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THE HOLYOKE TURBINE TESTS.

One of the finest illustrations of the results of New England thrift and energy is to be found in the city of Holyoke, Mass., the great center of paper-manufacture in this country—probably the greatest in the world. The city lies in a bend of the Connecticut River, below the Great Rapids, and is growing with astonishing rapidity in consequence of the unrivaled facilities the place affords for manufacturing enterprises, due to its magnificent, unfailing, and economical water power.

A dam, 1,019 feet long, 130 feet wide, and 30 feet high above the bed of the river, throws the vast volume of the Connecticut into a series of canals lying at three levels, with a total fall of 56 feet. Thus harnessed, the Connecticut yields at this point 30,000 horse power, with several miles of mill sites along its banks and beside the canals. The property is controlled by the Holyoke Water Power Company, who maintain the dam and canal, and lease the water power at a rate so low as to make Holyoke the most promising site for a great manufacturing city using water power this side of the Mississippi. As evidence that these promises are not likely to go long unfulfilled it may be noted that in 1861 the valuation of Holyoke was about two and a quarter million dollars, with a population of eight thousand five hundred. Now the valuation is about ten million dollars, while the population approaches twenty thousand.

In addition to the numerous paper mills there are already established many thread mills, cotton mills, manufactories of silk and woolen goods, extensive machine shops, cutleries, rubber works, besides establishments for the manufacture of screws, wire, and so on. On all sides the visitor sees new buildings going up, particularly new mills, factories, and machine shops, and extensive additions to old ones.

The general basis of the city's growth and prosperity being the utilization of water power, the importance of deciding by thorough competitive tests the relative values of the different styles of water wheels, to establish, if possible beyond a chance for doubt, the best turbine plans, is very naturally a matter of special local interest in Holyoke, apart from the great importance of such tests to all water power users throughout the country. Accordingly the city authorities united last spring with the Water Power Company in an invitation to water power companies, cities that pump their water supply, and all others interested in the matter, to take part in a series of tests of water wheels, at the expense of the Holyoke Water Power Company, with special invitations to the Locks and Canals Company, of Lowell, Mass., the city of Philadelphia, the National Millers' Association, the American Society of Civil Engineers, and the representatives of the owners of the turbines furnished, to send accredited engineers, as guests of the city, to witness and take part in the trials.

These tests have been in progress during the past two months at the testing flume of the Holyoke Water Power Company, which had been enlarged and put in excellent condition for the purpose, making it the most perfect flume of the kind ever constructed. The apparatus used in testing the wheels and the methods employed are those of Mr James Emerson, whose tests at the same flume during recent years have done so much to determine the actual practical efficiency of the different styles of water wheels.

In the course of a month or so the reports of the testing and supervising engineers covering the whole series of tests will be officially promulgated, and will promptly appear in the SCIENTIFIC AMERICAN. In the meantime we shall begin a series of special reports of the tests of the more important wheels, with full details, and a more particular description of the methods, apparatus, and conditions of the tests than is possible at this time.

COLLISIONS AT SEA.

On Friday, November 7, occurred two remarkable collisions at sea, one between the coasting steamer Champion, of the New York and Charleston line, and the English ship Lady Octavia, off the Delaware Cape, resulting in a heavy loss of life; the other between the Arizona, of the Guion line, and an iceberg, while crossing the northern edge of the Newfoundland Banks, no lives being lost. On the following day another steamer, the Falcon, plying between Baltimore and Charleston, was run into by a large three masted schooner laden with ice, and quickly sank, the passengers and crew escaping in life-boats.

These three collisions, occurring almost simultaneously, give terrible emphasis to the ever-imminent risk of such disasters, and the vital importance not only of keeping a good look-out at sea, but of the need of improvements in ship-construction which shall make all vessels practically unsinkable.

The Champion was an iron steamship, 234 feet long, 31 feet beam, and 18 feet in depth of hold. She was built in four compartments, and was lightly laden; yet she filled and sank within five minutes after striking the Octavia. The Lady Octavia was slightly smaller, but much more substantially built. She was one of the first sailing vessels built exclusively of iron, and her plates were much thicker than those now used in shipbuilding. She was struck abaft the stern on the port side, smashing her bows and cutting two great holes in her side, one of them three feet under the water line. The fore compartments filled almost instantly, the watertight bulkhead alone saving the vessel from foundering. Four passengers and twenty of the Champion's crew were picked up, the most of them having clung to floating fragments, or taken refuge on a life raft and in one of the boats which broke away as the steamer was sinking.

The disaster was due wholly to the absence of a proper look-out on board the steamer. The night was clear, the moon was shining brightly, and the captain of the Octavia reports that the Champion was in sight ten minutes before the collision occurred.

The Arizona's mishap was equally inexcusable. With a clear sky and a smooth sea the ship was run head on against a huge iceberg, while going at a rate of fifteen knots an hour. Her entire bow was literally smashed, but fortunately the collision bulkhead was staunch and the vessel was saved It will be remembered that the Arizona was launched only last spring, when a full description of her magnificent appointments was published in this paper

Except in the face of a disaster of this sort it would be impossible to believe that a ship built and run as the Arizona was for superiority in every particular, could have been so recklessly navigated. Her escape from instant sinking, with the loss of every one on board, was almost miraculous. Had the blow been a quartering one, the ripping open of her side would have been all but inevitable, and we should simply have had to record another disappearance of a great ship at sea.

In the case of the Arizona, as in that of the Octavia, the vital importance of collision bulkheads is most impressively illustrated; and indirectly also the value of the compartment system when the partitions are strong and the ports closed. They are not all the conditions requisite for safety, but they go a long way to lessen the risks incident to seafaring—not the least of which would appear to be the criminal carelessness of ship commanders and their assistants.

So long as men, even those in the most responsible positions, are liable to relaxations of vigilance; so long as men in subordinate positions find it less easy to take trouble than to take the chances that no harm will come from their shirking of duty, just so long may we expect the repetition of those preventable disasters, miscalled accidents, which add so many needless terrors to seagoing. For an endless variety of reasons that are no reasons, look outs will fail to look out, and collisions will occur after every provision has been made for preventing them by the use of electric lights, sound-signals, and other contrivances. All these are useful and desirable, no ship should go to sea without them; no officer should be retained who neglects them. But more than these is necessary. The ships themselves must be made with such elements of buoyancy that they will not sink under any probable condition of things at sea. With the enormous actual and prospective increase in shipping, particularly in the department of passenger traffic, the heavy annual losses by shipwreck, and the increasing thousands always at sea and subject to its dangers, the need of unsinkable ships must every year grow more and more urgent. There is no field in which the inventor can more directly contribute to the welfare of men than in this; nor is there any which holds out more generous promises of reward to the men who shall solve the problem involved. The closing years of this century are likely to see as grand an advance in the scope and magnitude of American commerce as recent years have shown in the advancement of agriculture and the mechanic arts. It lies with our inventors to determine whether the commerce of the future shall be secure as well as great.

THE AMERICAN PUBLIC HEALTH ASSOCIATION.

The seventh annual meeting of the American Public Health Association will be held in Nashville, Tenn., November 18 to 21. The principal subjects for discussion will be the sanitary condition of cities and towns, especially those of the Southern States, and the proper treatment of actual or threatened outbreaks of yellow fever. Under the former head will come subjects relating to water supply, drainage and sewerage, disposal of garbage and excreta, slaughter-houses and abattoirs, public school-houses, public health laws, regulations, etc., expenses of municipal sanitation, and the like. In the discussion of yellow fever the following points will be specially considered.

1. How to deal with a city in the yellow fever zone in order to prevent the appearance of a first case. 2. How to prevent the importation of a first case. 3. How to deal with a first case and early cases generally when, in spite of precautions under first and second headings, it has made its appearance. 4. The duty of local boards of health, or other health authorities, to report such cases promptly, even though there may be some doubt as to the diagnosis. Whether the knowledge that such reports would be faithfully made would not have a tendency to allay apprehensions, and give confidence to other communities while warning them of the importance of making preparations for contingencies. 5. Under what circumstances may it become necessary or expedient to remove the unacclimated portion of the population from an infected place? How may this be effected for the poorer classes of the population, and how should the people thus removed be cared for and supported? 6. Measures for isolating a dangerously infected place. 7. Organizations for the relief and treatment of the sick in an infected city. 8. Measures for preventing the spread of the disease from an infected place by railroads, including the management of transfer stations. 9. Inspection of steamboats at an infected place and at intermediate stations between the port of departure and their final destination. Should stations of observation be established by the National Board of Health? If so, what should be their relations to the health authorities of the