

RAILWAY TIMBER BRIDGE.

Our engraving illustrates a timber bridge, constructed to carry the Southern Railway of Canada over Kettle Creek, at St. Thomas, Ontario. The work not only is an excellent example of type construction, but is remarkable for the rapidity with which it was completed. Its extreme length is 1,366 feet, divided into 736 feet of trestle work and 630 feet of house trussing; the latter is made up of 14 spans, resting upon timber piers. The extreme height of the structure is 92 feet. There were used in its construction 1,070,672 feet of timber, board measure, 4,600 lineal feet of piling, about 35 tons of wrought and 37 tons of cast iron. The work was commenced on the 20th September, 1871, and completed the 13th February, 1872—a period of less than five months, and part of which lay in the severe season. Messrs. Dunn, Holmes, and Moore were the contractors, Mr. M. Courtright being the president of the railway, and Mr. M. N. Finney the engineer-in-chief.—*Engineering.*

French Prizes.

The Société d'Encouragement pour l'Industrie Nationale, of Paris, has published the programme of premiums and medals, to be awarded between the years 1873 and 1878.

The 2,000 franc prize (1873) for a steam launch 40 or 45 feet long working at 9 knots an hour in still water, and carrying sufficient fuel for 12 hours, working at maximum speed.

A prize of 3,000 francs (1876) for a steam engine of from 25 to 100 horse power, burning as a maximum in full work 700 grammes of coal per horse power per hour, weighing less than 300 kilogrammes (660 pounds), and costing from \$60 to \$100 per horse power. During trials the competitors will be at liberty to make use of any kind of fuel and system of generation which they prefer.

A prize of 1,000 francs (1873) for the best domestic engine, designed with the special object of assisting home work in towns.

A prize of 4,000 francs (1873) for progress made in the process of hemp and flax spinning. This prize will be awarded to the manufacturer who shall, on a production of more than 20,000 francs' worth of yarn, effect an economy of 15 per cent on the power employed, and a degree of fineness exceeding 150,000 feet per pound for the flax, and 20,000 feet for the hemp.

A prize of 2,000 francs (1874) for preparing fibers, hitherto subjected to carding.

A prize of 3,000 francs for a file cutting machine. The cutting tool of this machine to have a form mathematically true, to act without shock, and not to be liable to excessive repairs. The cost and maintenance of this machine, its production, and the driving power required, must be such that the results obtained offer sensible advantages over those obtained by hand work.

A prize of 5,000 francs (1873 to 1875) for a practical and cheap means of dressing millstones, so as to remove the existing dangers of this industry. This prize was founded by subscriptions made in La Ferté-sous-Jouarre.

In the chemical arts, prizes are proposed for the wholesale manufacture of oxygen and nitrogen, the utilization of waste materials, the production of graphite suitable for pencils, for a treatise on steel, based on certain experiments and having for its object improvement in the steel manufacture, and, lastly, for a process capable of disinfecting and clarifying,

promptly and efficiently, the water of sewers, etc. Other prizes will be awarded for an electro-magnetic machine, for a system of heating houses and apartments, with constant circulation; for a process of meat preserving, for drying wood, for an industrial application of the spectral analysis, etc.

Among the agricultural prizes we may mention one of 6,000 francs for steam culture, and one for the best means of distributing powdered manure.

In the section of the Beaux Arts there are two entries, one

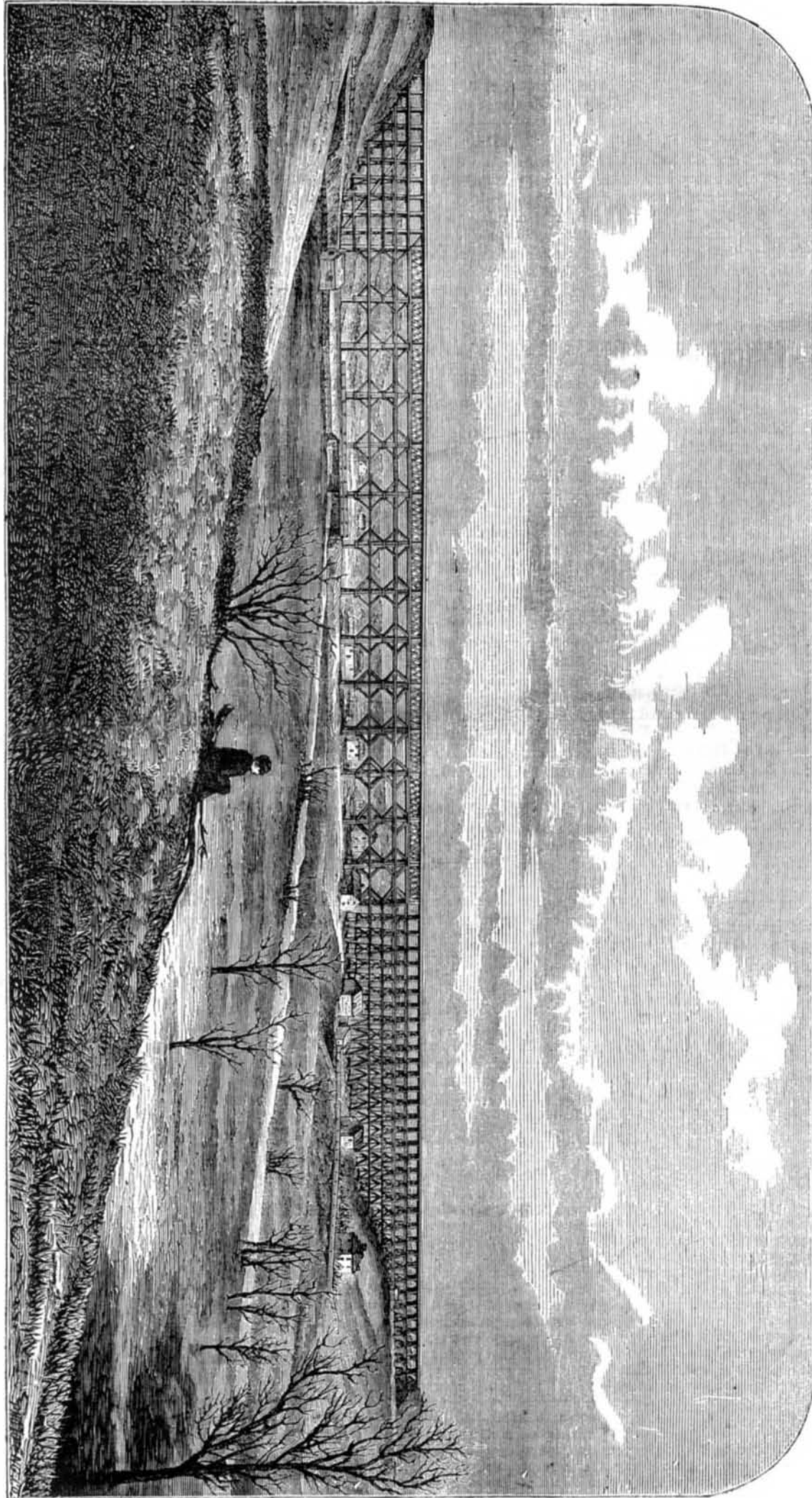
RAILWAY PROGRESS IN 1872.

The Chicago *Railway Review* publishes carefully compiled statistics, showing the rapid progress that has been made in the construction of railways in the United States since the opening of the first 23 miles of the Baltimore and Ohio road in 1830. From the various portions of the statement showing the advance made in the past year, we extract the following interesting facts.

The number of miles added to all railways in 1872 was 7,925. It is estimated that at least 10,000 miles more of road

are under construction and will be completed before the close of 1873. Progress was made on 353 roads. In Illinois 837½ miles, a distance greater than any other State, were finished. The total number of miles in that State on which work was done aggregated 1,401½, the labor being distributed over 28 railroads. In New York construction was carried on over 1,338½ miles, on 32 roads. The longest distance finished on any one line was on the Atcheson, Topeka, and Santa Fé road, in Kansas, 360 miles being laid during the past year. The progress in the States, Territories, and Provinces is as follows, estimating on the number of miles completed and in course of construction: Alabama, 299; Arkansas, 316; California, 560; Colorado, 317; Canada, 675; Connecticut, 53; Dakota, 65; Florida, 8½; Georgia, 138; Illinois, 140½; Indiana, 394; Iowa, 913; Kansas, 773; Kentucky, 463; Louisiana, 106; Maine, 42; Massachusetts, 165; Maryland, 418; Michigan, 625; Minnesota, 942; Mississippi, 173; Missouri, 584; Nebraska, 233; New Hampshire, 162½; New Jersey, 79½; New York, 1,338½; North Carolina, 266; Ohio, 754½; Oregon, 136; Pennsylvania, 732½; Tennessee, 346; Texas, 637; Utah, 123; Vermont, 120; Virginia, 421; Wisconsin, 797. The aggregate tonnage of the roads has increased to nearly 200,000,000 annually. The increase in earnings has averaged about 25 per cent a year since 1851.

The past year will be especially noted as dating the beginning of the operation of narrow gage roads in the United States, as members of the railway system for general business. In the latter part of 1871, the first section of the Denver and Rio Grande road was completed and opened—76 miles from Denver to Colorado Springs—and it was maintained in efficient and economical operation during a winter of unprecedented severity. In the mountain regions of Colorado, the maximum paying gage has been fixed at 36 inches; and this has been adopted for the mountain extensions of the Colorado Central from Golden City, the terminus of the 4 feet 8½ inch gage line of the company. In Utah, also, the 36 inch gage is an accomplished fact. From Salt Lake City starts the Utah Southern, already completed (31 miles), connecting with the American Fork road, completed 17 miles; while to the north runs the Utah Northern, already finished for 25 miles. The Kansas Central has been built and opened for 50 miles. More important than the lines above named will be the opening of the Cairo and St. Louis road, extending over 150 miles, midway between the Illinois Central and the Mississippi river. From this road, the narrow gage system in the South may be said to derive almost its chief importance. A project is also on foot for the construction of a line from St. Louis into the heart of the South, east of the



TIMBER BRIDGE AT ST. THOMAS, ONTARIO.

(1874) for the manufacture of good photographic paper, the other (1873) for a process to produce photographic electrotypes which may be printed from in a common press, and used instead of wood engravings.

CEMENT FOR LEATHER.—Ten parts of carbon disulphide and one part oil of turpentine are mixed, and as much gutta percha added as will readily dissolve. The surfaces of leather must be freed, with a hot iron, from fat, and the parts once joined should be well pressed until they are firmly united.