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NEW YORK, SATURDAY, DECEMBER 17, 1881.

Contents.

(Illustrated articles are marked with an asterisk.)

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THE SCIENTIFIC AMERICAN SUPPLEMENT

No. 311,

For the Week ending December 17, 1881.

Price 10 cents. For sale by all newsdealers.

Detailed table of contents for the supplement, including sections on Engineering and Mechanics, Electricity, Light, Heat, etc., Technology and Chemistry, Astronomy, etc., and Natural History.

SOME GREAT ENGINEERING PROJECTS.

The shortening of commercial routes by means of ship railways and ship canals seems to be the great ambition of the engineers of to-day.

In addition to the De Lesseps Ship Canal at Panama, the Eads Ship Railway at Tehuantepec, the Florida Ship Canal, the Chesapeake and Delaware Ship Canal, the Cape Cod Canal, and others in the interior of this country, there are several other important projects of like nature under way or in prospect in various parts of the world.

The projector of the ship railway, Mr. H. G. C. Ketchum, writes us that the plan grew out of a desire to save lockage and a deep channel in the design of the Baie Verte Canal. His first plan was to lift vessels by hydraulic power on pontoons and then float them through the canal.

Across the ocean the construction of the tunnel under the British Channel, connecting England with the Continent, is being prosecuted with an energy which is indicative of ultimate success, and thus far no obstacles have been encountered to make the undertaking a difficult or exceptionally hazardous one.

In France the connection of the Atlantic with the Mediterranean by a ship canal, to save the long and stormy voyage around the Spanish Peninsula, is under serious consideration, and the Council-General of the Seine have just adopted a resolution approving of the project.

The ship canal across the Isthmus of Corinth, in Greece, to shorten the route to Constantinople and the ports of the Black Sea, has, we believe, been definitely determined upon.

In the far East a bolder and more important project is in contemplation, with a view to shortening the commercial route to China and Japan by six hundred miles or more. At the head of the Malay Peninsula is the Isthmus of Kra, connecting Upper with Lower Siam; and by the cutting of a ship canal at this point, about thirty miles in length, the need of sailing around the peninsula might be obviated.

The French appear to have taken the lead in proposing this important commercial short-cut, and, if the opinion of the London Times is well founded, the Government of British India will not decline to actively participate in its execution.

RAILROAD ACCIDENTS.

Railroad statistics show that there were an unusual number of accidents attended with fatal results on American railroads during the year ending October 31, 1881. They foot up 1,492 accidents, by which 397 persons were killed and 1,687 more were injured, being a monthly average of 124 accidents, 33 killed, and 141 injured.

The month of October, as reported by the Railroad Gazette, shows a greater number of accidents than the monthly average for the year, although the fatality was slightly less, the total for the month being 131 accidents, 31 persons killed, and 133 more injured. Of the October accidents, 51 were collisions, 77 derailments, 2 boiler explosions, and 1 fire.

January took the lead in number of accidents, 223 having occurred in that month, while the greatest number of fatal casualties were in September, namely, 56 killed.

There were no less than four successful attempts at train wrecking in October. In one case obstructions were put on the track, in another a rail was removed, and in two more switches were misplaced. In only one case were the wreckers caught, and they are to be tried for murder, an engineer having lost his life in the wreck.

Six broken bridges are in the record for the month, an

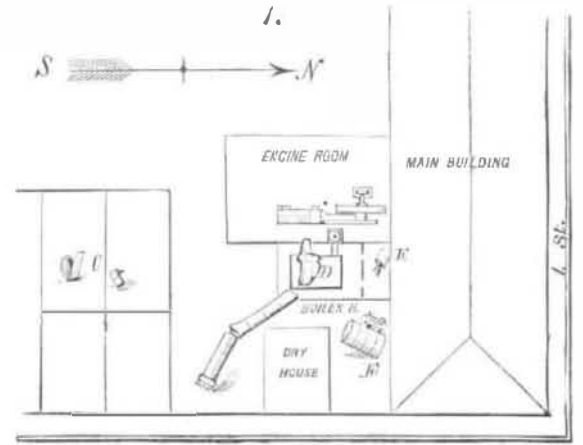
unusually large number. One of these had its abutments washed out, and in two other cases they were small wooden bridges.

TERRIBLE BOILER EXPLOSION IN OHIO.

The new Dayton Wheel Works, one of the finest manufacturing of light vehicle wheels in this country, owned and occupied by Pinneo & Daniels, Dayton, Ohio, was, on October 25, the scene of a most astonishing and lamentable boiler explosion.

Three persons were killed, a number severely injured, and extensive damage was done to the works.

Henry Rokel, the only man in the fire-room at the time of the explosion, which took place at the noon hour, was blown into the fuel room and fatally mangled. Katie Makley, a girl of thirteen years of age, was killed by a flying brick while at play with her companions in St. Joseph's school-yard, a square away from the boiler house.

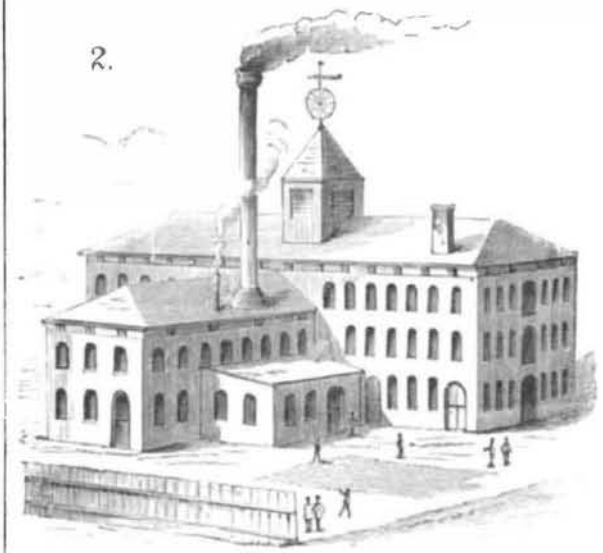


Plan of Dayton Wheel Works—(C, rear end of boiler. D, girale of plates. E, front end of boiler. F, boiler No. 1.)

of seventeen years of age, named Mostbaum, was so badly injured that he died soon after the accident. He was eating his dinner in the yard. Peter Aplin, the engineer, formerly a railroad engineer, but in the employ of this firm since 1852, in their old works and their new, was in the engine room oiling his engine and preparing to start up the machinery. He was thrown among the ruins badly bruised and cut about the upper part of his body, but able to dig himself out.

The plan of the works and the distribution of the parts of the broken boiler are shown in the diagram, Fig. 1. The four story main building and the wings, all of brick, are shown in Fig. 2. Other buildings, including a large dry-house, shown in the foreground of the diagram Fig. 1, are omitted from Fig. 2 for the sake of clearness of illustration.

The one story building (Fig. 2) in the angle was the boiler house, in which were two horizontal tubular boilers, 5 feet diameter by 16 feet long, each containing 46 flues, 4 inches



Dayton Wheel Works before explosion.

diameter, full length of the boiler. The steam drums, shown in Fig. 3, were 24 inches diameter by 7 feet long, upon which were attached the safety valves and steam connections, as shown. Each boiler had also a mud drum, 18 inches diameter by about 6 feet long, seen in Fig. 5.

The shells of these boilers had double riveted longitudinal seams, were new less than a year before the explosion, and originally had the appearance of being what they were intended by both makers and users to be—sample pieces of workmanship. The iron was five sixteenths charcoal brand, slightly under thickness, ranging from 0.29 inch to 0.30 inch, and said to have a tensile strength of 55,000 pounds to the square inch, meaning simply that a strip 1 inch wide, 0.29 inch thick, would break, if steadily pulled without shock, torsion, or bending, under a force of (55,000 x 0.29 =) 15,950 pounds acting in a direct line parallel to the plane of the strip, as in a testing machine, for example.

These boilers were provided with the usual attachments, including two steam gauges, one in the fire-room and one in