Engineering: Sea and Land

Light Railways for New Zealand.

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It cannot be denied that there exists in many parts of New Zealand at the present time a veritable railway hunger. During the past few months deputations of representative men have come literally from the east and from the west, the north and the south to impress upon the Minister for Railways the urgent need and superior claims to consideration of their respective districts for branch railways. It is not merely a twice, but a twenty times, told tale, and in spite of the practically uniform answer given to each body of applicants, the making of deputations still goes on. The Minister's reply on each occasion may be summarised thus:—

(*a*) The Government admits that the district would be greatly benefited by having a branch railway to it or through it, and it expresses no doubts as to the traffic possibilities, but

(*b*) The completion of the country's trunk lines is of paramount importance, and will require for the next few years the whole of the money that it is possible to obtain by the same borrowing policy

(*c*) And when the trunk lines are finished, branches will be duly considered, and some of them will be built.

So plainly, emphatically, and repeatedly, has the Government made these statements that its attitude ought to give pause to those committees which are preparing "to bring under the notice of the Minister the great natural resources and traffic prospects" etc. Neither the Minister, nor anyone personally acquainted with the districts concerned, questions either the resources or the present difficulties of marketing them, but the best of propositions cannot be carried out if money is lacking. As a matter of hard fact, however, a number of these desired branch lines are not payable propositions, and, if constructed, would throw a greater or lesser burden on that part of the railway system which does pay. Few people realise what a traffic should be, in volume and character, to justify the construction of a railway, and perhaps fewer still consider the matter very seriously, when it is a question of their district obtaining transport facilities without having to shoulder the whole of any loss resulting. While the unanswerable argument as to the concentration of the money on the trunk lines is available, the Minister has no need to discuss with deputations the probabilities of branches paying; but later on, when some money is available, not a few districts will be hard put to show prospects that will warrant railway construction on a business basis.

With a more general recognition of the really hopeless outlook for branch lines during the next few years, public attention will more readily turn to the building of light railway systems by local bodies, and it may be by private enterprise also. Already there are some County Councils giving this matter their earnest attention, and from 30 to 40 miles of track are now under consideration in districts where the burden of road transport and road maintenance is becoming too heavy to be borne. The light railway is not much understood by the general public in New Zealand, and perhaps on this account it is regarded as something a long way removed from the usefulness and permanence of the standard railways of the country. It may therefore surprise some people to learn that our main lines, as originally constructed, have been classed by more than one eminent authority as light railways. There is no hard-and fast division between light and ordinary or heavy railways but it is tolerably safe to assert that lines of 3′ 6″ gauge employing 60lb to 70lb rails, and built on land exclusively reserved for them, are not light railways, so that the main lines of to-day do not fall within this class. On the other hand, a 3′ 6″ or any lesser gauge line, with rails from 20lb to 40lb could under most circumstances be fairly described as such. The general significance of the term and the one I have in mind, is a railway of lighter and cheaper construction than the standard types adopted in this country. Such a system is, generally, though not invariably, of comparatively short length, not often exceeding 50 miles, and more commonly is from 10 to 20 miles only.

In many countries systems of this kind are in extensive use, and render the most valuable services more especially in agricultural districts. In Belgium there are 1100 miles of narrow gauge light lines and nearly as many in Italy. Both France and Germany (like Italy) have classified light railways into three or four grades, and possess many examples of each. Of other Continental countries Sweden and Holland have adopted them, and in Austria there is a considerable mileage. In England provision is made by law for grants of public money to private enterprise establishing these undertakings in certain classes of districts, but this State aid has not been so fruitful as the Government assistance given in Belgium and France, probably because the English agricultural industry is a dwindling one. Ireland, among its limited number of these lines, possesses at least one of special interest in the Bessbrook and Newry system, which was the world's first electric railway, as first built it was 3 miles long with a gauge of 3′ 0″ and the cars were run by hydro-electric power. It is some years since I visited it, and probably it is now—like another famous pioneer work in that country, the Port Rush to Giants' Causeway electric tramway, with its extraordinary third rail conductor—reconstructed on a modern design. In India there is a very large mileage of light railways with gauges of 2′ 0″ and upwards, and in Canada Mexico and most of the South American republics there are many examples. The gauges adopted are numerous ranging from the 1′ 11½″ of Festiniog (Wales) to the metre (3′ 3½″) which is a favourite one on the Continent where also the .75 metre (2′ 5½″) is largely used. In British countries 2′ 0″, 2′ 6″ and 3′ 0″ are almost exclusively used, though there are instances of light lines on the standard gauge (4′ 8½″), such as the Southwold line in Suffolk, now worked by the Great Eastern Railway Co., as a branch to its main system.

On the majority of these lines, steam locomotives are employed, and short trains of cars are hauled. Electric traction will in time be almost universally used where the traffic movement is not of insignificant amount, for infrequent traffic having small scope for development steam will always be the cheapest power.

Some reference will probably be expected to the latest idea in light railways of which a good deal has been heard during the last few months—the single rail Brennan system. So far, no actual installation has been carried out, and only a model has been built, therefore nothing is definitely known as to the limitations this invention will experience when tried on a practical or commercial basis, After gathering such information as is available, I am inclined to think that it will find its chief field of usefulness (if it proves able to find one at all) in service of a temporary nature, such as the transport of an army through new country, maintaining communications between a military base and the front, or piloting the way in an unroaded district for the construction of the more conventional class of railway. At present there is no evidence whatever as to its carrying capacity in relation to its cost, nor indeed as to either its first cost or working expenses. It is quite clear, however, that every car on the Brennan system must be equipped with the two gyroscopes and a motor, or engine, to rotate them—plain trailer cars will be out of the question—and it is a fair inference, therefore, that the labour and maintenance cost will not be small, and that the rolling stock will be expensive. High speed machinery demands close attention, particularly at bearings; and it is certain that if a bearing on a gyroscope shaft, which runs at several thousands of revolutions per minute started to seize, it wouldn't be many seconds before the shaft fractured and the gyroscope wrecked the car. It is not pleasant to contemplate the opportunities that would exist for this occurrence on a Brennan line laid over, say, a pumice plain in the North Island, or a nor-wester-swept district in Canterbury, when grit and dust were plentiful in the summer air. However until some experience of the system has been gained, judgment must be suspended, but I think it will be wise on the part of New Zealand to contentedly allow Home districts, which have the advantage of being within a few hours of the works manufacturing the plant, to undertake all the experimenting and perfecting of parts that is inseparable from any new system.

(To be continued)

Aluminium.

THE REGULATION OF PRICE.

The comparatively high price which prevails for the metal aluminium has continued for a year or two, and there is no immediate prospect of any reduction, notwithstanding the non-existence of the internationial syndicate which formerly controlled the price. It is probable, (says the *Mechanical World*) that if water power were not used on a large scale in connection with the electrical production of aluminium in different countries, the quotation for the metal would be higher than it is at the present time. The reason for the maintenance of the price at its present level is to be found in the large demand which is experienced for aluminium for numerous purposes, a demand which has increased in a greater proportion than the production.

Apparently a great deal of secrecy exists in respect of the actual output of aluminium in the United States, Great Britain, Switzerland, France, Germany, and Austria. It is known that the different works are equippen with plant representing 100,000 h.p., but the production of each is not specifically stated. It is estimated by expert metal statisticians that the output of aluminium throughout the world amounted to 14,500 tons in 1906, and representing an augmentation of 3,000 tons over the preceding year, and 5,000 tons as compared with 1904. These figures are, of course, estimates, and there are no means of testing their accuracy. At the same time, there is no reason for doubting that they are approximately correct. The future is to witness a large increase in the outturn of the metal, seeing that all the producers, including the British companies, have extensions of work in hand, and most of these are expected to be completed and in operation next year. The directors of the Neuhausen Company, which was one of the pioneers in the electrical production of aluminium, have expressed the opinion that when these developments have actually been completed, the considerably greater quantity of metal which will then be available will lead to a decline in price.

Such an event would be welcomed by consumers, but there is no certainty that the future will confirm this opinion. In the first place, it is highly probable that the consumption of aluminium will continue to increase, and if the augmentation equalises the advance in the production, there is little prospect of the price being reduced. On the other hand, if the output should become greater than the demand, the quotation may be lowered to promote the consumption. It is, however, far from certain that the producers would act in this manner, and for