SKIDDING LOGS BY STEAM.

To a few, perhaps, of our readers, the statement that logs are now skidded by steam power instead of horse and ox power, may not be new, but it is believed will be new to a great majority. It seems to be a settled fact that logs can be, and are, handled successfully by this means, and by a comparatively simple and inexpensive apparatus. The following account of the apparatus and its operations, is taken from the columns of a Michigan journal.

The method and machinery consist essentially of a hoisting machine with drums operated by steam power, upon one of which is wound the skidding rope and around another of which passes an endless rope attached to a traveller, which moves upon a guy rope fixed to some point distant from the hoisting machine. The hoisting machine is not materially different from such machines used for other purposes. The motive power is furnished by a portable upright boiler.

The engine has two cylinders, which drive a shaft giving motion to the drums. The drums are loose on their shafts. The pinions driven by the main shaft have frictions on their inner faces which are moved by means of quick screws, engaged with the friction pinions, and cause drums to revolve. It will be seen that thus each drum can be put in motion, or left at rest, independently of the others. One drum is used for the loading line, another for the skidding line, and still another, which is called the receding drum, is used for hauling the velocipede to which the skidding is attached back into the timber. The patent office specifications call for a mast on the portable truck, to the top of which is attached the main guy rope, and also sheaves for directing the various hauling ropes, but in ordinary use in the woods, trees can be found to answer the purpose better.

An ordinary logging road or railroad is built, into the timber or to the edge of swamps, and here a strong tree is chosen to which a ¾ or 1inch steel wire cable is attached. This is stretched about 20 to 40 feet from the ground, out over the land to be logged, for a distance of 500 to 600 feet, and fastened to another tree, both trees being well guyed to prevent them from breaking. Just at the side of the track is placed a small but powerful hoisting engine, provided with three drums and suitable clutches for operating them. On this wire tramway, as it really is, there is a two-wheeled velocipede, with an inch manilla rope attached, so that it may be drawn back and forth over the tight wire rope. The bottom of the velocipede is further provided with a sheave block, carrying a 1¼ inch manilla rope, one end of which is connected with a drum, the other being spliced into an ordinary pair of skidding tongs. This rope with the tongs is, by operating the receding drum, dragged into swamp or woods and fastened to the log to be taken out, the engine started, and the log hauled under the velocipede, one end of the log being suspended in the air, the other dragging, and in this way hauled over logs, brush stumps, etc., there being no roads cut for them, or swamping, as it is called, to the track, and there loaded on the cars. The velocipede is then run back for another log, which follows in the path of the other. The engine and boiler are both placed upon a little car or truck, that may be easily removed from the main track and run into any position that may be desired. Its construction may be varied to suit the taste or the necessities of the men who are to use it. The ropes are ordinary manilla, and the velocipede or trolleys and blocks are simple and of the ordinary type. It is only necessary to see this contrivance at work to be convinced of its great usefulness for the purpose for which it was invented. Logs are snaked out of mud holes, ravines and gulches, where no horse could ever be driven, raised into the air, run along through the woods at a good rate, and piled at the track or loaded on to the cars with a rapidity and ease that would surprise any man accustomed only to the slower methods heretofore in use: for with ordinary working 30,000 feet have been taken from the woods where the trees were felled, and loaded on the cars in the space of two hours, on a trial, and this with the service of 15 men. So strong and serviceable is the whole mechanism that with a single line of 600 feet in length at least 30 acres may be cleared by running the hoisting rope out on each side and beyond its limits, and by changing the terminus of the tram cable; and when all the timber within its reach has been removed, the whole is taken down, packed on a car and set up in another locality. With a force of 16 men we skid 50,000 to 60,000 feet, and in one day over 70,000 feet has been skidded and loaded on cars.

The machine is the invention of Mr. Horace Butters, of the firm of Butters & Peters. There are at present four of them in operation, the firm of which the inventor is a member employing two.

The machines complete, with cables, ropes, velocipedes and all other attachments, it is thought, will cost about $4,000, about the price of six or eight span of horses, and when they have done their work for the season, they may be stored away at no expense for hay and oats to feed them, and by their use all necessity for making roads and swamping to get logs to the cars is obviated. One prominent lumberman when referred to for an opinion, remarked that there would doubtless be a few slight improvements, but any man who witnessed its workings could only assert that it was a grand success.

WHERE TORNADOES BEGIN.

The most remarkable and interesting feature of the development of tornadoes, is the fact that they nearly always form southeast of a moving center of low pressure, and their tracks, scattered here and there, conform closely to the progressive direction of the main storm. For example, on February 19, 1884, forty-four tornadoes occurred in Georgia, Alabama and South Carolina, but principally in Georgia and Alabama. This developed at a distance of from five hundred to two thousand miles from a storm center that moved across the northern part of the United States, beginning at the northern extremity of the Rocky Mountains in Montana, thence southeasterly through Dakota, Minnesota and Wisconsin to Northern Illinois and Indiana, northward through Michigan, across Lake Huron, and disappearing north of Quebec. This sudden, sharp turn of the storm center southward into Illinois and Indiana seems to have relation to the unprecedently large number of tornadoes that developed not far from the South Atlantic coast, extending inland as far as Southern Illinois and Indiana. This southward lunge of a mass of cold, moist air seems to have caused the abnormal conditions of temperature and dew point, and the high winds necessary to cause the most tremendous exhibition of destructive tornado power ever recorded by the Signal Service. This invariable location southeast of the storm center is one of the main peculiarities of tornado development upon which the predictions depend.

AUSTRALIAN TARIFFS.

A study of some facts and figures in connection with the tariffs of the various Australasian colonies is full of interest, remarks *Bradstreet's*. It shows in their true colors the actual position of the so-called protection and free trade colonies, and the relative advantages derived from each system. The figures are taken from an elaborate comparative statement of the customs duties for 1884 that has been prepared by the South Australian government. The first table gives the number of articles imported into each colony that are free or dutiable, thus:

Colony.	*Dutiable.*	*Free.*
Victoria	687	522
New South Wales	180	1,025
Queensland	1,107	80
South Australia	657	570
Western Australia	1,175	21
Tasmania	919	229
New Zealand	820	401

From the above it will be seen that there is considerable similarity and dissimilarity. For instance, Victoria and South Australia approximate closely, as far as numbers are concerned, in their ideas of taxation. The other colonies, excepting New South Wales, which is prominent with its free list, are even more strongly protectionist than the recognized protectionist colony of Victoria. In all the colonies, except New South Wales, there are two recognized kinds of duty—specific duty and ad valorem duty. It is the latter that is abolished by New South Wales, and through which abolition she lays claim to the title of "the free trade colony." The rates vary from the specific without ad valorem of New South Wales to specific with ad valorem of from 5 to 25 per cent., the highest rates being charged in Victoria. The following table gives details of the duties:

Colony.	*Rate of duty.*
Victoria	Specific, with 7½@25 ad valorem.
New South Wales	Specific, without ad valorem.
Queensland	Specific, with 5 ad valorem.
South Australia	Specific, with 5@10 ad valorem.
Tasmania	Specific, with 10@12½ ad valorem
Western Australia	Specific, with 10@12½ ad valorem.
New Zealand	Specific, with 15 ad valorem.

It appears that New South Wales objects to the ad valorem duty on the grounds that this system opens the way for fraudulent transactions through the falsification of invoices. Such being the case, the government of that colony cannot have a very high opinion of the honesty of its merchants. If the system works well in the other colonies then why not in New South Wales? The only possible inference to be drawn is that either the Sydney merchants are dishonest or that the various governments of the other colonies connive at and are blind to frauds practiced by their merchants. This is hardly likely or probable, so it would seem that the taint of the old penal Botany Bay settlement in New South Wales can, so far, have scarcely been eradicated. The next table presented is exceedingly interesting as it shows the aggregate amount of duty collected in the different colonies in proportion to the value of the imports. Thus:

Colony.	*Imports.*	*Duty collected.*
Victoria	£19,201,633	£1,936,358
New South Wales	22,826,985	1,806,328
Queensland	6,381,976	914,372
South Australia	5,749,353	517,489
Tasmania	1,656,118	254,946
Western Australia	521,167	117,478
New Zealand	7,663,888	1,409,343

The above is a remarkable exhibit. It shows that the 180 dutiable articles of New South Wales without ad valorem contribute within £75,000 as much revenue as the 687 dutiable articles of Victoria. The taxation on these 180 articles must be exceedingly heavy and of a very protective nature, inasmuch as New South Wales admits free of duty almost 100 per cent. more articles of commerce than does Victoria. The principal consumptive commodities in which New South Wales exceeds her sister colony, in the way of duty, are spirits, wine, ale or beer, sugar, tea and coffee, candles, bacon and hams, jams, jellies, hops and malt. In most of these where the excess is shown the object is mainly to protect the industries that exist in New South Wales. On the so-called question of "protection" there is still considerable diversity of opinion in the colonies; much dissatisfaction is expressed, and the outcome of the revenue system, which is really the main feature that all are concerned in, will be a subject to be noted with considerable interest.

WATER IN BREAD.

Translated from the Austro Hungarian *Müller*.

A local police court in Wurtemburg, aiming at the prohibition of the sale of bread not perfectly baked and containing too much water, recently addressed the royal chamber of trade and commerce asking what methods should be employed to test the amount of water contained in bread, and the probable cost of employing those methods. The answer received from the authorities was published by Herr Alett in Wurtemberg, and we present it herewith to our readers. After stating that not even a quantitative analysis would decide the exact amount of water contained in bread, that the proportion might be obtained by drying out the bread, whereby the loss of weight would measure the water lost, and that, for a decision as to the goodness of the bread, the determination of the amount of water in the crumb when separated from the crust would be valuable, the following things were designated as necessary:

1. A scale capable of weighing 200 grams and of accurately weighing one-tenth of a gram. Such scales may be obtained of the gaugers.

2. A drying room or air-bath, 25 centimeters deep, built of copper, which may be obtained of mechanics for about 30 marks.

3. A thermometer which registers over 100 degrees Celsius, costing two and a half marks.

4. A gas lamp for heating the air-bath, costing with the necessary gas connections four marks, and an iron chimney costing 30 pennies. From these figures it appears that the entire necessary apparatus will cost about 37 marks.

The determination of the proportion of water is accomplished in this way: Out of the center of the loaf of bread a piece is cut in a vertical direction, and this is divided into equal parts. A fourth part of these, from which the crust has been separated and the crumb of which is weighed, is devoted to the water-test. The crumbs to be dried should weigh at least 50 grams, and it is better to take 100 grams. The weighed bits of bread are placed in the air-bath on a floor raised about five centimeters from the floor of the bath, with a paper underneath, and the thermometer is so suspended in the chamber that its bulb is suspended among the crumbs of bread. If the bulb of the thermometer were placed higher than the crumbs, the instrument would show a lower temperature than that surrounding the crumbs. Then the lamp is lighted and placed under the bath, and the flame is so regulated that the thermometer rises slowly and after a few hours registers only 100 degrees Celsius. A little practice will enable the investigator to so regulate the flame that the temperature shall remain between 100 and 110 degrees Celsius, in order to perfectly vaporize the water in the bread. When it appears that the water has been expelled, the bread should be taken from the box and weighed after cooling. Then it should be again placed in the box and subjected for a half hour to a temperature of 100 to 110 degrees, and this operation should be repeated so long as diminution of weight is perceptible. The loss of weight answers to the water contained in the bread and may be easily reckoned in per cent.