

kilos, holding 50 passengers, that is from 100 to 120 kilos per passenger of dead weight, whilst on the broad-gauge lines the dead weight, in first, second, and third class carriages, is respectively, per passenger, 250, 200, or 150 kilos.

As to the freight wagons, they are simple and strong, and well suited to the demands made upon them.

All the freight-wagons are mounted on grease-boxes (patent axles), but they have no spring check.

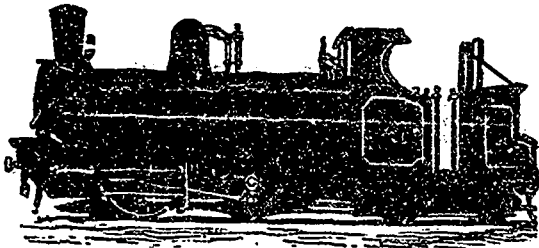
The *tampon* is of iron, with, underneath, a hook and chain.

The proportion of dead weight 300 kilos per ton, whereas on the broad-gauge lines it is 600 to 1000 kilos.

The two first locomotives, built in 1863, are the same as those employed by the contractors. The wheels are coupled, and the weight is 7000 kilos. We give an engraving of one, "The Princess," from a photograph.

Proving satisfactory, two other engines were built of like form the year afterward and allowed to experiment on the passenger traffic, which was carried on gratuitously for a few months. In 1868 two more engines were built, same wheels as before, but ten tons in weight. In 1869, the traffic increasing, a *Fairlie* engine was made with 8 wheels which drew much heavier loads, at a rate of 40 to 50 kilometres an hour. It weighs 22,000 kilos, and cost 50,000 francs; on account of its great weight, rails of 24 kilos a yard have been used.

To-day, the Festiniog line possesses 4 *Fairlie* locomotives, and still employs the 6 original four-wheelers; in all, 10 locomotives; and the gross receipts in 1877 were 692,000 francs, of which 126,825 francs were for 195,000 passengers, and 507,000 francs for freight.



Fairlie Machine.

No one can doubt, after this description, the existence and the prosperity of the Festiniog line, built of 23½ inch gauge, with ties of wood. In fact, this line can be put forward boldly as an example of success by all the promoters of narrow gauge lines.

All arrangements for building a line of this sort can be made, easily and rapidly, by applying at the workshops at Petit-Bourg.

The 0.60 can be built on the Decauville system with rails of iron or steel, of 7, 12, 18, or 24 kilos per metre, and all parts, for straight or curved lines, are sent out ready made, and fit to be laid down.

For a beginning in a new country, a trial of civilisation as it were, it were better to try the smallest of these plans, cost, about \$2,400 a mile. If a sufficient traffic should not arise, mules or small locomotives might be used, for local traffic, on the 7-kilogs rails.

If, on the contrary, this trifling outlay shall develop an increasing traffic, and oblige the proprietors to replace the 7 kilogs rails by those of 12 or of 24 kilogs, their consolation must be that the old rails have earned 3 or 4 times their cost, and we make them our compliments on the result.

This is indeed a question worthy of the attention of our legislators, as well as of all those who desire the development of our mines, and the colonisation of our country in the more removed spots.

Having studied this subject deeply, on the spot, we have

thought it only right to give a full account of it, in hopes that it may be taken up and freely discussed by the Press of Canada.

HAY.

The time will soon be at hand for one of the most important operations of the year. As long as our farmers persist in cultivating so small an acreage of land with root-crops, so long must their chief dependence for the keep of their stock during the winter be upon hay.

Now, what is hay? Dried grass, some will reply—yes, it is dried grass, but its value depends entirely on the manner in which it is dried, and the time at which it is out. It is not, like the cereals, valuable in proportion to the seed it contains. On the contrary the seed should never be allowed even to form.

The composition of hay, meadow and clover, according to Voelcker, is as follows:

	Clover.	Meadow.
Water	20.50	16.66
Oil, &c.....	3.59	5.01
Albumen, &c.....	5.00	1.81
Sugar, mucilage, &c.....	13.07	15.98
Digestible fibre, &c.....	16.42	28.88
Soluble inorganic matter.....	4.43	4.37
Insoluble protein compounds...	8.75	6.25
Woody fibre—indigestible....	25.62	17.64
Insoluble inorganic matter....	2.62	3.40

100.00 100.00

Total percentage of nitrogen.. 2.20 1.29

Equal to protein compounds... 13.75 8.06

It appears then certain that, as the danger is great that the starch, &c. will, if allowed to run their natural course, be converted almost entirely into woody fibre, which is about as digestible as an old calico gown, the grass should be cut as soon as possible after the full growth of those substances has arrived; that is, when the greatest amount of full bloom is visible over the whole meadow.

But now arises the difficulty; grass cut at this season cannot be carried into the barn in the afternoon, or even on the next day. It will take, even in the finest weather, three days to make, perhaps more, but, when it is made, it will be as superior to the ordinary trash, as wheat cut green is to whert, with its thick coat of bran, which has been allowed to stand till it is dead ripe. The people in the States have learned the lesson, long ago, and there is as good hay made there as in England. In Scotland, whence came most of our better farmers of the old school, it was a rarity to see, in my time, a decent stack of hay; the rye-grass was, like our *Timothy*, allowed to stand till ripe, in fact the seed for the next year was the produce of the whole shift, being very often, the grain shed from the hay into the bottom of the racks in the horse-stable.

Now though, of course, as an Englishman, I am full of prejudices, I will bring Mr. Stephens, a Scotsman, to back me in what I have just stated. In the last edition (1876) of his work, "The book of the Farm," a book which is beyond all comparison the most thoughtful and well arranged agricultural work in existence, thoroughly practical, intensely interesting, and one which ought to be in the hands of every young man who intends to make farming his business, he says: "It has been often alleged that Scottish Farmers show little skill in making hay. Ready as I am to vindicate the general excellence of Scottish husbandry, I own the allegation to be well founded. Instances of its truth are, delaying the cutting until it has passed its most succulent state; allowing it to lie on the ground when out: till bleached by the rain, scorched by the sun, or rotted by growth of the aftermath