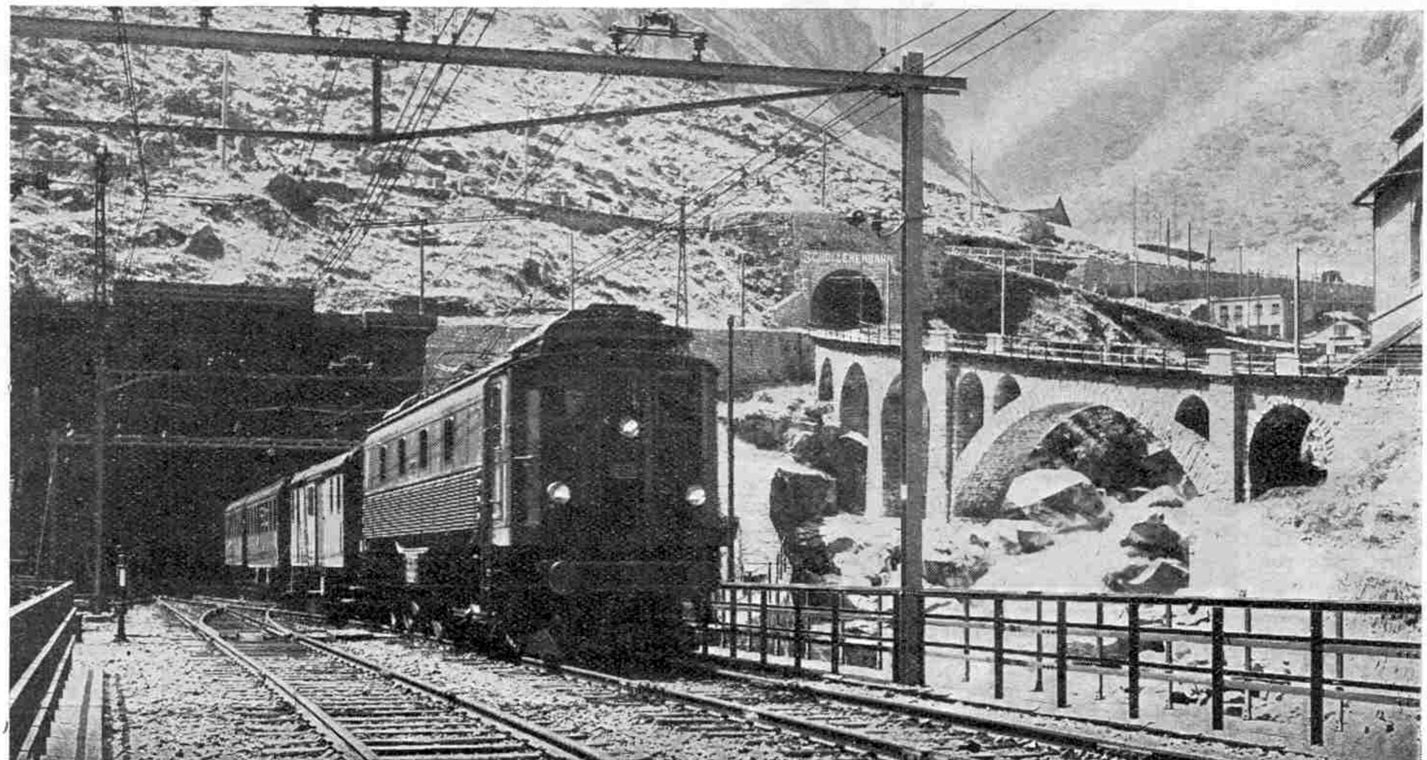
SWISS, FRENCH AND ENGLISH RAILWAYS COMPARED

By H. E. Underwood



Photo] Northern Entrance to the St. Gothard Tunnel, at Göschenen [*Swiss Federal Railways*

As is the case with the inhabitants, the railways of the various countries of the world all have certain distinguishing features, and it is always interesting to compare foreign locomotives, rolling-stock and methods of working with those of our own railways. The following article deals with the more interesting and important points of difference between British railways and those of France and Switzerland.

Railway Organisation

First of all, there is the difference in the organisation of the respective railways. In Great Britain and France the lines are owned by various private companies, but in Switzerland the railways for the most part are owned by the State. For this reason they are called the Swiss Federal Railways, which name includes practically all the main lines and a large number of the branch lines also. On the other hand, the Swiss mountain lines—"funiculars" as some of them are called—are owned by various companies, and they form an interesting class quite apart from the ordinary railways. Mountain railways were briefly described in last month's "*M.M.*" and we have another article in preparation.

In France there are six railway systems—Nord, from Paris to Calais and Belgium; Est, Paris to Germany and Basel; P.L.M. (Paris—Lyons—Méditerranée), Paris to Lyons, Marseilles, the Riviera, Italy and Switzerland; Paris—Orleans, Paris to Bordeaux and Nantes; Etat, Paris to Bordeaux, Brest and Dieppe; and Midi, lines at the foot of the Pyrenees, centred round Bordeaux and Toulouse.

Of these lines only one, the Etat, is owned by the State, and all of them except the Midi have one or more terminal stations in Paris. (Incidentally it may be mentioned that the locos and rolling-stock of the Hornby Trains in France are lettered to correspond with either the P.L.M., Nord or Etat lines).

The Track

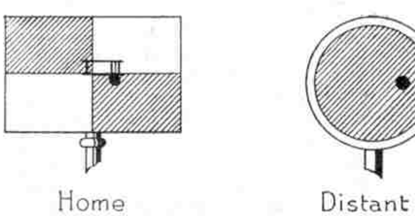
Turning now to the technical and mechanical differences between the railways of the three countries, we will deal first with the track itself.

In England and on the Etat, Orleans, and Midi railways of France, double-headed rails are fitted in chairs and held in position by wooden blocks. In all other countries a rail of Vignole type is secured to the sleeper by means of a spike driven on each side, bolts being used instead of spikes in the case of metal sleepers.

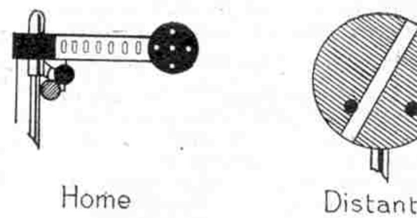
The main lines generally have two tracks in France and in Switzerland, although this is less frequently the case in the latter. Local lines in both countries are always single-track. Four-track lines, which are so common on main lines in England, do not exist in Switzerland. In France they are to be found only on a few main lines for a short distance out of Paris. The standard gauge of the Swiss and French Railways is 1.435 metres, slightly over 4 ft. 9 in., as compared with the British gauge of 4 ft. $8\frac{1}{2}$ ins.

Stations

Stations in France and Switzerland differ in many respects from those in

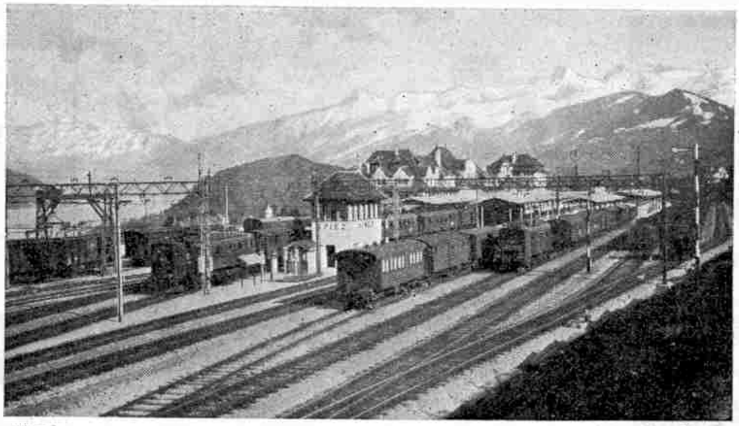


French Signals



Swiss Signals

England, the most noticeable difference being in regard to the platform. In France and Switzerland, and in fact in nearly every country in the world except England, the platform consists of a simple pavement raised only a few inches above the level of the track. Such a thing as stepping directly from the platform into the carriage is a luxury known only in this country and on certain electrified lines in the United States. In nearly all other countries boarding a train or leaving it is a matter of climbing up or down, as the case may be!



Photo] [G. Schneiter, Thoune

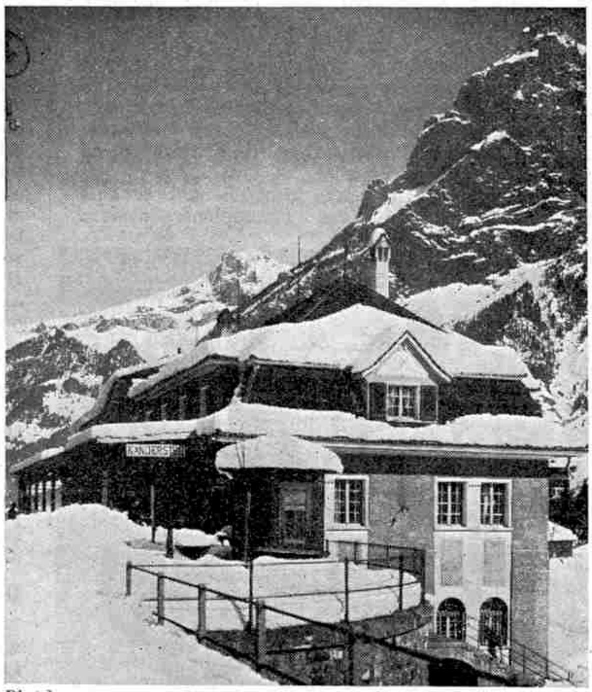
Spiez Station, an important Junction

An electric locomotive of the Lötschberg Railway is seen on the left, near the signal box, and a signal, seen from the back, to the right.

Another point to be noted is that all Swiss stations are "open"—that is to say, entrance is free, the tickets being examined in the trains. In England and France, and in many other countries also, the stations are closed and tickets are punched or collected at the station entrance or exit. In such a case, entrance to the stations is confined to passengers, the booking hall being situated outside the control gate. In many cases, as in this country, friends seeing passengers off, or meeting trains, are allowed on the platform on production of a "platform ticket," which is obtainable for a small sum (one penny in this country) either at the booking office or from an automatic machine near the station entrance.

Swiss stations are generally built to conform to the style of their surroundings. In the mountain districts they are mostly designed on the lines of the neighbouring "chalets." In the cities, however, they are planned on lines in keeping with the other public buildings, and compare favourably in architectural beauty with the stations of any other country. The stations of Lausanne, Bienne, Basel, Lucerne, and Thoune are specially fine buildings.

In France the station buildings, with the exception of those in and around Paris, are as a rule unsatisfactory and frequently not too clean.



Photo] [G. Schneiter, Thoune

Kandersteg Station in Winter

Signalling Methods

The signalling methods adopted on the various railways are as interesting as they are important.

In Switzerland the system does not differ a great deal from that in use in England. The "home" signals are of the semaphore type, but for "distant" signals green discs are used, which face the track to indicate "danger" and are turned face upward for "line clear." At night two green lights are shown for "danger" and two white lights for "line clear." The "home" signals show one red or one green light respectively for danger or safety. There are also specially-shaped signals, coloured blue, for controlling shunting movements.

French signalling is more complicated, but judging from the number of accidents on French railways it does not appear to be any more satisfactory than the English or Swiss systems. On French lines a distinction is made between signals for block-sectioning and those for what is called "station protection." The first class of signals take the form of semaphores rather similar to English "home" signals. These are used only between stations for block-sections. The other signals are placed at all points requiring special protection—junctions, stations, etc.—and they are used also as "starting" signals. They are known as "*carrés*," the name being derived from their peculiar form, which is that of a flat square plate divided into four equal parts, which are coloured alternately red and white. The "distant" signal is a disc as in Switzerland, but the French signal indicates "line clear" when the face is parallel to the track. There are, of course, other types of signals in France, mostly discs coloured green, blue or yellow, but those just described are the most important.

Photo] [Swiss Federal Railways

St. Gall Station

Tunnels and Bridges

As is only to be expected in a mountainous country, tunnels and bridges occur very frequently on Swiss lines, and are often on a larger scale than those of England or France. The most noted are the three great Alpine tunnels—the Simplon ($12\frac{1}{4}$ miles in length), the St. Gothard ($9\frac{1}{4}$ miles) and the Loetschberg (9 miles). Other tunnels over five miles in length are the Ricken tunnel between Wattwil and Uznach (near the Lake of Zurich), the Moutier-Granges tunnel on the Bienne-Basel line, and the Hauenstein lower tunnel between Olten and Basel.

The St. Gothard Tunnel

The construction of the St. Gothard Tunnel was commenced in September 1872, driving proceeding from each end. Progress was made at the rate of 304 yards per month at each end when using rock drills. The chief difficulty in boring occurred where a variation in the condition of the strata to be traversed caused the drill to diverge sideways to softer rock and thus jam itself in the hole. The headings were joined on 29th February 1880, seven years and five months from the commencement of work. To show how greatly the adoption of improved machinery had speeded up the work it may be mentioned that the average daily advance of the two headings was six yards as compared with $2\frac{1}{2}$ yards at the Mont Cenis Tunnel, to which reference will be made later. A considerable amount of water was encountered, whereas scarcely any water at all was met with in the Mont Cenis Tunnel.

The St. Gothard Tunnel was found to be $8\frac{1}{3}$ yards shorter than had been calculated. The centre lines of the northern and southern sections of the tunnel, although prolonged for more than four miles from each extremity, differed in direction only by 13 in. at their junction, while the error in level was

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The Conquest of the Air—

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aileron control in monoplanes is almost always due to lack of torsional stiffness in the wing.

The bracing struts and pins by means of which the wings are attached are easily removed, allowing the wings to be quickly and easily folded alongside the fuselage. When this is done the overall width is only 9 ft. so that the machine may thus be easily stored or transported. Hinged inspection doors are fitted on each wing allowing the levers and control cables to be easily inspected.

Steel Tail Unit and Original Undercarriage

Owing to its small dimensions the tail is built entirely of steel. The spars and edges are of steel tube and the ribs of pressed sheet steel suitably lightened. The tail plane is triangular in shape, with the apex forward. It hinges on the fuselage transom to provide tail plane angles. The elevators extend across the whole span of the fixed tail. After disconnecting the operating rods it is only necessary to unscrew two set screws to remove the elevators.

A distinctive and original feature of the machine is the undercarriage. The legs look something like two Pogo sticks and contain compression rubber blocks which are used with a double acting oleo cylinder. Springing is thus obtained from the combined deflection of the tyres, axle, and shock absorber legs.

The tail skid is a straight piece of cane of circular section, fitted with a shoe at its lower end and fixed to the fuselage top member fitting.

The Engine Mounting

The engine mounting is an entirely separate unit from the fuselage, allowing different types of engines to be used. Made of tubular steel with swaged rod cross bracing, it has been specially designed to withstand the shock of persistent misfiring.

Various types of engines may be fitted to the "Pixie" including the 1070 c.c. flat-twin Bristol Cherub, direct drive or geared; the Anzani inverted V twin; the 3 cyl. Radial Blackburne or the A.B.C. engine.

A five-gallon petrol tank is provided and this is fitted with a petrol level indicator, whilst the oil tank holds three quarters of a gallon. The engines are oiled by mechanically-driven pumps.

Convertible to Biplane

The machine is readily converted to a biplane for the use of beginners by the addition of top planes and interplane struts. All "Pixie" machines are very easily handled by means of only a finger and thumb on the joystick, and it is claimed that the machine will fly hands off in all but really bad weather.

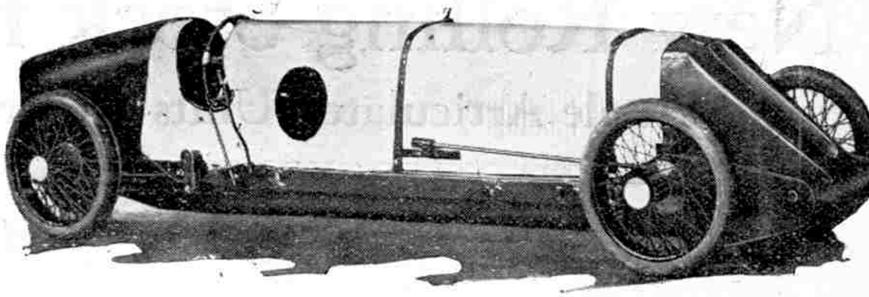
The machine can climb to 4,000 ft. in 15 minutes and has been "stunted" quite a lot. She loops, rolls, and spins very well.

It will be seen that the Parnall Pixie III. is thus an ideal machine for the use of light plane clubs.

NEXT MONTH:—

DE HAVILAND "MOTH."

Another Racing Car in Meccano



By the courtesy of the Editor of "*The Autocar*" we are able to reproduce the above illustration of a clever model of a racing car, which is made chiefly of Meccano parts. The constructor of the model is Mr. D. M. Dent, who states that as yet no engine has been fitted although the small electric motor has run the car very successfully.

The drive is taken through a plate clutch to a three-speed and reverse constant-mesh gear-box, fitted with gate-change, thence by a universally-jointed propeller-shaft to a differentialless back axle. The brakes are of an external contracting type working on a servo principle, and operated by cable through a compensating gear by the hand lever. The steering drop lever is placed in a horizontal position, thus giving the steering column a pronounced rake.

The main body and fairings are made of thin gauge sheet zinc, while the tail is hammered out of sheet copper. The tail, chassis, undershield, and cowl are painted bright green, while the bonnet and scuttle are white. The wheelbase is 26 in. and track 10 in.

Swiss, French and English Railways Compared—

(*cont. from page* 325)

only 2 in. The tunnel, which was not actually ready for traffic until early in 1882, cost £2,300,000.

The Simplon Tunnel

The cutting of the Simplon Tunnel was a bigger undertaking than that of the St. Gothard, but the lessons learned in constructing the latter tunnel enabled the engineers to adopt various improvements in order to render the work easier.

During the construction of the St. Gothard Tunnel no less than 800 of the workmen died, mainly through the lack of proper ventilation and means of keeping down dust. In the Simplon Tunnel the ventilation arrangements were all that could be desired—in fact we are told that the current of air was strong enough to blow a man's hat off! The clouds of dust that arose after the firing of each of the blasting charges were laid by opening a valve immediately after each discharge, and thus allowing five jets of water to play upon the splintered rock. The great improvement effected by these means may be judged from the fact that, during the whole period of construction, only 60 lives were lost from all causes.

Triumph of the Engineers

Work on the Simplon Tunnel was commenced in November 1898. For some time all went well, but in 1901 the workmen cutting from the Italian side reached a very soft stratum in which the rock appeared to be alive. The movement, of course, was caused by the enormous pressure imposed by the weight of the mountain above. The strongest baulks of wood were crushed like matchwood and solid iron supports were bent in all directions and finally collapsed. As a last resource the space between the beams was filled with quick-setting concrete, which withstood the strain sufficiently long to enable a thick masonry lining to be built strong enough to resist all pressure.

Another and even more serious trouble was encountered by the Swiss workers. While the Italians were being delayed on account of rock pressure, the Swiss workers got well ahead and reached the centre point first. They then decided to drive galleries down-hill in order to meet the Italian party, but unfortunately they encountered springs of extremely hot water, which ultimately compelled them to abandon the work after erecting heavy iron doors to keep back the water.

By this time the Italian engineers had overcome their own particular difficulties and were pushing on, and shortly they too met the hot springs that had held up the Swiss. In spite of all efforts to keep the temperature within reasonable limits by mixing cold water with the hot streams, work in the main tunnel was impossible. The engineers were far from beaten, however, and by means of gallery and cross-cut they were able to circumvent the springs and push on with the work. Finally on 24th February 1905, the last section of rock was pierced.

Accuracy of Cutting

The remarkable accuracy with which the cutting of the Simplon Tunnel was carried out is shown by the fact that in the total length of over 12 miles the headings were out of alignment only 8 in. laterally and 3½ in. vertically, while the estimate of the total length of the tunnel was only 31 in. less than the actual length. The tunnel cost £3,000,000 or about £150 per yard.

It is interesting to note that the Simplon Tunnel was opened almost exactly 100 years after the completion of Napoleon's military road over the Simplon Pass.

Circular tunnels are also frequent on the lines through the Alps. The Gothard line has seven of these tunnels, and the Albula line of the Rhaetian Railway has five between Bergun and Preda, a distance of only about eight miles.

Bridges and viaducts in Switzerland are generally graceful and imposing and cross valleys and gorges at a dizzy height. The Wiesen viaduct, for instance, on the Rhaetian Railway, is 288 ft. in height and 688 ft. in length, and it crosses the Albula river by a single centre span 180 ft. in width. On the Swiss Federal Railways the Grandfey bridge near Fribourg is 250 ft. in height and 1,252 ft. in length.

(*To be continued*)

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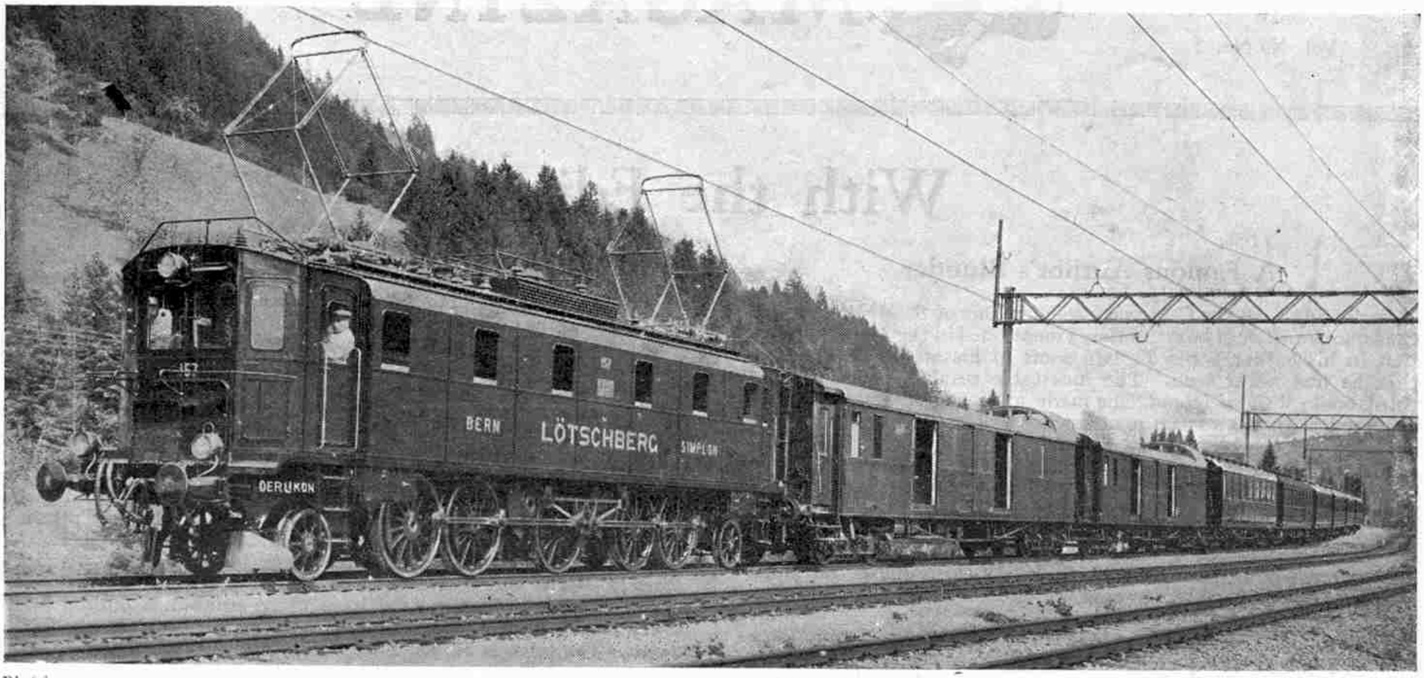


Photo] [Machine Works, Oerlikon

Express on the Loetschberg Railway

(Concluded)

LAST month the first instalment of this article dealt with Swiss, French and English railway organisation and we described also the famous Swiss tunnels of St. Gothard and Simplon. We now describe a famous French tunnel, the Mont Cenis, the best-known of all French tunnels, for it was the first tunnel through the Alps and connects France with Italy. The line here is worked (electrically) by the Italian railways as far as Modane on the French side.

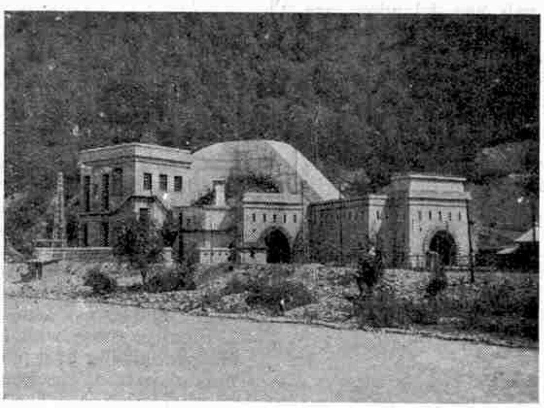
The Mont Cenis Tunnel

The construction of the Mont Cenis Tunnel was a remarkable engineering feat for its day. Work was commenced at both ends of the tunnel in 1857, the boring of the holes for the blasting charges being done by hand until the end of 1860 at the southern heading and until 1862 at the northern heading. Compressed air rock drills were then introduced and the average rate of progress was nearly trebled. It was speeded up even more during the last few years of the work.

The rock along the southern or Italian portion of the tunnel was on the whole easier to work than that on the French side, so that the two headings met at a point 2,107 yards nearer the French end than the Italian end. The wall between the two headings was cut through on Christmas Day 1870, 13 years and 1 month from the commencement of the work, and by the following day the aperture was sufficiently enlarged for the tunnel to be traversed from end to end.

The tunnel proved to be 15 yards longer than had been calculated, and the small error of 12 in. in level was probably due to this discrepancy in length. The direction of the two headings was perfectly correct, showing with what accuracy the alignment had been made from the two ends. Two short curved tunnels were subsequently made near each end to connect the railway in the tunnel with the approach railways on each side, with the result that the actual length of tunnel through which the trains run is very nearly eight miles.

The opening of the Mont Cenis railway for traffic took place in 1871, nearly a year after the tunnel headings had been joined. The tunnel cost about £3,000,000 or £225 per yard.



Swiss entrance to Simplon Tunnel, near Brigue. The electric ventilating plant is seen on the left

In passing we may note that all other French tunnels are less than three miles in length.

There are many important bridges and viaducts in France, notably the Morlaix viaduct on the Rennes-Brest line, 183 ft. in height. Generally speaking, these French structures have much in common with those on English lines and therefore do not require any special description.

Speeds and Non-Stop Runs

Before passing on to describe the locomotives and rolling stock it will be interesting to consider two points of great importance to all railways—the average speeds and the length of non-stop runs. Before the war comparatively long non-stop runs were a regular feature on the French railways. The Paris-Royon express, for instance, ran regularly from Chartres to Thouars, a distance of 149 miles, without stopping. This may not seem a very brilliant performance when compared with that of certain Great Western trains in England, but the absence of really long non-stop runs in France must be attributed to the lack of water troughs on most of the main lines. The world's record for speed was held for a short time by the Paris-Brussels express, which ran from Paris to St. Quentin in 93 minutes at an average speed of 62 miles an hour. The normal average speed of a French express train is between 50 and 56 miles per hour.

In Switzerland the latest type of

Photo courtesy] [*Swiss Federal Railways*

Express Train at Fluelen Station, St. Gothard Railway

electric locomotive has a maximum speed of 56 miles per hour. The fact that there are no faster locomotives than this in Switzerland is due to the majority of the lines traversing hilly or mountainous country, and good climbing capacity is therefore the quality most looked for in a Swiss locomotive.

Owing also to the nature of the country, curves have had to be constructed of comparatively small radius, thus imposing a further obstacle in the way of high speeds. Long non-stop runs are very rare and what was once the longest of these—from Lucerne to Bellinzona, a distance of 106 miles—has now been discontinued.

French trains are noted for keeping bad time and it is by no means unusual for a train to arrive at its destination an hour late or even more. We can scarcely imagine the remarks that a regular passenger on, say, the "Flying Scotsman" would make if he had to travel in France! In this country we are so accustomed to our trains—at any rate our main line expresses—arriving dead on time, that we scarcely appreciate what this means. After even a few day's travel on the Continent, however, we are in a better frame of mind to understand how efficient our railway science really is.

The bad running of the French trains has a serious effect upon the Swiss railways, as most of these are international. For instance, the Swiss railways take over through cars from Paris to Milan at the French frontier and hand them on to the Italian railways at the Italian frontier. Thus if the French trains are late, the Swiss trains are delayed in consequence. This applies not only to the main line expresses but also to the branch line trains, for the latter have to wait for the expresses and so the delay is handed on.

Switzerland, being surrounded by four countries, has to act in railway matters as an intermediary between them, and has rightly been called "The Turntable of the Railways of Europe."

Rolling Stock

Turning now to the rolling stock, we find at once that there are great differences between the systems of the three countries, especially for local trains.

Swiss coaches for local trains are planned on the lines of a tramcar, in that they have a door at each end opening on to a platform. Steps at both sides of these platforms assist travellers to climb into the car, and an opening at the end with a small folding metal floor allows the conductor to pass from one end of the train to the other.

These coaches are usually six-wheeled, while express coaches are eight-wheeled. The interior of the carriages is similar to that of English carriages for the first class, the second class is a little better than the British third, and in the third class, as on the Continent in general, there are no cushions, the seats being of wood like those in a tramcar.

In France the coaches on local trains, like our English coaches, are built on the side-door system.

All sleeping cars belong to the International Sleeping Car Company, which has its headquarters in Paris. This company owns sleeping and dining cars on all European railways except in Germany. In Switzerland the dining cars, except those in international service, are owned by the Swiss Dining Car Company. The various "trains de luxe," including the Simplon-Orient Express (Calais to Constantinople and Athens), are made up exclusively of sleeping, dining and luggage cars owned by the International Company.

Goods wagons are of the same type all over the Continent and are larger than English wagons. Most of them are fitted with the Westinghouse brake, so that brake vans are never seen.

Photo] *Jullien Frères, Geneva*

Southern Entrance of Loetschberg Tunnel, at Goppenstein

Locomotives

And now we come to the most interesting and distinctive feature of all railways—the locomotives.

In France, electrified lines are very few and therefore steam locomotives only will be considered in that country. The best express on the Nord system, the Paris-Brussels "flyer" to which we have already referred, was hauled by a "Baltic" compound loco capable of working a 400-ton train at 75 miles an hour. This company, as also the P.L.M., has a number of American engines brought over during the war, some of which still had "U.S.A." painted on the tender in 1921. On the P.L.M. the fastest trains are drawn by 4–6–2 locos, while many 4–6–0's are used and also a number of 4–6–4 tanks. A speciality of this line is the "Mastodon" 4–8–0 compound, while the Paris-Orleans has several 2–10–0 ("Decapod") locos. The last-named line uses 4–6–2 compounds for its expresses.

A new and powerful engine designed by M. H. Mestre, engineer of the Est Railway, has recently been tried, and 50 others of the same type have been ordered. This loco is of the 4–8–2 type and is over 80 ft. in length.

The above-mentioned locomotives represent some of the types in general use on French railways, and it will be noticed that the compound engine is greatly in favour.

Swiss steam locomotives on the Federal Railways are mostly 4–6–0 compounds for express trains, 2–10–0 and 2–8–0 for goods, and 2–6–0 or 2–6–2 tanks for local trains. The electric locomotives are principally of the 2–6–2, 2–6–4 or 2–4–4–2 types for express and local trains and 2–6–6–2 for goods traffic. The maximum speed is about 56 miles per hour for the express locos and about 40 miles per hour for goods engines.

Colour of Locos and Coaches

In France the colour of the rolling stock varies according to the owning company. The Paris-Orleans and Nord systems, for instance, have green coaches, while on the P.L.M. the coaches are dark red, yellow and green for first, second and third classes respectively.

The locomotives are usually coloured by their own smoke, but if by any chance some paint is visible it is green!

Swiss steam locos are black and the electric locos red. Coaches on the Federal railways, at present, are mostly black, but they are gradually being re-painted green, especially on the electrified lines. On the other Swiss railways the colour of the rolling stock varies, as in France.

Passenger trains on French lines are divided as follows:—The "train de luxe," to which we have already referred; the "rapide," which stops at very few stations; the "express," a fast train but which stops at all important stations, and the "omnibus," which stops everywhere.

In Switzerland there is the "train de luxe"; the "direct," which is the fastest train; the "omnibus," which stops at all stations; and in addition on some lines—Geneva-Lausanne, for instance—the "train-tramway," which stops at every station and also at a number of small

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Swiss, French and English Railways

(Continued from page 379)

"halts," consisting of two gravel platforms and a wooden shed.

Electrified Lines

The only important electrified lines in France are the local lines of the Paris-Orleans railway round Paris, and a section of its main line worked by American and Swiss-built locos, the latter being of the 2–8–2 type and the most powerful locos in Europe using continuous current. The Midi railway has electrified several lines in the Pyrenees, single-phase current at 12,000 volts being used.

Electrification plays a more important part in the railway system of Switzerland than in that of any other country in Europe. Having practically no coal without importing it, but having almost unlimited water-power at her disposal, Switzerland naturally has turned to electricity as the most economical source of power for her railways.

Many lines have had electric traction from the first, as for example the Loetschberg Railway and most of the narrow-gauge lines.

The Swiss Federal Railways, with a network of over 1,800 miles, had a particularly serious problem to consider when, in 1916, they decided to electrify the whole of their lines. First of all it had to be decided what system of current should be used, and after long consideration single-phase alternating current at 15,000 volts was determined upon. Previous to this, however, the line through the Simplon tunnel, from Brigue to Iselle, had been electrified with three-phase current at 3,000 volts, and this system was subsequently extended to Sion on the Lausanne line. After a good deal of discussion it was decided to leave this line as it was for the time being, and to electrify all other lines on the newer system.

An extensive programme of work was drawn up and immediately taken in hand, and to-day the following lines are operated by electricity:—Basel-Lucerne-Gothard-Chiasso, Zurich-Lucerne, Zurich-Arth-Goldau, Zurich-Olten, Berne-Thoune and the continuation by the lines of the Loetschberg Railway to Brigue and Interlaken, Lausanne-Sion-Brigue-Iselle, Lausanne-Yverdon and Lausanne-Vallorbe.

Work is in hand on the Geneva-Lausanne line and on the Berne line as far as Palézieux, and these sections will be completed by the end of this year. Work is also in progress on the Berne-Olten and Zurich-Coire lines and others will follow in due course. In addition, the whole of the lines of the Rhaetian Railway have been converted to electric traction.

Thus the three great international railway routes through the Alps are now worked electrically, and it will not be many years before our old friend the steam locomotive has become extinct in Switzerland.

Furka Line Nearing Completion

The Swiss metre-gauge Furka railway was begun many years ago, but the war intervened and only the section from Brigue to Gletsch was opened for traffic. Work has now been resumed, and it is expected that the whole line, passing through the Furka and Oberalp Passes to connect Brigue with Disentis, will be complete by next summer.

How Iron Wire is Made—(cont. from p. 405).

the wire, after having been steeped in acid, is passed through a spelter vat and the coating thus obtained is evened out by passing the wire through a heap of sand before coiling again. Tinning is done similarly with block tin, the only difference being that the surface is made smooth by passing the wire through compressed rubber instead of sand. Japanned wire is merely dipped into vats of hot Japanning liquid.

For the purpose of making springs, steel wire is used, but the process of drawing remains the same.

Packing the Wire for Delivery

The methods of packing coils of the finished wire vary according to the gauge of the wire and whether it is intended for export or for the home trade. Coils of large gauge wire for export are tied up into 1 cwt. lots, after which those of 16 in. diameter are placed inside those of 24 in. diameter and the two are tied together in one bundle, two of these bundles making a final bale which is sewn in sacking, five bales to the ton. For home trade the 1 cwt. lots are packed in paper, no further packing being necessary. All the packing that Japanned wire receives consists of tying it into bundles of 2 cwt. for export or 1 cwt. for home trade.

Smaller gauge wire requires more packing. For export, 28 lb. coils are covered with waterproof paper and packed in casks specially constructed for the purpose, whereas for home trade the coils are wrapped in ordinary brown paper and then sewn up in bags each containing 1 cwt.