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ous bottom, or to replace a weakened structure without interrupting the traffic of hundreds of daily trains or fleets of vessels. These things & others still more difficult are accomplished by the bridge-erector, who, with a few diagrams, some car-loads of steam-engines, ropes, tools, timbers, & a few score men, rapidly and safely assembles the great fabric, in summer or winter, storm or flood, with a resourcefulness, skilled ability, & ready courage that can hardly be matched by any other calling.

The most simple and usual way of erecting the superstructure of a great bridge is to build underneath it a temporary wooden platform, called a "falsework." On this the different members of the trusses are supported until they can be connected together and enabled to sustain themselves. Such a falsework costs many thousands of dollars, & in itself is often an engineering work of no small magnitude. It is composed ordinarily of rows of heavy piles driven deep in the river bottom, & carrying above the water-level story after story of framed timber columns and beams bolted and braced in every direction. On top of this edifice are wide steel tracks, on which rolls a tower of steel or wood called a "traveler." This traveler does the heavy work of construction, its booms and tackles, operated by hoisting engines, swinging the great steel pieces into position.

These falsework structures must be solidly built, for they are called upon to endure enormous strains. With all care in their erection, they are sometimes wrecked by floods or ice, or by the scouring of the river bottom beneath them. Sometimes the disaster comes suddenly, & the workmen have barely time to escape. Sometimes the danger is known well in advance. In these disasters, hairbreadth escapes for the men are of no uncommon occurrence. In one wreck of an Ohio river bridge, in which many men were killed, different portions of the span fell successively from one end to the other. One man fleeing toward shore just kept pace with the falling structure, so that all the time he was running up an incline. At length the collapse of the falling timbers overtook him, & he was knocked into the river, whence he was rescued by his comrades on shore.

An accident equally remarkable and more ludicrous occurred during the building of the Washington Bridge across the Harlem River, in New York. The plate girder arches of this bridge were erected on falsework nearly 150 ft. high, with wide openings in it to permit the passage of boats and trains. In the course of the work a man fell from near the top. He struck head first in the shallow water, and stuck fast in the mud, his feet waving signals of distress in the air until he was pulled out, when he was found to be only slightly injured.

In building the Poughkeepsie bridge across the Hudson, the depth of water & mud was so great that piles 120 feet long were required. As such dimensions could not be secured from single trees, each pile was composed of two large tree trunks spliced together. Above the water-level these were capped with square timbers, on which was erected a massive body of symmetrical timber work of remarkable proportions. It extended to the lowest part of the bridge-span, 120 ft. above the river level. Upon it was reared a tower over 100 ft. high, which carried the tackle for assembling the trusses. In its entirety this temporary structure, built merely to facilitate the erection of the bridge, attained a height greater than that of the majority of "sky-scrapers."

While the Poughkeepsie falsework was one of the most lofty ever constructed, the most massive was built at Memphis during the erection of a railway bridge across the Mississippi. The bridge itself is the longest truss span in America, & with two exceptions the longest in the world, its span being 790 ft. The foundation of the falsework was formed by rows of 100 ft. piles driven through 60 ft. of water and twenty ft. of sand. On these was built a superstructure 85 ft. high, carrying 20 lines of heavy stringers to sustain the weight of the bridge and traveler.

Where it is impossible to drive piles in the river channel, temporary trusses are sometimes supported on the bridge-piers as platforms from which to erect the permanent structure. This was done in the case of the Plattsmouth bridge across the Missouri. Three short spans with timber towers were used for the erection of one main span. After the completion of the latter, the temporary structure was lifted on boats and towed around into position to be used on the next span. This was a hazardous undertaking, but it was successfully accomplished.

When it has been found difficult or impossible to erect a bridge on the actual site which it is to occupy, the problem has sometimes been solved by putting the span completely together on shore, & then floating it into position. This operation is one of the most spectacular connected with bridge erection, as it also is one of the most hazardous. Notable among those constructed in this manner is the Hawkesbury bridge of Australia.

More difficult still was the erection of the Canada Atlantic Ry. bridge near the Coteau Rapids, in the St. Lawrence river. Here the task was complicated by the depth of the water & the swiftness of the current. The bridge contained 14 spans, each more than 200 ft. long. These spans were erected on shore, & skidded on greased rails to the tops of towers built on the decks of a pair of scows braced together like a catamaran. The unwieldy craft & its topheavy load were in each case floated several miles down the swift current, anchored in 30 ft. of water, & the span lowered to its seat of masonry.

The largest span ever erected in this manner was 523 ft. long. It forms part of the Brunot Island bridge across the Ohio,