A PROPOSED "WHALEBACK" PASSENGER STEAMER.

BY HAROLD AVERY.

Through the growth of transatlantic travel the modern steamship has developed into a floating hotel, and the great ocean fliers of to-day are well nigh as perfect as vessels of their model can be made. Approaching the ideal of a safe, speedy and commodious carrier still nearer is the design presented on the front page, of a steamer intended to lessen the time between New York and Queenstown to five days. The hull is of the steel barge pattern, almost submerged, supporting a strongly built pier beyond the reach of the wildest sea. Two longitudinal bulkheads divide the hull into three main compartments, which are subdivided by transverse bulkheads into twenty-one separate water-tight sections, without doors below the water line. The curved deck affords immunity from crushing waves above and the double bottom from perils that may lurk below. The dimensions are as follows:

Length	528 ft.
" load line	504 "
Beam	72 "
Depth	38 "
Draught	28 "
Displacement	14,000 tons.
	490,000 cu. ft.
Weight of hull	4,360 tons.
" " superstructure	624 "
Capacity of hull	20,000 "
" " double bottom	2,300 "
Distance between double bottom	3 ft.
Necessary to depress hull one inch	73·3 tons.
Area of midship section	1,713 ft.
" " plane of flotation	31,108 "
Center of gravity of displacement below water line	8·5 "
" " " " hull " " "	12·7 "
Common center gravity of hull and superstructure below water line	9·3 "
Height of metacenter, angle 6°	17·4 "
Pressure of wind necessary to deflect to angle 6°, 56 lb.	per square foot- tornado.

It will be seen at a glance that these elements give a stability not possessed by any other form of hull, and even when heeled by a tornado to the extent above mentioned, this model would have a statical stability of 23,476 ft. tons. The engines designed to drive this vessel at a speed of 24 knots an hour are of 19,500 I. H. P., three in number, of the triple expansion type, running 120 revolutions per minute, with propellers of 24·2 ft. pitch, 11·8 ft. diameter, and are to be supplied with steam by sectional boilers at a pressure of 115 pounds.

There will be numerous auxiliary engines for electric lighting, elevators, hoisting, ventilating, heating, etc. The superstructure is supported by five piers twelve feet in diameter, at distances respectively of 60, 180, 204, 228, and 372 feet from the bow, and at distances of 132, 300, and 344 ft. are steel masts, used also as ventilators. Ranged along the deck two feet inboard, and the same distance above the water line, are sockets, 21 in number, which rest upon and are bolted to the deck beam beneath, and whose base forms the deck plate. Set in and bolted to these sockets are cylindrical steel columns 10 inches in diameter, 1 inch thick, 32 feet long and weighing 2,920 pounds. They are flanged at bottom to fit sockets, and at top to contain ends of beams that form a continuous frame for base of the upper works. This frame is connected by transverse beams to the central lattice girder that is supported by and bolted to the piers and masts. To cylinders whose axes coincide with those of the supports below and are 6 inches diameter, ½ inch thick, 18·6 feet in height, flanged at base, middle, and top, two series of beams parallel with the first are joined, the whole forming a light yet wonderfully strong framework that will stand any conceivable natural stress. The beams on the lower tier are 24 feet long, 5 inches flange and half inch web; those above proportionately lighter. The space between the hull and floor beams is 24 feet.

The arrangement of apartments may be seen from the plans. The lower floor is devoted entirely to staterooms that are lighted by incandescent electric lights at night. During the day those rooms along the central girder are lighted from beneath by disk grating, over which an electric mat heater is placed. Accommodation for seven hundred and twenty first-class passengers is provided for. Steerage travelers will of course be limited to the hull. On the upper floor are the various halls, parlors, a grand dining room, and as novelties a billiard parlor, baths, a laundry and ocean mail room; and for those who delight in promenades, two four feet wide completely round the floors, and that upon the roof. Passage between the hull and superstructure is accomplished by means of electric lifts, within the first, central, and last piers. By the separation of hull and living apartments the passenger is enabled to avoid the smell of machinery, the racket of freight handling, and all those ills that transatlantic travelers condemn. By the union of ship and hotel he is enabled to convert the voyage of three weary months in an open caravel into five days of luxurious ease and pleasure. The accommodations and capacity of a ship thus designed will commend it to the favorable notice of those interested in European trade and travel.

Correspondence.

Decay of Bone in the Mouth.

To the Editor of the Scientific American:

While rolling the broken-off head of a bone collar button in my mouth it fell into a hollow tooth. As it closed the tooth effectually, it was left there for about two months, when it was found to be tough and glue-like in appearance, like bone treated with sulphuric acid, thus showing the effect a decayed tooth has on the others. F. E. B.

South Bethlehem, Pa.

High Temperature in Fevers.

To the Editor of the Scientific American:

The following remarkable instance of the intense degree to which fever heat may range in the human body, even during life, is reported for the information and investigation of scientists.

Quain, in his "Dictionary of Medicine," says, "a temperature of 106° indicates great danger;" but Dr. Wilson Foy relates a case in his experience in which the temperature reached 110°. These with some others are accounted extraordinary records of high temperature. Wunderlich noted a temperature of 112·55° in a case of tetanus; but this temperature was reached after the patient expired. It is evident, therefore, that up to a temperature of 110°, or even 111°, in some exceptional cases, a patient may live, but we have no instance anywhere recorded of a patient surviving a higher temperature than that. The following, therefore, which is a thoroughly trustworthy and authentic account, and may at any time be verified by such as are desirous in the cause of science to inquire further into it, is worthy of record, and I therefore send you such details as I am in possession of, and which I have obtained from an eye witness, for a corner in your scientific paper, in view to inviting further investigation into such cases.

In July last, at Naini Tal, a hill sanitarium in British India, situated in latitude 29° 22', longitude 79° 29', at an altitude of 6,409 feet above sea level, a religious lady in St. Mary's Convent was attacked with what appeared to be an ordinary fever. After a few days symptoms of typhoid fever developed, and the patient's temperature was taken by the doctor in attendance, a clinical thermometer with a range of 110° being employed. On the application of the thermometer the temperature of the patient was found rising rapidly till the quicksilver reached its maximum limit of 110°, when the registering tube burst. Another clinical thermometer of the same range was immediately procured and applied with the same result, and another and another. After four of 110° range had burst, one of 115°, and 2° over, was procured and used, and this also burst. At this last experiment, the military surgeon in charge of the convalescent depot was also present. It is therefore, in point of fact, unknown how much above 117° her temperature may have risen, as no thermometer of a greater range was procurable. But the most remarkable feature in the case remains to be told, and that is, the patient has made a good recovery, and is at this present time doing well in her convent at Naini Tal.

The lady is a German by birth, is aged 38 years, has been 12 years in India, and has a strong, robust constitution; but to my thinking no constitution, however strong, could go through such an ordeal without supernatural aid.

I am not too ready to believe in miracles, I am a skeptic, but if this is not a miracle, I should like to know if science has discovered any other name for it.

I have had a long experience of fevers of all kinds in this land of fevers; but I have never heard or seen a case in any way resembling this. The patient, notwithstanding the extraordinary intensity of the fever which raged in her, was never so totally unconscious as not to be able to recognize those who were in constant attendance on her. She was at times delirious, but only for short intervals, and considering she has been ill altogether only seventy days or thereabout, her recovery seems to be as wonderful as the malady from which she has suffered. The medical authorities have pronounced her case one of typhoid fever; but perhaps science will be able to find an exceptional name for a fever that no heat-registering invention has been able to gauge. D.

Lucknow, East India, September 21, 1891.

The Fiber Exhibit at the Exposition.

The efforts which are being made to increase the production of vegetable fiber in this country will receive a strong stimulus from the display of fibrous plants and their products at the Columbian Exposition.

Group 9 of the official classification includes all of the vegetable fibers, such as cotton, hemp, flax, jute, ramie, in primitive forms, and in all stages of preparation for spinning, substitutes for hemp, cocoanut fiber, and all similar substances.

This country grows annually about one million acres of flax, and a very large acreage of hemp, and these two are our principal fiber-producing plants, with the exception of cotton.

Our imports of textile grasses and fibers now amount to about 258,000 tons per annum, valued at about fourteen million dollars. There seems to be no good reason why a large part of the above sum should not be paid to the home producers, which would be the case if more attention was paid to the production of the vegetable fiber in this country than has been done in the past. Heretofore the flax has been grown by the farmers of this country almost entirely for seed, a part of the straw going to tow or paper mills and bringing on an average not more than $2.50 to $4 a ton, the remainder, and much larger part, being burned or wasted. To what extent flax may be profitably grown both for seed and fiber is one of the vexed problems which it is hoped the exhibit at the exposition will throw some light upon. Investigations show that the average humidity of the flax-producing sections of this country is the same as that of Belgium and other parts of Europe where the production of flax for fiber is the chief industry of the farming population, and the exhibit of flax from those countries will no doubt prove very interesting and valuable to the American farmers.

Fibrelia, a new product from common flax straw, promises to have an important bearing on textile interests in the future. By a process of manipulation the straw is reduced to a short staple very closely resembling cotton or wool, and when mixed with either is said to add materially to the value of the product in beauty and strength. It is claimed that twenty-five per cent of fibrelia mixed with seventy-five per cent of wool made into broadcloth gives a product much more valuable than if made of wool alone.

The area devoted to the cultivation of American hemp has of late years been extended into States north of the Ohio River, and recent experiments encourage the hope that Sisal hemp may be profitably grown in Florida.

Among other fiber plants now attracting considerable attention, especially in the temperate sections of the United States, where there is not a great amount of rainfall, is ramie, a plant indigenous to Java and China, and from which it is exported in large quantities to France, Germany and England, and manufactured into linen and silks. California has appropriated $5,000 to purchase ramie roots for free distribution and as a bounty for merchantable ramie. The fiber of this plant receives and retains the most brilliant dyes, is very repugnant to moths, and its tensile strength is forty per cent greater than flax. It ranks next to silk as a textile fabric. When cultivated it grows luxuriantly in the Southern States and in Southern California, and the only difficulty attending the product is that a machine which will effectually separate the fiber from the stalk has not been produced, although a number of machines have been invented for the purpose and will be exhibited at the exposition.

The exhibits of hemp, flax, jute, ramie, etc., at the Paris Exposition in 1878 and at the Centennial in 1876 were very interesting and complete, and it is the purpose of Chief Buchanan, of the Agricultural Department, to make this group at the Columbian Exposition equally so, and fully illustrative of the progress made in later years in the cultivation of fiber plants and the methods of preparing the raw material for market.

Metallochromy.

Metallochromy is a process of direct polychrome printing upon metallic surfaces recently presented by Mr. Josz, its inventor, to the Society of Encouragement of National Industry. Hitherto, all impressions upon metal have been obtained by the transfer of a freshly printed sheet, or by the transfer of the impression upon a sheet of rubber to a sheet of metal. To this effect, it is necessary to construct special lithographic presses in order to obtain an exact adjustment of the colors forming the subject. In order that the printing may be done directly from a hard surface, that is, the lithographic stone, upon another hard surface, that is, the metal, it is necessary to be able to render the metallic surface elastic enough to take the ink that the stone carries, without impasting or destroying the details of the subject. In order to reach such a result, the process employed is as follows:

Upon the metallic surface to be printed there is produced by the mechanical action of very fine sand a fine and close grain, which is diluted and cleaned by immersion in different alkaline solutions. This roughened and velvety surface takes a lithographic impression as well as paper and fabrics do. Immediately after the printing, the sheet of metal is submitted to a temperature of 50 degrees in a special stove, the object of which is to cause the ink to enter the pores. The impression is therefore no longer superficial, but is printed in the metal itself, whose expansion and contraction it may follow without undergoing any alteration. The metallochromic prints, covered with two coats of varnish, applied hot and fixed in a stove, present the same characters of durability as faience and enamel.—*La Nature.*

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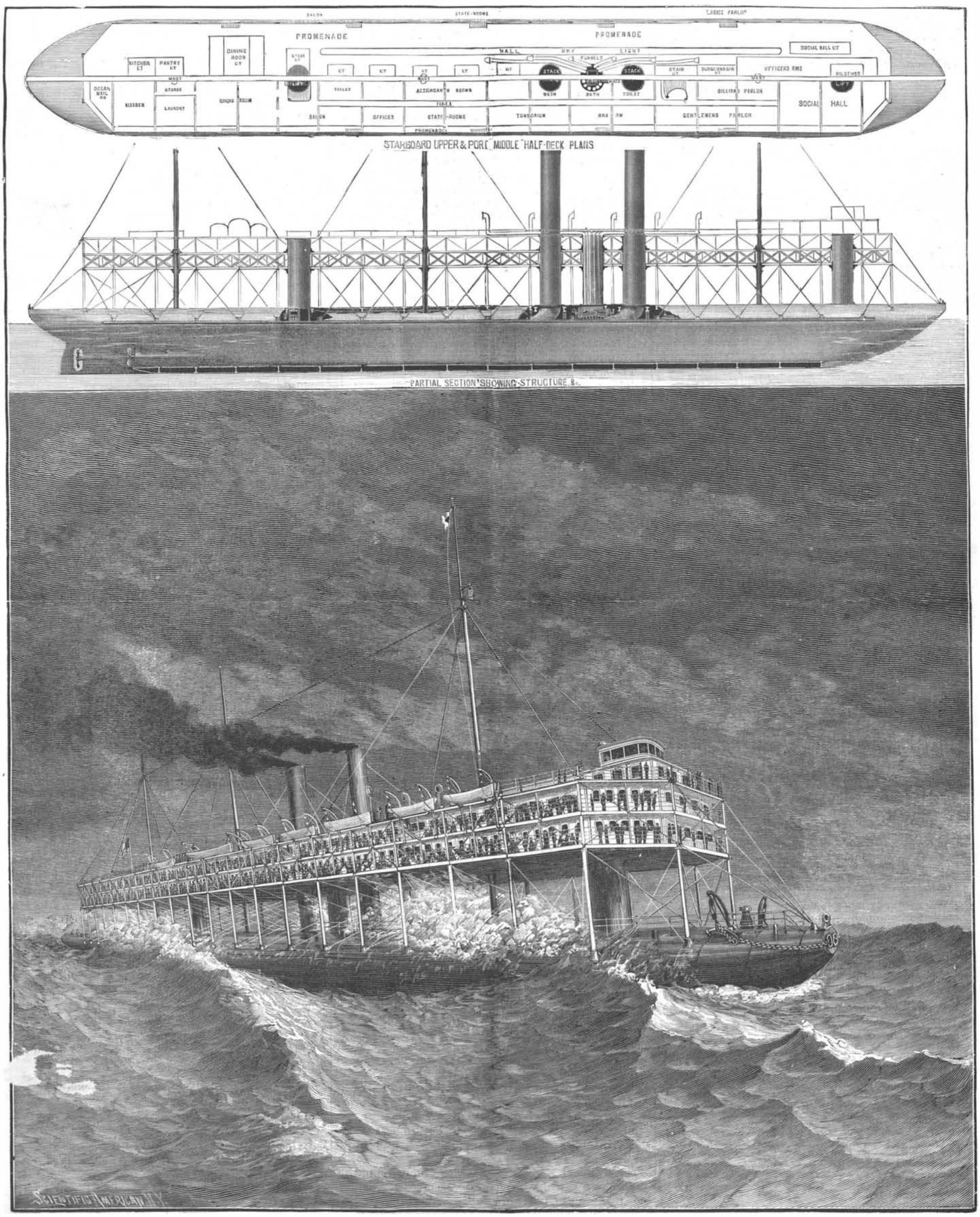

A WHALEBACK PASSENGER STEAMER—DESIGNED BY HAROLD AVERY.—[See page 309.]