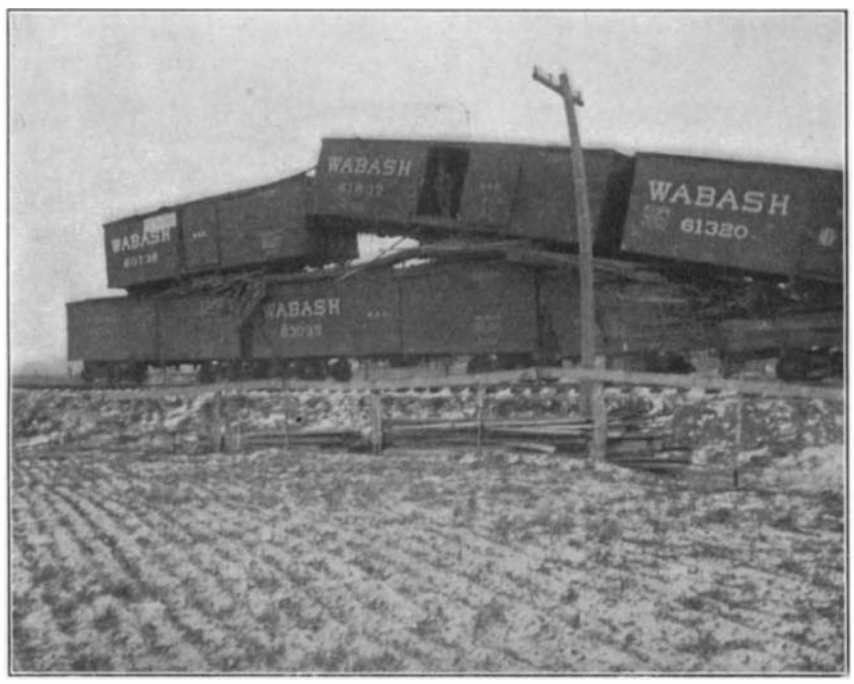
THE VAGARIES OF A RAILROAD WRECK.

We present a photograph of a recent railroad wreck which, on account of the curious effects of suddenly arrested momentum which it portrays, is worthy of something more than a passing mention. In a recent issue we gave an illustration of a collision which resulted in a locomotive climbing onto the platform of a 50,000-pound freight car, which stood up so nobly under the burden that it was utilized to carry the wrecked engine to the nearest repair shop. It is decidedly interesting to study photographic views of railroad collisions with a view to noting what is the least line of resistance along which the momentum of the train exerts itself. As a rule the direction is a lateral one, the cars usually spreading to the right and left; but occasionally the line of least resistance lies in a vertical plane, and one train will mount the other, as in the case we illustrate. In other collisions, conditions of resistance are so well balanced that the two trains pile up into an indistinguishable mass of wreckage.

The accompanying photograph, which was furnished us by Mr. G. F. Belknap, of Chicago, present a wreck which occurred early in the year at South Whitely, Indiana. It seems that as a freight train was approaching the town, the couplings gave way about a mile and a half before the station was reached, and the engineer carried the forward half of the train into the yard without being aware of the accident. On discovering that half of the train had been left behind, he attempted to back his train onto the side track. The rear half of the train, however, had gathered speed on a down grade some distance back from the station and was following the forward half at a speed of about ten miles an hour, the two halves of the train colliding before the side track was reached. In the center of the train was a freight car loaded with lumber, and immediately behind it were the three box cars which will be noticed in the photograph mounted upon the cars in front. Evidently, when the crash came, the first of these cars mounted the platform of the car ahead and pushed the loose lumber into the form of a rude inclined plane or runway, over which this box car and the two immediately following it slid without any serious damage to themselves. The trucks, with one exception, were left behind on the track, the body of the cars simply sliding clear of their trucks onto the lumber car and over the pile of lumber to the cars ahead. Our correspondent informs us that the cars were so little damaged that "you would never know they had been in a wreck." In the center car there were three stockmen, whose escape was due, no doubt to the extemporized inclined plane ahead of them.



VAGARIES OF A RAILROAD WRECK.

A PATENT has been taken out by a Boston inventor for the combination of an additional air port with the Westinghouse engineer's brake valve, by the use of which an automatic flow of sand to the rails is insured whenever an emergency application of the air brake takes place. The sanding of the track is most important when the brake must be applied quickly, and it is desirable that every part of the brake be operated by one motion on the part of the engineer.

THE NEW JAPAN BATTLESHIP "SHIKISHIMA."

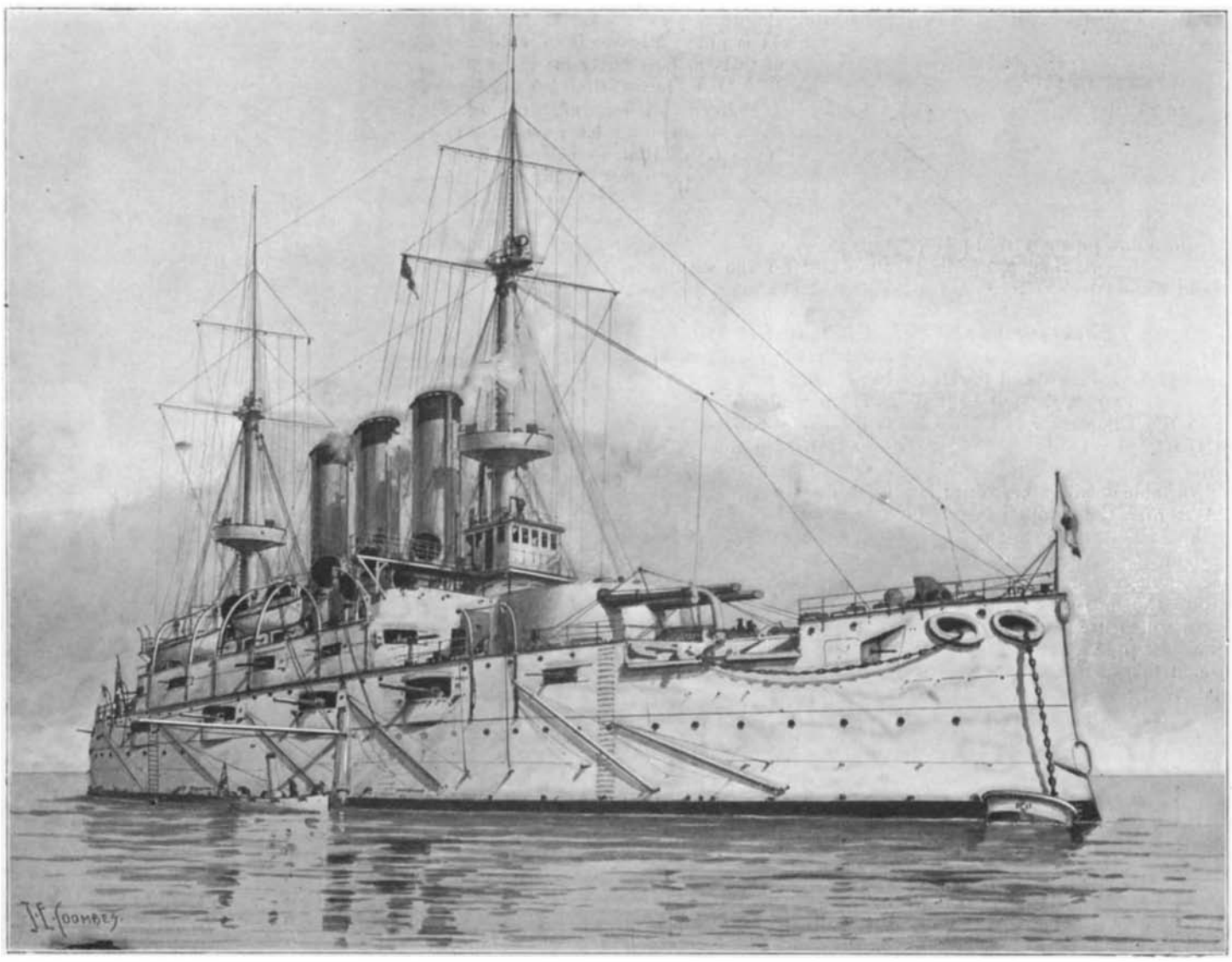
Japan has given many evidences during the closing years of the century of her determination to stand in the very fore-front of civilization. A striking evidence of this is afforded in her naval and military affairs, in which she has shown herself alive to every improvement which has been made in the materials of war.

From occupying practically no rank whatever as a naval power, in a few years she has developed a navy which is so thoroughly efficient, so essentially modern, that it should be invariably included in any list of the leading navies of the world. Ever quick to note the latest trend of design and construction, Japan has realized the value of size, speed and power, both for attack and defense, and has wisely, as it seems to us, put the bulk of her naval displacement into ships of great size, high speed and powerful batteries. Moreover, she was one of the first nations to realize that the first line of defense must consist of ships of the armored class, and in accordance with conviction, the latest additions to her navy have consisted mainly of powerful battleships and large armored cruisers.

Concrete evidence of the truth of the above statement is found in the fact that her fleet includes six thoroughly modern battleships which range in displacement from 12,300 to 15,000 tons, while none of these vessels has a speed of less than 18 knots an hour. At the same time there are now either building or completed six powerful armed cruisers of between 9,000 and 10,000 tons of 21½ knots speed. This is a remarkable showing for a nation which may be said to be just emerging from semi-barbarism, and which less than half a decade ago did not reckon a single modern armored ship among her fleet.

We present an illustration of the "Shikishima," which recently sailed for Japan from the yards of the Thames Shipbuilding Company, where she was constructed. She is probably the largest warship afloat. With an over-all length of 438 feet, and an extreme beam of 75 feet 6 inches, she displaces on her mean draught of 27 feet 3 inches, nearly 15,000 tons. With a complete equipment of stores, and carrying her maximum coal supply, the displacement of this great ship must be considerably over 16,000 tons. She is essentially a typical modern battleship, with a decided approximation to the English school of design as represented by the present Chief Constructor of the English navy, Dr. White; although perhaps, it would be still nearer the truth to say that she is a modified Armstrong design, such distinctive features as the vessel possesses having in them a suggestion more of the extreme Armstrong ship than of the more moderate vessels turned out by the English government designers.

The armor throughout is of Harveyized nickel steel. The water line belt is 8 feet 2 inches deep, and is continuous from stem to stern, tapering in thickness from 9 inches amidships to 4 inches at the ends. Above the main belt is an upper wall of 6-inch armor, which extends between the main barbettes, a distance of 250 feet. Between the end of this armor and the barbettes are screen bulkheads of 6-inch armor. Below these 6-inch bulkheads are heavy 12-inch bulkheads, which extend also from the main barbettes to the side of the ship. The armored deck is located 2½ feet above the mean water line, and slopes at the sides to a junction with the lower edges of the main belt. On the flat it is 2 inches in thickness, and on the side-slopes, 3⅛ inches thick. That portion of the main deck which is within the central citadel of 6-inch armor is 1 inch in thickness. The barbettes are protected with 14 inches of armor, and they extend to a height of 4 feet above the upper deck. The main armament consists of four 12-inch 40-caliber rifles, two in each barbette, protected by 6 to 8-inch shields. The intermediate battery consists of fourteen 6-inch rapid-fire guns, which are mounted within casemates on the broadsides, eight of them on the main deck and six on the upper deck. All of these casemates are protected by 6-inch armor. The two 6-inch guns at each end of the upper deck battery are capable of being trained parallel with the keel of the ship, thus giving a concentration of two 12-inch and two 6-inch rifles both ahead and astern. The broadside concentration is four 12-inch and seven 6-inch guns. The secondary battery is a very powerful



LATEST JAPANESE BATTLESHIP, "SHIKISHIMA." DISPLACEMENT, 14,800 TONS; SPEED, 19·03 KNOTS.

one of twenty 12-pounder rapid-fire guns, disposed on the main deck, on the upper deck and on the superstructure, and eight 3-pounder rapid-fire guns and four 2½-pounder rapid-fire guns carried on the superstructure and in the tops. There are four 18-inch underwater discharges for Whitehead torpedoes.

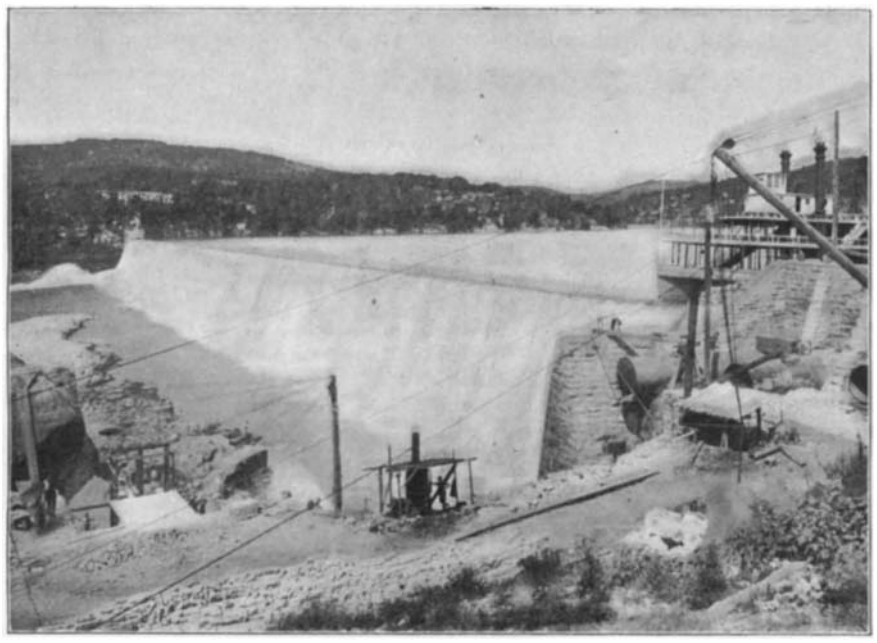
On her full speed trial this fine vessel attained a mean speed of 19·03 knots, with 14,657 indicated horse power. With her full complement on board she will carry 741 souls.

THERE seems to be an excellent chance for paper making in the South. Every Southern State has one or more varieties of trees suitable for paper making, and there is almost an exhaustible supply of wood in the South. Paper is made out of bagasse, or sugar cane, in Texas, and out of poplar and spruce in Virginia and West Virginia.

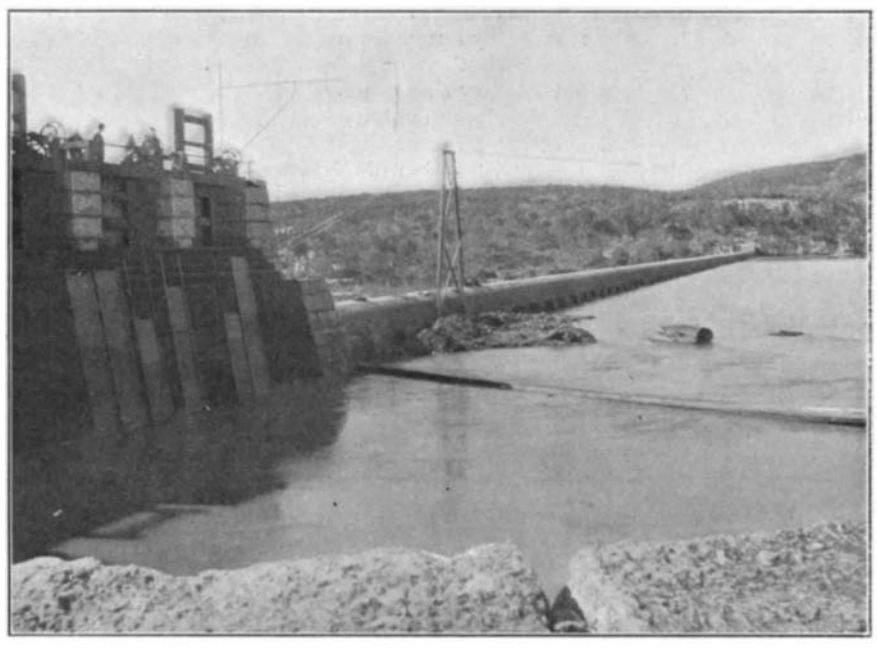
THE FAILURE OF THE MASONRY DAM AT AUSTIN, TEXAS.

The great size and importance of the dam across the Colorado River, at Austin, Texas, and the peculiar features attending its recent failure, render this wreck one of the most interesting on record. It was about ten years ago that the scheme for damming the river at a point some 2½ miles above the city of Austin was inaugurated. The project contemplated the furnishing of electric current for water-supply pumping, electric lighting, electric railways and general manufacturing purposes. Construction was commenced in 1890, and after the work had been two years under way the Board of Public Works called in consulting engineers with a view to modify certain features of design. There seems to have been considerable difference of opinion between the engineer who was responsible for the first plans and his successor. The chief subject of contention was the contour of the downstream face of the dam and its crest, which was originally designed to be flat, but was afterwards changed to the curved form shown in the sectional view herewith presented. The flat crest was objected to on the ground that the mass of falling water, during the periods of flood, would be liable to break way the rocky bed of the river below the toe of the dam, thereby endangering the whole structure. The fact that such a controversy existed is interesting in view of the probable cause of the disaster as referred to later in this article.

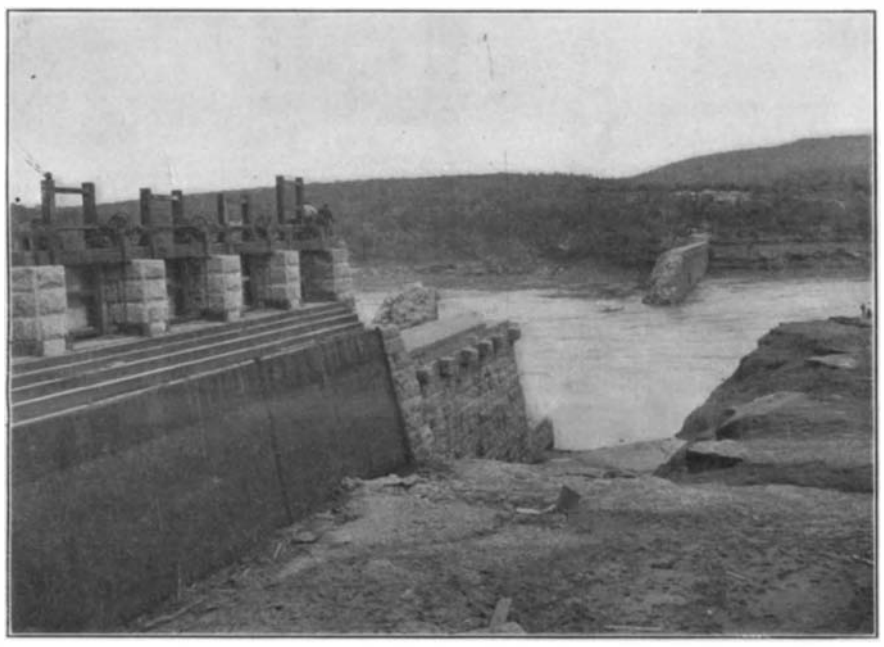
The dam measured 1,125 feet on the crest line, and the height from the bed of the river to the crest was 65 feet; the width of the masonry on the foundation being 66 feet. The bed of the river at the dam location consists of what is known as medium grade limestone, while the bluffs on each side of the river are of the same material. The structure was built with a heart



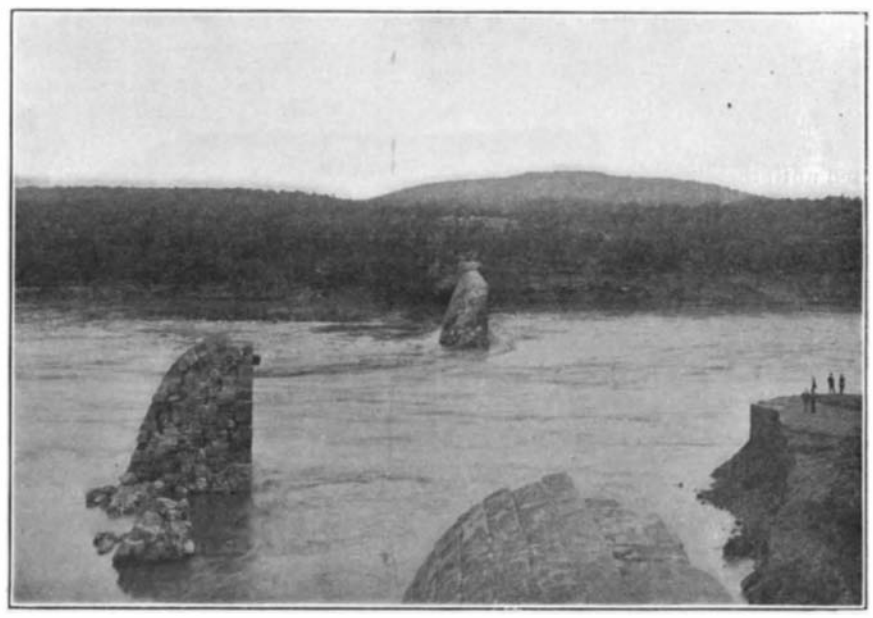
The Austin Dam During the Construction of the Power House.



View of Dam from Upstream, Taken Last November.

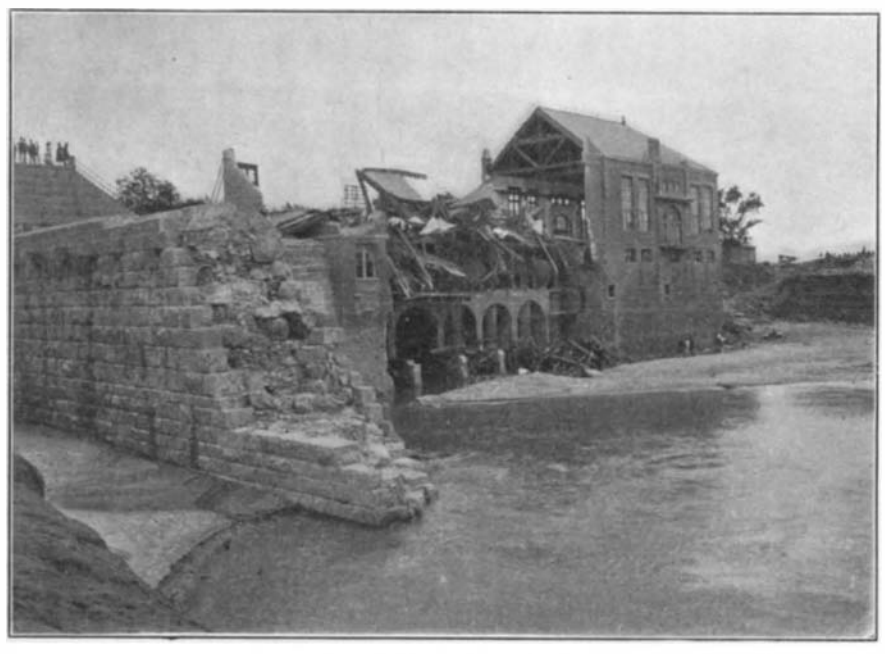


View from Same Position After the Wreck.



The Break Viewed from the Headgate Masonry, Showing Section of Dam Moved Bodily Downstream.

Wheelpits Exposed by the Fall of the West Wall of the Power House.



The Wrecked Power House Seen Through the Break in the Dam.