

destroyers are of the general type that did such good work for the Japanese in the late war, although they are somewhat larger in displacement. The trial speeds ranged from 28 to 29.9 knots an hour, and each is armed with two of the formidable 18-inch Whitehead torpedoes. The torpedo boats are of the first class, with a displacement of from 142 tons in the "Rogers" to 200 tons in the "Stockton," and the speeds average about 25½ knots an hour. Last, and in point of spectacular interest, perhaps, the most attractive to the layman, will be the two submarines "Porpoise" and "Shark." They represent a method of naval warfare which, after a long and discouraging struggle for recognition, has now established itself, and promises to figure very largely in such future naval operations as concern the attack and defense of fortified harbors and roadsteads.

Finally, there will be seven auxiliary ships, including the "Yankee," a troopship of over 6,000 tons; the 8,000-ton Celtic—a provision ship capable of carrying 2,500 tons of supplies; the 6,200-ton water ship "Arctusa," whose tanks can hold for the use of the fleet 850,000 gallons of fresh water; and the three colliers, "Abarenda," "Lebanon," and "Leonidas," which between them can carry 7,400 tons of coal for the replenishing of the bunkers of the warships.

Summing up the fleet as a whole, the total figures



are decidedly impressive. The forty-five ships represent a total displacement of 274,251 tons, carrying in its bunkers and in the holds of the colliers a total of 41,881 tons of coal. In the whole fleet are mounted twenty 13-inch, thirty-eight 12-inch, seventy-three 8-inch, twelve 7-inch, one hundred and fifty-eight 6-inch, sixty-six 5-inch, twenty-four 4-inch, one hundred and fifty 3-inch, and six hundred and forty-five rapid fire and machine guns.

For torpedo attack there are carried about one hundred 18-inch and 21-inch torpedoes. The fleet will be assembled under Rear Admiral Robley D. Evans, as commander-in-chief, who will hoist his flag on the battleship "Maine," and the personnel will include 812 officers and 15,235 men.

Humanity and Machinery.

Machinery is the cornerstone of modern society, the very foundation on which law, science, ethics, the arts, even the state itself, rests. It is so new that we do not yet know its poetry. We do not yet understand. Only two generations have lived beside the highway of steam; only one has seen the Bessemer converter transform the blacksmith into a master builder of ships and towers. The sewing machine, the far speaker, the typewriter are common things of to-day, accepted as a matter of daily convenience, and yet are they teachers of the people. Machines that come close to our lives and homes insensibly teach truth, precision, the adjustment of universal laws to human needs, respect for that wise American idea that labor saved is labor released for higher and nobler toil. The machine is the head master of the high school of the race.—Reader Magazine.

WRECK OF THE DULUTH-SUPERIOR DRAWBRIDGE.

The two photographs which we publish of the important Duluth-Superior Bridge, otherwise known as the Interstate Bridge, show with very dramatic effect that a structure of this kind, in spite of its great size, weight, and apparent stability, is only strong and stable when the stresses applied to it act directly in the planes of the trusses and along the axes of their various members. They also show how great is the momentum existing in a large steamship even when, as in the present case, the speed has been reduced almost to the stopping point—a lesson which should be taken well to heart at the present juncture, when the question of the best location of the Panama locks is under active discussion.

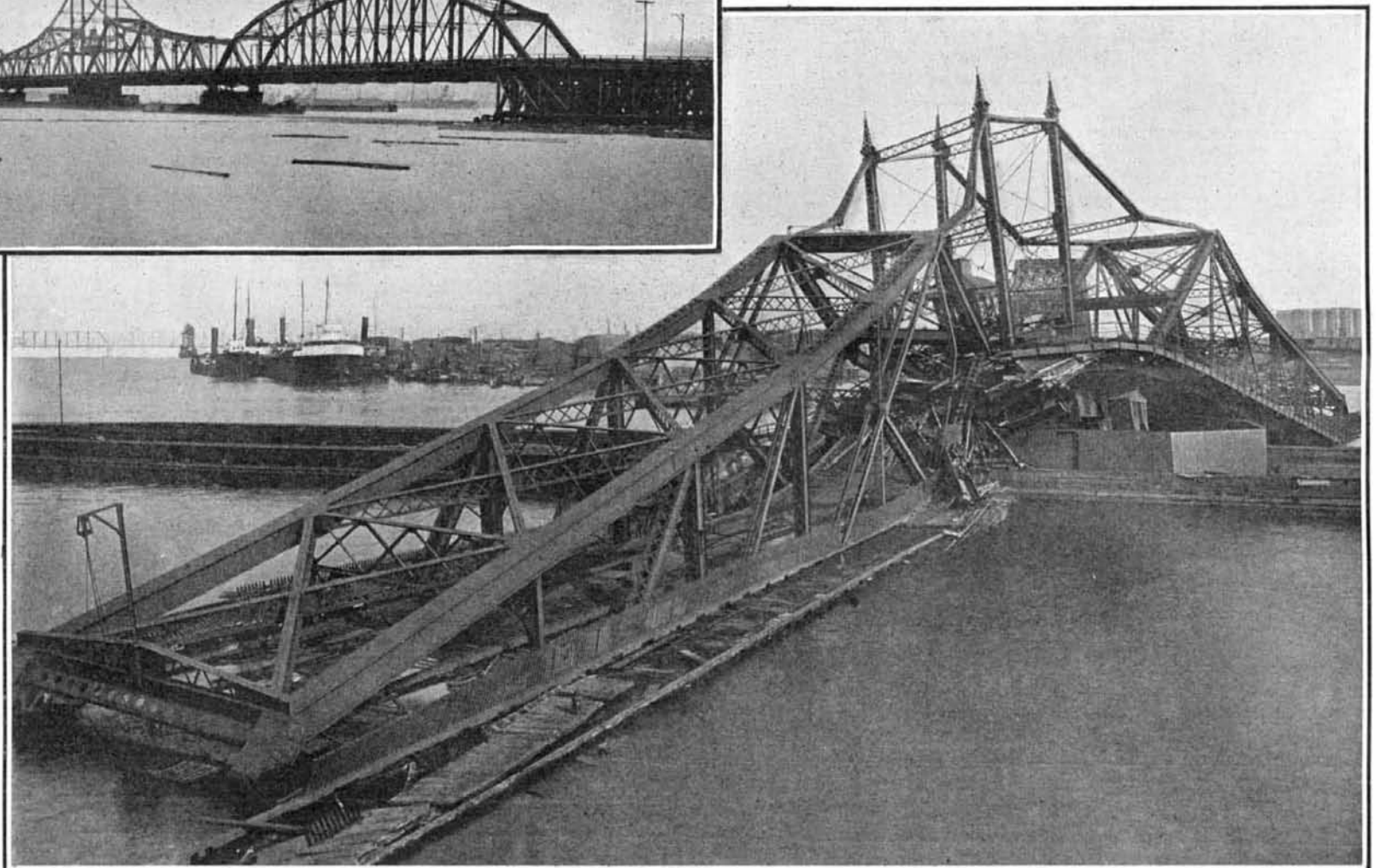
The Interstate Bridge was built in the year 1893, and consists of two large shore spans, and a center draw span with a length over all of 500 feet (which renders it one of the largest, if not the largest draw span in the world), the clear opening for shipping on each side when the span is swung clear for traffic, being 220 feet. The accident occurred on August 11, at 1 o'clock in the morning, and was due to collision with the structure of the steamer "Troy" of the Western Transit Company. The steamer was approaching the draw slowly, and although the captain noticed that the operator on the bridge was tardy in opening the

same, he continued under a slow bell in the expectation

taken in the use of this draw span, both on the part of the bridge crew and of the ships that pass through. Where masses of such great total weight have to be moved, it is courting disaster to allow only a small margin of time between the opening of the draw and the passage of the ships; and this is a fact which holds true, not merely in connection with this structure, but in others of equal importance that are to be found spanning our great waterways. A limit of distance should be imposed, nearer than which no ship should approach an important draw until it is swung entirely open and the channel is clear for passage.

The Hair an Indicator of Health.

A Japanese physician, starting with the fact that illnesses exercise a notable and well-known influence upon the growth of the nails both in length and thickness, asked himself if the hair too might not be affected by sicknesses. The result of his investigations is, that every general illness diminishes the diameter of the hairs. The medullary layer may even be wanting, and it happens to the peripheric hard envelope to disappear. The influence of illnesses is sometimes more marked in the races or the individuals that have coarse, thick hair. In this case, it is easy by the inspection of a hair to know if the person who furnished it has recently passed through a general illness. The hair is made thinner along a part of its length, and the length of the thinned part is proportional to the duration of the illness. We can, therefore, say whether the illness has been long or short, and almost to a week indicate the duration which it has had. That is a fact that may have importance, e. g., in a



The Vessel, Moving Very Slowly, Struck the Span Near the Center Pier. Her Stem Cut Through the Lower Chord, and the Two Arms Sagged Into the River.

WRECK OF THE LARGE DULUTH-SUPERIOR DRAW SPAN, 500 FEET LONG, BY A COLLIDING STEAMSHIP.

that, as is usually the case, the span would be swung clear with a rather small margin of time for the passage of the ship, this, according to his statement to the press, having been the common practice. When he discovered that the collision was inevitable, he backed his engines, the effect of which was to slow down the ship, and swing her bow from the center to the side of the channel, with the result that she struck the draw span about 20 feet from the central pier on the Superior side. It is easy to see from the photograph the nature of the collapse. The stem of the steamer struck the bottom chords (which, of course, at this point are members that are always in compression), cutting through them and causing that arm of the draw to sag into the river. The other arm followed suit almost immediately, the whole draw span settling into the position shown in the photograph. The impact of the ship was sufficient to push the whole structure over on its bearings, throwing the heavy supporting frame of girders below the central tower, and the turntable, out of plumb. One immediate effect of the disaster was to completely tie up both the water traffic in the harbor and the land traffic across the bridge itself.

Judging from the interviews given in the local press, it would seem that very grave chances have been

question of identification. From the biological point of view it is, moreover, interesting to find that a hair behaves like the nails. But that was to be expected.—L'Illustration.

Duration of Flashes of Lightning.

We possess as yet only pretty vague data as to the average duration of flashes of lightning, says L'Illustration. Faraday thought he could fix it at a second. Dufour claimed that the flashes of lightning were instantaneous, and that their rapid succession gave the illusion of one flash of a certain duration. Herr Schmidt has just been devoting himself to a series of observations, employing a disk of ten centimeters diameter bearing upon a black ground a white cross, the arms of which were two millimeters across, the disk being set in motion by clockwork with a speed of 50 to 60 revolutions a second. At certain flashes, the cross appeared a single time, very distinct; the duration of lightning was, therefore, inferior to the time of revolution of the disk, which would represent about the fiftieth of a second. In more numerous cases, the cross appeared two or three times, or even more, but with a decreasing luminous intensity; the lightning had, therefore, lasted during several revolutions of the disk.