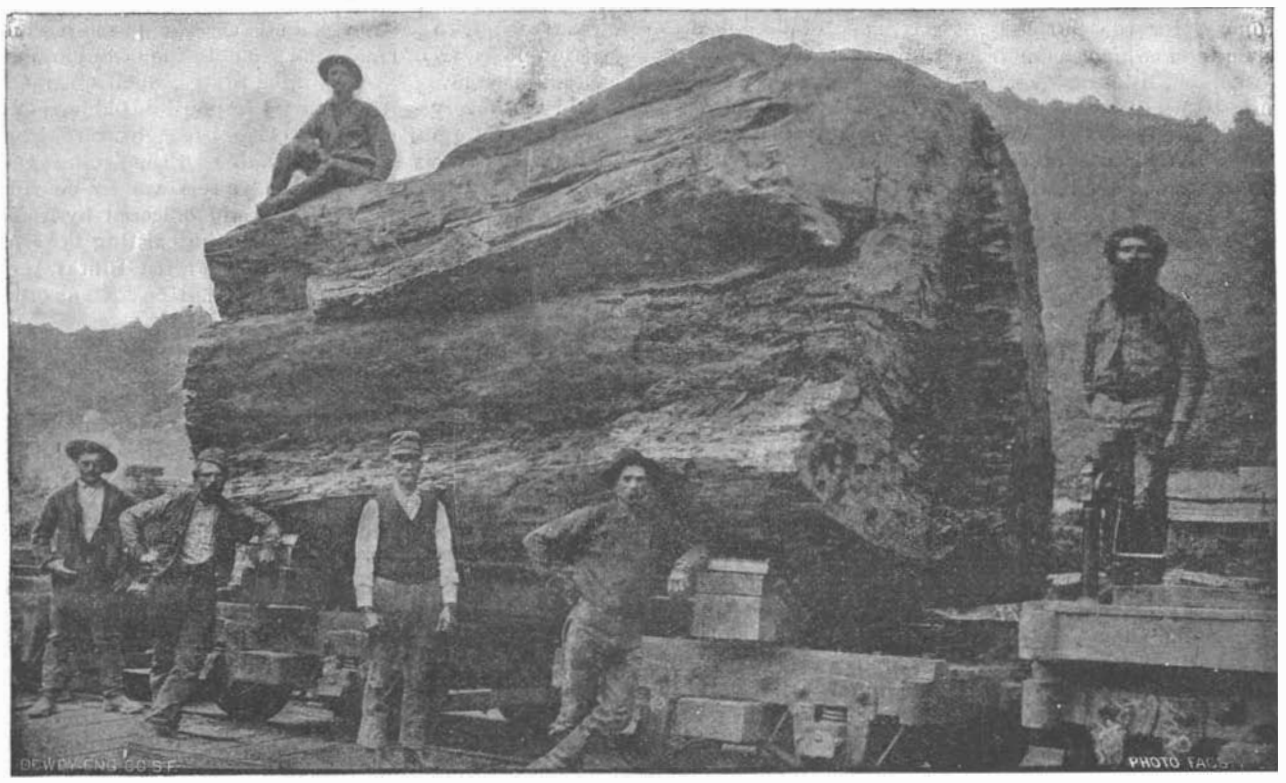
REDWOOD LOGGING IN CALIFORNIA.

The illustrations herewith, both made from photographs, give a vivid idea of the size of the lumber afforded by California trees, and go a long way to afford an explanation of the wonderful growth of the lumber industry on the Pacific slope within a few years past. The picture of the hauling of a redwood log to the mill, for which we are indebted to the *Mining and Scientific Press*, of San Francisco, represents a scene in Humboldt County, while the immense train load of logs shown in the larger view was photographed for the SCIENTIFIC AMERICAN while on its way to the Excelsior Redwood Co., at Eureka, Cal. These trees are not what are known as the great trees of California, the *Sequoia gigantea*, which have been found only in small groves on the Sierra Nevada, at a height of about 4,500 feet above the sea level. But the redwood bears a strong resemblance to the mammoth tree, and is sometimes mistaken for it, as it frequently grows to a height of 300 feet and a diameter of 16 feet.



HAULING A REDWOOD LOG TO THE MILL.

In felling these trees, saws are now largely used instead of axes—the ordinary cross-cut saw, usually from 10 to 12 feet in length, with the ax, wedges, and a sledge hammer. Logging railways are largely used in transporting the logs to the mill, and in many cases to carry the lumber from the mill to tidewater or the place of shipment. When the railroad runs into the tract of timber being cut, donkey engines are used to load the logs on the trucks and for other heavy work usually done by horses or oxen.

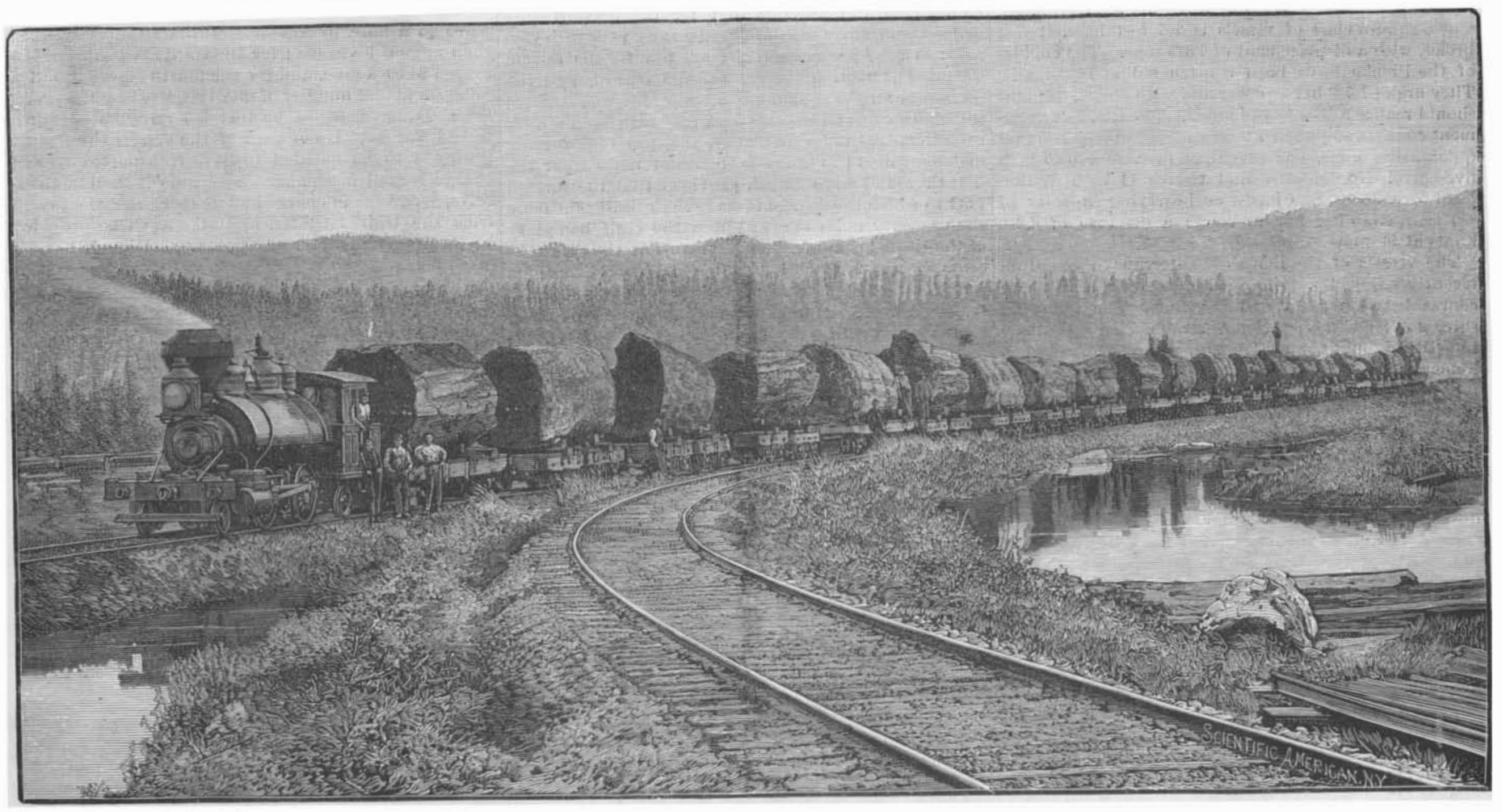
The redwood forests are generally in hilly country, so that in many cases it has been a matter of no great difficulty to get the lumber to tidewater or to a railroad leading to market. The timber is light and close-grained, much resembling in appearance red cedar, but darker. It is eminently durable and not attacked by insects, and the large growth of the trade in it attests the number of new uses to which it is constantly being put. The tree is found from the boundary of Mexico northward, and never very far from the coast, there being in some cases forests of this tree exclusively on the Coast Range.

Another Warning.

Waterbury, Conn., is suffering from what may almost be called an epidemic of typhoid fever, due to the contaminated milk served from a dairy farm that supplied part of the city with milk. The city engineer, a member of the health board, was one of the victims to whom the disease proved fatal. One of the daily papers, commenting on this, says:

"This man had labored long and earnestly in defense of the public health, so far as the removal of unfavorable conditions within the city limits was concerned, and as a member of the board of health his attention must have been called to many subjects in the field of sanitation that were not connected with drainage. But in the prime of life he has been cut off by poison sent to the city from a farm where the farmer himself lay ill of typhoid fever, and from which an employe had recently been taken to the city hospital, there to die of the same malady. If so well-informed a civil engineer and practical sanitarian as the late Mr. Weld was willing to use in his family the milk sent from a herd and a dairy farm that had not been subjected to sanitary inspection, we cannot expect that the average citizen will strive to protect himself under similar conditions. The frequent sanitary inspection of suburban dairy farms is required for the protection of the inhabitants of the cities in which milk from those farms is sold."

This is only another warning, adds *The Christian Union*, to every citizen. You may protect your property from burglars by bolts and bars, but the lives of those dearest to you, who have a right to look to you for protection, depend on your intelligence for their health, for their lives. Insist on public officers doing the work for which they are appointed; in every way see that your own home is conducted on such a basis as not to endanger public health. See that your neighbor does not endanger the health conditions of your own home, and these frequent public calamities will be avoided. They are preventable, and it is criminal carelessness to live under conditions that make them possible.



A REMARKABLE TRAIN LOAD OF REDWOOD LOGS IN CALIFORNIA.

SHIP railways appear to be growing in favor. In addition to the one now under construction across the Chignecto isthmus, comes a report concerning a similar project from Georgian Bay to Toronto, Canada, a distance of about seventy miles. This railway, if completed and successful, will, says the *Railway Review*, shorten the distance between Chicago and Lake Ontario some 600 miles. Mr. E. L. Corthell, of Chicago, who, it will be remembered, was intimately associated with Mr. James B. Eads, the projector of the Panama ship railway, is reported to be favorably impressed with the idea and to be ready to take an active interest in it. Modern engineering apparently delights in accomplishing the impossible, and it is not improbable that in the modern ship railway a new transportation element may be developed.

AN electrician says that just what takes place in the human organism to produce death from an electric current seems to be an unsolved problem. One of the theories sometimes advanced concerning it is that when a being suffers death from electric shock, it is a pure case of internal rupture or explosion from the generation of gas or vapor. In support of this view, the way in which telegraph poles are sometimes torn to pieces is referred to. The lightning follows the moist portion of the pole, which is the core or heart; in this case the moisture is vaporized, and an explosion occurs. The high resistance produces heat, the heat in turn steam, and the steam explosion.

New British War Vessels.

The second class protected cruiser Pallas, which was laid down on July 1, 1889, was lately floated out of No. 4 Dock at Portsmouth. She is the first of the ships building at the dockyard under the Naval Defense Act, and has for sisters the Pearl, Philomel, and Phœbe, under construction at Pembroke and Devonport, and the five vessels—namely, the Pandora, Pelorus, Persian, Phœnix, and Psyche—which are in course of building by contract under arrangement with the Australian government for the purposes of colonial defense, and the names of which have been recently changed to the Catoomba, Mildura, Wallaroo, Taurango, and Ringarooma respectively. Being intended for service on stations where docking accommodation is available, the Pallas is destitute of copper sheathing, but has a steel bottom coated with the usual compositions to prevent corrosion and fouling. She measures 260 feet between perpendiculars, and has a breadth of 41 feet, a mean draught of 15 feet 6 inches, and a load displacement of 2,573 tons. The weight of the hull is 1,250 tons. A watertight steel deck extends throughout the entire length of the ship, whereby protection is afforded to the engines, boilers, magazines, etc., and which is supplemented by the coal bunkers. The hull is largely subdivided by watertight decks and bulkheads, so that a bilged compartment can be isolated at will. Special protection is provided for the fighting stations of the ship, as well as for the necessary instruments, telegraphs, etc., that would be required for maneuvering in action. The Pallas is to be provided with two sets of inverted direct-acting engines, for which steam at 155 lb. pressure will be supplied by four double-ended boilers. The indicated horse power at natural draught is 4,500, and with forced draught 7,500, the speed resulting being estimated at 16½ knots and 19 knots respectively. The continuous sea-going speed to be maintained on a four days' run is specified to be 14¾ knots under a natural draught horse power of 2,500. The coal capacity at load draught will be limited to 10 knots, will insure the vessel steaming a radius of not less than 4,800 knots.

The armament of the Pallas will consist of eight 4·7 inch and the same number of three-pounder quick-firing guns, in addition to smaller machine guns and the usual torpedo equipment. The total estimated cost of the ship, including £54,410 for propelling machinery and £7,597 for guns, is £150,186.

On July 1, the twin screw protected cruiser Phœbe was launched at Devonport dockyard. The Phœbe is of the Pandora type, the Philomel, building at Devonport, the Pallas, just launched at Portsmouth, and the Pearl, building at Pembroke, being sister ships. Five vessels of the same class are building at Newcastle-on-Tyne and Glasgow for the Australian government. The Pandora class of vessels is 265 feet long, 41 feet broad, with a displacement of 2,575 tons. The engines of the Phœbe have been constructed at Devonport. They are of 7,500 horse power and with forced draught should realize a speed of 19 knots. The Phœbe's armament consists of eight 4·7 inch and eight three-pounder quick-firing guns, one seven-pounder, four 0·45 inch five-barrel Nordenfelts, and twelve 14 inch Whitehead torpedoes. She has a coal-carrying capacity of 300 tons, enabling her to steam a distance of 6,000 knots at 10 knots.

The vessels of the British Mediterranean squadron recently enjoyed a full speed race over a five-mile course between Jaffa and Beyrout. The following ships took part: Victoria, Australia, Benbow, Phaeton, Dreadnought, and Colossus, while the Trafalgar, Temeraire, Edinburgh, and Agamemnon acted as umpires and did not compete. The Australia took the first place very easily, and in the course of five hours' run gained nearly four miles on the Benbow, which was second. The Victoria was third, followed by the Dreadnought, while the Phaeton and Colossus brought up the rear. The Australia averaged a speed of 16·5 knots, the Benbow 15·5, the Victoria 15, the Dreadnought 14·5, the Phaeton 14, and the Colossus about 13 knots.

Nickel-in-the-Slot Telephony.

A novel telephone station is being introduced in Connecticut. The instrument cannot be used unless a fee is paid. There are five slots in the machine for the reception of a nickel, ten cent piece, quarter, half dollar, and dollar respectively. These amounts cover the rates charged for telephoning to various places in and out of the State. To use the telephone it is first necessary to call up the central, as on an ordinary telephone. The objective point is then asked for, and when this is reached, the party who rings up is told to put the necessary fee in the slot. If five cents is dropped in the slot, it strikes a bell of a high note, once. Ten cents strikes a bell of the same note, twice. A quarter strikes a bell of a lower note, once. A half dollar strikes that bell twice, while a silver dollar strikes a very low tone "cathedral gong."

The Southern New England Telephone Company has arranged to place a large number of these instruments in Connecticut as rapidly as they can be furnished.

Subsidies for American Ships.

Two subsidy bills have lately passed the U. S. Senate and are now before the House of Representatives. If enacted, they are likely to have a most important influence in the development of American commerce and ship building. These bills provide for the payment of liberal subsidies to American vessels that engage in foreign trade; and additional subsidies to steamers that are employed to carry the United States mails.

In so far as the general principle is concerned of paying subsidies out of the public treasury, to private individuals, there can be no question it is wrong, and if long continued is corruptive and disastrous.

On the other hand, in the history of every nation exigences have arisen when as a matter of public expediency, for the immediate realization of great benefits to be secured in no other way, the grant of special subsidies for a limited period has proved in the highest degree advantageous.

Such an emergency it is claimed is now upon us. Our seaports and coasts are without adequate naval protection, while our foreign commerce is in a state of sad decline.

We have allowed other nations to monopolize the principal routes and vehicles of ocean commerce, and at the same time overshadow us with superior naval establishments. It is to be hoped we shall never have occasion to resort to hostilities with any nation. Still it is humiliating to feel that, in case of insult or attack, we have little or no means of naval offense or defense.

We see, in the examples of other nations, that the quickest and most satisfactory way to build up foreign commerce and provide an effective navy is to grant generous subsidies wherewith to stimulate and reward individuals who build and navigate ocean vessels. The experience of Britain during the past fifty years appears to show that the gains to the empire, in freights, in commerce, and in manufactures, have been at least a thousand millions for every million expended in subsidies. The public benefits of the system have far outweighed its admitted evils.

Let us hope that corresponding benefits will accrue to this country as a result of the new subsidy legislation now about to be inaugurated.

The Tonnage Subsidy bill, passed by the Senate, provides for the payment to any vessel of more than five hundred tons gross register, whether sail or steam, constructed and wholly owned by citizens of the United Sates, or registered pursuant to the laws thereof, and which shall be engaged in the foreign trade, plying between the ports of the United States and foreign ports, the sum of fifteen cents per gross registered ton for the first five hundred miles or fraction thereof sailed outward, and the same sum for the first 500 miles or fraction thereof sailed inward on any voyage or voyages; 15 cents per gross registered ton for the second 500 miles or fraction thereof sailed outward, and the same sum for the second 500 miles or fraction thereof sailed inward; and 30 cents per gross registered ton for each thousand miles thereafter, and pro rata for any distance sailed less than one thousand miles after the first thousand miles sailed, provided that the foreign port to which the voyage is made shall be distant more than seventy miles seaward from the Gulf boundary of the United States. The payments at the rate of 30 cents per ton, for each 1,000 miles sailed, are to continue for the term of ten years at that rate, and thereafter for another term of nine years at a reduction of three cents per ton each year upon each 1,000 miles sailed, and pro rata for any less distance.

No vessel is to be entitled to the benefits of this act unless its entire cargo shall be loaded at a port or ports of the United States, and discharged at one or more foreign ports, or shall be loaded at one or more foreign ports and discharged at a port or ports in the United States; nor shall a vessel be entitled to receive payment under this act unless it shall have freight on board at the time of sailing to the amount in tons weight or measurement of at least 25 per centum of the net registered tonnage, 2,240 pounds or forty cubic feet to make a ton of cargo. There is to be no discrimination between competing lines.

No vessels are to be entitled to the benefits of this act unless all the officers thereof shall be citizens of the United States, nor unless upon each departure from the United States the following proportion of the crew shall be citizens of the United States, to wit: During the first two years, one-sixth thereof; during the next three succeeding years, one-third thereof; and, during the remaining term of this act, at least one-half thereof; nor unless there be carried on vessels of less than one thousand tons gross register one native-born apprentice, and on vessels of one thousand tons and upward one such apprentice for each 1,000 tons or three-fourths fraction thereof. The government of the United States have the right during the time this act shall be in force to purchase or charter any vessels receiving the benefits of this act, at a price to be fixed by agreement with their owners or agents, or by the judgment of appraisers mutually selected in case of disagreement.

The Secretary of the Treasury is to fix the times and manner of payments, prescribe the vouchers, with forms of account and verifications, upon which payments shall be made, and shall adopt whatever regulations may be necessary to carry out the provisions of this act.

The Postal Subsidy bill authorizes the Postmaster-General to enter into contracts for a term of not less than five nor more than ten years in duration with American citizens for the carrying of mails on American steamships between ports of the United States and such ports in foreign countries (the Dominion of Canada excepted) as in his judgment will best subserve and promote the postal and commercial interests of the United States. Such contracts are to be made with the lowest responsible bidders, and the Postmaster-General is to have the right to reject all bids not in his opinion reasonable for the attaining of the purposes named.

The vessels are to be American-built steamships, owned and officered by American citizens in conformity with the existing laws, and upon each departure from the United States the following proportion of the crew shall be citizens of the United States, to wit: During the first two years of such contract for carrying the mails, one-fourth thereof; during the next three succeeding years, one-third thereof; and during the remaining time of the continuance of such contract, at least one-half thereof. They are to be constructed after the latest and most approved types, with all the modern improvements and appliances for ocean steamers. They are to be divided into four classes. The first class is to be iron or steel screw steamships, capable of maintaining a speed of twenty knots an hour at sea in ordinary weather, and of a gross registered tonnage of not less than 8,000 tons. No vessel except of the first class is to be accepted for the mail service between the United States and Great Britain. The second class is to be iron or steel steamships, capable of maintaining a speed of sixteen knots an hour at sea in ordinary weather, and of a gross registered tonnage of not less than 5,000 tons. The third class is to be iron or steel steamships, capable of maintaining a speed of fourteen knots an hour at sea in ordinary weather, and of a gross registered tonnage of not less than 2,500 tons. The fourth class is to be iron or steel or wooden steamships, capable of maintaining a speed of twelve knots an hour at sea in ordinary weather, and of a gross registered tonnage of not less than 1,500 tons.

NAVAL OFFICERS MAY SERVE.

The steamships of the first, second, and third classes are to be constructed with particular reference to prompt and economical conversion into auxiliary naval cruisers. The rate of compensation to be paid for such ocean mail service of the said first class ships is not to exceed the sum of $6 a mile, and for the second class ships $3 a mile, by the shortest practicable route, for each outward voyage; for the third class ships not to exceed $1.50 a mile, and for the fourth class ships $1 a mile, for actual number of miles required by the Post-Office Department to be traveled on each outward-bound voyage. Upon each of the vessels the United States is to be entitled to have transported free of charge a mail messenger whose duty it shall be to receive, sort, take in charge and deliver the mails to and from the United States, and who shall be provided with suitable room for the accommodation of himself and the mails.

Naval officers may volunteer for service on the vessels, and when accepted by the contractor or contractors, may be assigned to duty by the Secretary of the Navy, whenever in his opinion such assignment can be made without detriment to the service, and while in said employment they shall receive a furlough pay from the government, and such other conpensation from the contractor or contractors as may be agreed upon by the parties; provided that they shall only be required to perform such duties as appertain to the merchant service.

The vessels are to take as cadets or apprentices one American-born boy under twenty-one years of age for each 1,000 tons gross register, and one for each majority fraction thereof, who shall be educated in the duties of seamanship, rank as petty officers, and receive such pay for their services as may be reasonable.

The steamers may be taken and used by the United States as transports or cruisers upon payment to the owners of their fair actual value.

A Statue to an Inventor.

American inventors are beginning to be appreciated by the public as public benefactors, and monuments are gradually appearing in the public parks to commemorate their valuable services to mankind. In the chief park of Newark, N. J., may now be seen a newly erected statue of Seth Boyden, the inventor of the process of making patent leather, and that of making malleable iron castings, besides many important improvements in steam engines. It is said he made a large sum of money out of his inventions, but lost it in speculation. Although dying a poor man, he left a record rich with noble work behind him, and the people of Newark have done well in honoring his memory.