

## Correspondence.

## A Tip from an Inventor.

To the Editor of the SCIENTIFIC AMERICAN:

Under the heading "Tips for Inventors," the matter in your issue of July 21, 1900, reminds me of a very clever all-round inventor of the name of Alexander Barr, with whom I had the benefit of being intimate while serving my apprenticeship as mechanical engineer in Glasgow, Scotland.

Mr. Barr, or "Sandy" Barr, as his intimates used to call him, styled himself "Inventor for Manufacturers," and had a large clientele of manufacturers who used to come to him with their sorrows, and Barr generally invented some device to help them out.

I was in his sanctum one day, when a large egg shipper called and told Barr he wanted a better way of packing eggs. Barr talked over the existing methods of egg packing with him, and before he went promised to show him something new in that line inside of a week.

After the packer left, Barr turned to me and said, "What would you select in nature to hold an egg?"

"I don't know," said I.

"You would never select a sun-flower, would you?" said Barr.

"I think a tulip would be better, as far as shape is concerned," I replied.

"All right," he said. "Make a three-leaved tulip out of wire, with springs at the base of the leaves for adjustment, and of such a size to hold an egg of ordinary dimensions comfortably."

I set to work under his instructions, and the result was called "The Barr Patent Ovifer." Ovum—egg, and fero—to carry—thus derived.

Three wire tulip leaves were fastened at an angle of 120° on a piece of board, and held an egg very securely.

From the time the egg shipper left Barr's office till we had the first experimental egg holder finished was something like two and a half hours. The holder was subsequently bought by the egg shipper, who paid \$250 for it.

Since then I see it has been improved upon by substituting two oval wire leaves, without any spiral spring at the base, but the first idea was gotten from nature.

E. A. SUVERKROP.

Philadelphia, Pa., August 21, 1900.

#### THE NEW ERA OF THE AMERICAN SAILING VESSEL.

BY WALDON FAWCETT.

Basing the conclusion on the development of the past few years there is nothing extravagant in the prediction that American sailing vessels will ere long have fully regained their supremacy among the world's wind-propelled craft. Statistics show, to be sure, that the decrease of American sail tonnage has been, during the past few years, proportionately as great as that of other maritime nations, but this is due almost solely to the passing from existence of old wooden hulks, which are now arriving at the termination of their period of usefulness in great numbers. The other side of the picture is vastly different. The problems presented by high priced fuel and other conditions have proved that there is yet a field of work for the sailing vessel, and five- and six-masted wooden schooners and steel sailing vessels are being constructed to meet the new requirements, and doubtless to prove, in their way, quite as successful and profitable as their predecessors.

These new vessels are considerably larger than the clipper ships with which American shipbuilders startled the shipping world about the middle of the century. In fact, most of the steel sailing vessels now being turned out at Bath, Me.—long famous as the home of the clipper ship—are in excess of 350 feet in length, whereas the "Great Republic," the largest of the old clipper ships, was but 325 feet long and carried but 4,000 tons as against 5,000 tons, which is the average capacity of the new vessels. The sailing vessels of recent construction, both wood and steel, have made some wonderful speed records and have easily discounted the performance of that one-time pride of the shipbuilders, the "Red Jacket," which sailed from New York to Melbourne, 12,720 miles, in 69½ days, or the "Sovereign of the Seas," which covered 5,391 miles in 22 days.

It must not be supposed that the sailing vessel of steel construction, or rather metal construction, is an absolute innovation. Early in 1883 there was launched at the shipyard of John Roach, at Chester, Pa., the "Tillie E. Starbuck," a full rigged iron ship, the first metal sailing ship built in the United States and one of the first turned out anywhere in the world. The "Starbuck" was also the first sailing vessel in the world to carry metal masts. She was 273 feet in length, 42 feet beam, and 26 feet depth of hold. She was of somewhat over 2,000 tons burden and cost \$150,000. The seaworthiness of the iron sailing ship was early proved by the behavior of the "Starbuck" in a terrific gale around the Falkland Islands, when her iron masts neither broke nor stranded, and the general efficiency of this class of craft is attested by the fact that the vessel in question is to-day trading around the world.

As to whether the lately renewed activity in the construction of sailing vessels is to be permanent or temporary there is a wide divergence of opinion, even among men in the shipping world, and consequently it is equally uncertain whether the steady decrease in the sail tonnage owned in the United States can be stemmed. To present figures showing accurately the extent of this decrease is well-nigh impossible because of the manner in which the governmental statistics are prepared. For instance, whereas there are owned in the United States 13,300 sailing vessels, aggregating 1,825,000 tons burden, in all comparisons they are included with the unriggered craft, such as canal boats, and thus the total appears as 15,891 vessels of 2,388,000 tons. Regarding the iron and steel sailing vessels, the statistics are, however, presented in detail and show that there are owned in America 120 vessels of this class, aggregating upward of 174,000 tons burden. This is about one-eighth the tonnage of the steam vessels of iron or steel construction owned in the country.

The full meaning of the discovery of new usefulness for sailing vessels is in no wise better attested than by a glance at the condition of the shipbuilding industry on the coast of Maine—long the center of this branch of the industry. Shipyards which had been closed for years have been re-opened during the past twenty-four months and other plants have been improved in equipment and materially enlarged. In 1890 there were completed at Maine yards vessels aggregating almost 75,000 tons burden, but the industry gradually declined until in 1897 the total output was but 5,000 tons. In 1898, however, the revival set in and the year closed with a showing of almost 30,000 tons. The total passed the 50,000 ton mark for the calendar year 1899, and during that year the port of Bath alone turned out almost 40,000 tons.

Indeed, the port of Bath has, since the renewal of activity, regained the first rank among the shipbuilding centers on this side of the Atlantic. During the fiscal year which ended June 30, 1899, Bath built more merchant tonnage than any other customs district in the United States, and moreover she built more tonnage of this character than was turned out in any entire State of the Union, save Maine. Only three districts in the United States turned out more than 20,000 tons. The showing is as follows: Bath, 43 vessels, aggregating 46,693 tons; Philadelphia, 37 vessels, aggregating 37,625 tons; Cuyahoga (Cleveland, O.), 13 vessels, aggregating 34,467 tons. Bath is also, in proportion to population, the leading ship-owning city of America, there being 12 tons of shipping per person owned in that city.

The steel sailing ships, which are, of course, by far the most interesting of all the craft of this character, have all been built by the firm of Arthur Sewall & Company, of Bath. The Sewall yard was first established in the first quarter of this century, and since the launching of the brig "Diana" in 1823 more than a hundred vessels have been turned out. About six years ago the Sewall yard was transformed to a plant for building steel ships, and the "Dirigo," the first vessel of this class which they completed, bore the distinction of being the first steel sailing vessel ever built in America. The steel for this initial vessel was imported from Glasgow, but the material for the later vessels has been secured in America. The "Dirigo" has already made some remarkably speedy voyages.

The steel sailing ships "Erskine M. Phelps," "Arthur Sewall," and "Edward Sewall," which followed the "Dirigo" from the yard of Sewall & Company, are each upward of 3,000 net tons burden. In general design all three are practical duplicates. The "Arthur Sewall" may be taken as a fair example. She is 354 feet in length over all, 45 feet beam and 25 feet depth of hold. When loaded she draws about 22½ feet of water. The whole construction of the vessel is strong and rigid, and she will fully meet the requirements of any of the classification societies. She is a two-decked vessel, and both the lower and main decks are continuous, extending throughout the entire length of the vessel. The main deck is plated throughout, and the lower deck for about 200 feet amidships.

Two commodious steel deck houses are provided. One is 46 feet in length and the other 26 feet, whereas each has a width of 18 feet. In the former, which is located forward, are the crew's quarters, consisting of twenty berths, the galley engine and boiler room and coal bunker. The other deck house, located amidship, contains six rooms for the petty officers, and a carpenter's shop. In the poop, aft, is a large, handsomely furnished cabin for the captain. Here, also, is the dining room, and adjoining it the main saloon. Opening off the main hallway also are the officers' staterooms and lavatories and bath-rooms. On the poop deck above is still another house, with accommodations for several passengers. The "Arthur Sewall" will carry 5,000 tons dead weight on the draught above mentioned. She has a neat sail plan and each of her four masts is 100 feet or over above the main deck. The lower masts and topmasts are of steel in one length. Some of the spars are also of steel, including the three lower yards on each mast. The vessel cost over \$150,000 and

is sailed by a captain, four mates, engineer, sail maker, cook, steward, twenty seamen and eight boys—thirty-seven men in all.

The "Edward Sewall," the fourth and last of the steel ships to be turned out up to date by the Sewalls, is only slightly larger than the ship "Arthur Sewall" just described, but is thus entitled to rank as the largest steel sailing vessel ever built in America. She also is shipentine rigged and is 355 feet in length, 45 feet beam, 28 feet depth and 23 feet draught. She is a two-decked vessel with poop and forecabin and two deck houses for the crew and donkey boiler. Her lower mast and topmasts are of steel, each in one piece, and measure 110 feet above deck. The vessel carries a total of thirty-four sails and cost over \$160,000.

The wooden sailing craft have in their recent increases in size fully kept pace with the development which has characterized their steel prototypes. When it was proposed to build a five-masted schooner as a successor to the three- and four-masted craft which had been in service for many years previous to 1898, the suggestion was laughed at in many quarters. Nevertheless five-masted vessels were constructed and proved a success. The same prophecies of failure greeted the plan, later, to construct a six-masted schooner, but the fall of 1900 will see the entrance into commission of the first latter class of carrier.

The pioneer five-masted schooner was the "Nathaniel T. Palmer." She is 285 feet in length, 44 feet beam and 22 feet deep, and spreads 10,000 yards of canvas. A vessel which, when she went into commission early in 1899, was the largest fore and aft schooner ever constructed for ocean service, was the five-masted craft constructed by H. M. Bean, of Camden, Me., for Capt. J. G. Crowley, of Taunton, Mass. A number of capitalists are interested with Capt. Crowley in this large vessel which cost \$90,000, and the vessel men who have been talking of the speedy decline if not total disappearance of wooden sailing vessels have had some difficulty in reconciling with their theories the fact that such men as Henry W. Cramp, of the large Philadelphia shipbuilding firm, are among those who have put money in this and other similar ventures.

The five-masted schooner constructed at Camden, Me., is 318 feet in length, 44 feet beam and 21½ feet depth. The spread of canvas aggregates 10,000 yards and the vessel will carry 4,000 tons of coal on a draught of 23 feet. The frame of the vessel is of Virginia oak, and the planking inside and out of Georgia pine. There are five Oregon pine masts, each 112 feet long. The diameter of the foremast is 29 inches, while each of the other four masts is 28 inches in diameter. The vessel is lighted throughout by electricity and heated by steam, and has all the latest improved equipments, including steam steering gear and two 6,000-pound anchors. Like a number of other large schooners of this class, she is engaged in the coal trade between Philadelphia and New England ports.

The five-masted schooner had scarcely been completed ere Capt. Crowley opened negotiations with Mr. Bean for the construction of a six-masted schooner, and work on this monster craft was commenced in the autumn of 1899. The vessel, which will cost when completed \$100,000 and will have a capacity for carrying 5,500 tons of cargo, will be ready to enter service late in the summer of 1900. The huge schooner is 330 feet in length, 48 feet beam, 22 feet depth of hold, and will draw 24 feet of water when loaded. Her lower masts of Oregon pine are each 116 feet long, and her topmasts are each 58 feet in length. Wire rigging will be used exclusively and four commodious houses are provided on deck. The pumps on the vessel are capable of throwing 1,000 gallons of water per minute, and the chains and anchors are exactly the same size as those placed on the new battleship "Kearsarge."

Perhaps the subject of the new era dawning for American sailing craft should not be dismissed without a word regarding the increased attention which the Navy Department is devoting to training ships. The remodeling of the "Hartford" has lately attracted considerable attention, but of far greater moment is the new training ship "Chesapeake," lately completed at the yard of the Bath Iron Works, at Bath, Me. The "Chesapeake" is the first sheathed vessel built in this country, and the only sailing vessel that has been built for the United States Navy since the sixties. The ship, which is full-rigged, is 225 feet in length, 37 feet beam, has three decks and 16½ feet draught and 1,200 tons displacement. She will spread 20,000 square feet of canvas.

#### The Meeting of the Association of Official Agricultural Chemists for 1900.

In harmony with the vote of the executive committee, the seventeenth annual meeting of the Association of Official Agricultural Chemists will be held in Washington, D. C., beginning Friday, November 16, and continuing over Saturday and Monday, 17 and 19, or until the business of the association is completed.

The authorities of Columbian University have extended the courtesy of the University lecture hall for the various sessions.