of drift snow. Avalanches are not uncommon in this region, and in March 1945, the line was cut and covered with snow and debris to the depth of 5 meters or about 15 feet.

As I have already mentioned, the battle against the forces of nature, the efforts to guard against them and the cost of safety installations are greatest where we have to deal with high mountain railways. The same applies to motor traffic over the alpine passes. I would, therefore, now like to give you an idea how and at what cost in effort and money some of these

undertakings manage to keep open to traffic under the most adverse conditions.

The only normal gauge international main line in Switzerland which is not nationalised is the Berne-Lötschberg-Simplon Railway. It links Northern France and the Swiss capital with the Rhone Valley and Italy. Operating conditions are similar to those on the Gotthard Line. The Lötschberg is a typical alpine railway. It was built between 1906 and 1930 at the cost of about 9 million pounds. The passenger who travels through this enchanting and often awe-inspiring mountain fastness hardly realises that an additional half million pounds were spent on special safety measures and constructions to protect the line against rock falls, avalanches and damage by mountain streams which in early summer when the snow and ice melt turn into raging torrents. There is, above Goppenstein at the northern exit of the main tunnel, a section of the line especially exposed to danger by avalanches. Its length is 443 metres, and the amount spent on constructional work was 650,000 francs or 1,470 francs per metre. Almost for the whole distance of 23 miles from the southern exit of the main tunnel of Brigue, the line is carried high up on the rocky walls of the Lonza and Rhone valleys, where avalanches are frequent. As a result, the train passes through a succession of avalanche galleries. I am almost certain that their number is a record for so short a distance. Curiously enough they hardly interfere with the magnificent view, as most of them are open towards the valleys. Many of these constructions all along this railway are models of their kind and often visited by interested experts from abroad.

(To be concluded in next issue.)

ELSIE ATTENHOFER PERFORMANCE.

March 27th, Institut Français.

Every seat was sold in advance for this great entertainment — and apparently some more, because extra chairs had to be brought in while the organisers were in despair where to accommodate irate ticket-holders. The crush to get in proved to be well worth while. Our Swiss Ruth Draper or, if you will, Yvette Gilbert, unfolded a rich and varied programme with consummate skill to the delight of 400 compatriotes and English and other friends of Switzerland.

Miss Attenhofer opened with our old folk-song " S'Vreneli am Thunersee ", followed by an English and a Ticinese folk-song, all of which were much applauded. For a Swiss artist to come to England to interpret English Folk Songs such as " The Tree in the Wood " or " The Drummer and the Cook " great daring and self-confidence are required. Whether she quite succeeded with our English friends we do not know. To her compatriotes the song duologue between the drummer and the cook could not have been more funny. The negro song by Max Werner Lenz, however, definitely failed to get across, the argumentative pathos of the plaint not corresponding to our own experience of the mellow sentimental simplicity of the negro-world. In " le vieux château, " however, a dramatic song from the Yvette Gilbert repertoire, Miss Attenhofer succeeded in capturing the audience so completely that she sent shivers down our backs as the old lady shivered with fear in her lonely vigil in her inherited castle.

The second part of the Programme opened with a delightful " Sunday Conversation " of a Bernese lady of leisure with her beau over the telephone. No doubt Miss Attenhofer must have felt herself that here, in