Lake Shipbuilding---A Masterpiece of System and Perfection of Detail

By Waldon Fawcett

It is doubtful if there is in the United States a more interesting example of the merger idea in business in its best form than is afforded by the American Shipbuilding Company—a consolidation of the principal steel shipbuilding plants on the Great Lakes. It has long been recognized in business circles that the shipping and shipbuilding industries on our inland seas are in ideal condition as compared with corresponding activities on the Atlantic and Pacific coasts, and it has never ceased to excite wonder here as well as abroad that these inland plants—located hundreds of miles from the sea—could turn out steel tonnage practically as cheaply as it can be produced at the world's shipbuilding center, the Clyde; but it is doubtful if the casual observer has appreciated how large a factor in bringing about this result have been the men and methods behind the industry.

To be sure, the average man of affairs is likely to find his most instructive lessons in the masterly system and perfection of detail which characterizes all operations in this field; but it is also interesting to devote a passing glance to the principles and policies which have contributed to the stability of this particular industrial combination, the success of which has been particularly emphasized by the singularly disastrous failure of its prototype on the Atlantic Coast. Indeed, Mr. Charles M. Schwab, one of the prime movers in the attempt to inaugurate a shipbuilding "trust" on the Atlantic seaboard, recently publicly expressed regret that his energies had not been devoted to the lake field.

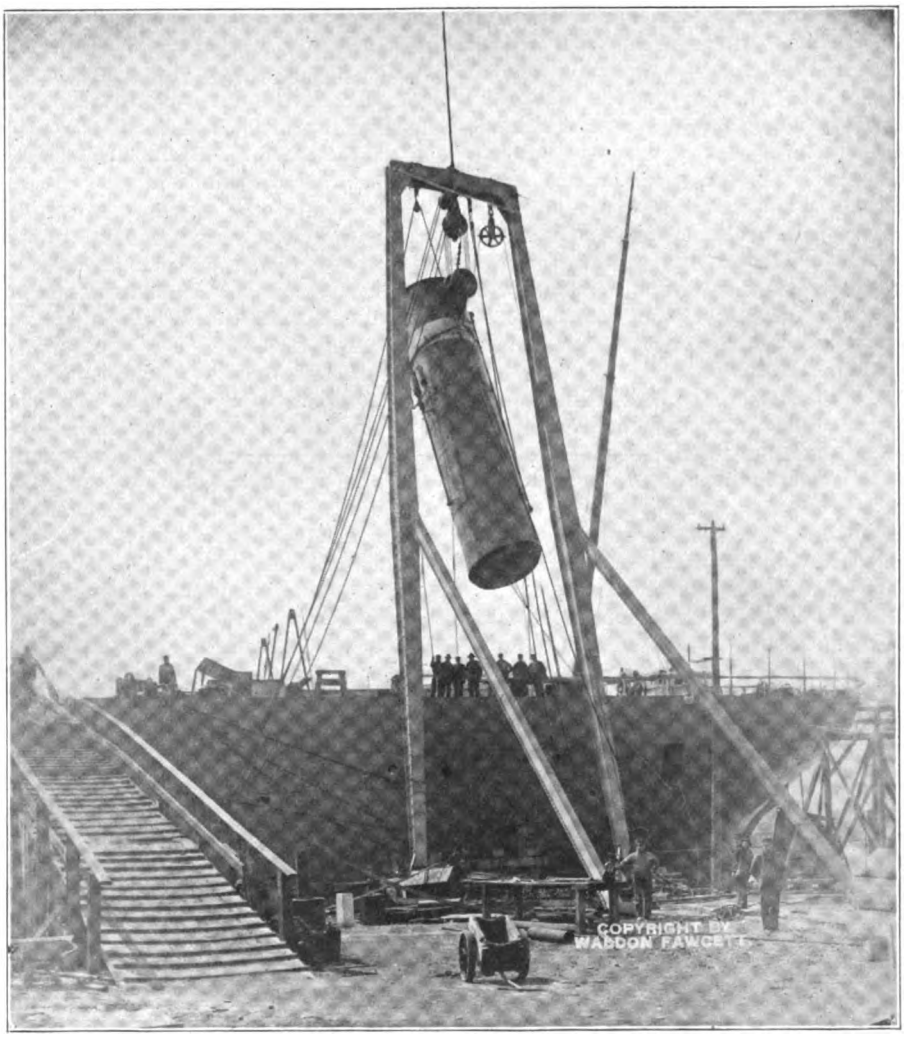
The American Shipbuilding Company was formed in 1899 as the indirect result of the merger mania that at that time swept over the country. However, the soil was right for the planting of the seed for harmonious co-operation, since many of the institutions involved had been operated with slight profit, owing to the fierce competitive conditions existing. Organized under the laws of New Jersey the shipbuilding consolidation has an authorized capital of $30,000,000, but the actual capital is only $14,000,000, of which $7,000,000 is non-accumulative 7 per cent stock and $7,000,000 common stock. The $7,000,000 of preferred stock, which in one sense represents the valuation placed on the seven or eight different plants which go to make up the company's holdings is, of course, the main feature of the capital, being actually paid up in full value at the outset. The $7,000,000 of common stock, also of a par value of $100 per share, was distributed share of common with share of preferred at $20 per share, the fund thus derived being designed for use as a working capital.

The reputation gained by the organization as one of the most conservative of all industrials formed in the United States in recent years is due in a great measure to the non-accumulative dividend feature which means that if the 7 per cent dividend is not earned it will not be paid on the preferred stock, thus making the common stock in a sense the most valuable. There was no underwriting in connection with the formation of the company, all of the stock being taken up by the old companies.

There was, of course, a considerable range in the valuations at which the different shipbuilding establishments entered the combination at the time of its formation. The Detroit Dry Dock Co. of Detroit, Mich., headed the list with a valuation close to $1,500,000. The only other company which went in for more than $1,000,000 was the Cleveland Shipbuilding Co., which has at Lorain, Ohio, one of the finest ship yards in the country. Three other plants were appraised at more than $900,000 each, and the lowest in the list was $750,000.

An interesting illustration of conservatism in business administration is found in the fact that despite a year of restricted activity in shipbuilding which has intervened since the consolidation, the American Company now has in its treasury a surplus of nearly $4,000,000, and announces its intention of maintaining a working capital of $2,500,000. An expenditure of $1,000,000 will be made during the year 1905 to modernize the various ship yards, so that they may be fully qualified to undertake the construction of the new classes of freight-carrying steamers now coming into use on the Great Lakes, a class of cargo vessels which, in many instances, exceed 550 feet in length and which naturally render unserviceable the equipment adapted to ships not exceeding 500 feet in length—the extreme limit of length for fresh water freighters up to a year ago.

In view of the present tendency in the business world in general it is significant that the management of this cen-

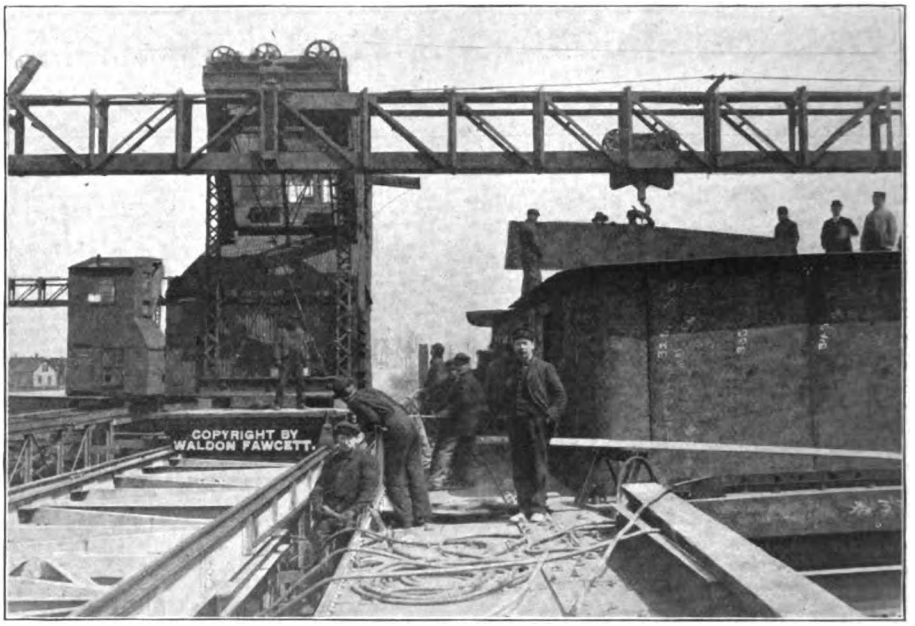


Hoisting Smokestack On One of the New 10,000 Ton Lake Steamers at Lorain, Ohio, Ship Yard.

tralized shipbuilding industry is exclusively in the hands of young men. Mr. James C. Wallace, the president of the company, is not yet thirty-nine years of age, yet has worked his way up through every department of the business. As a young man he learned the machinist's trade, serving at this for three years. Then he took up work in a ship yard and later in the drafting room of a modern vessel-building establishment. Then followed a period of active service on the Great Lakes as assistant engineer on the steamer Onoko. His next berth was that of superintendent of the drafting room at a ship yard, and from that he advanced by rapid steps to his present responsible post.

The business man in search of suggestions for the betterment of his own institution may find many of them in the conduct of the plants of the American Shipbuilding Company. Time and labor saving appliances and methods are utilized in the fullest possible degree; but even more important than these is the advantage taken of the opportunities for specialization. The company with all its various plants, some of them situated hundreds of miles apart, builds for the most part one general class of vessels. That is, out of, say, $10,000,000 worth of new construction on hand at a given time during a fairly active season considerably more than $8,000,000 worth of contracts will call for steel freight-carrying steamers of the same general design and, mayhap, virtual duplicates in every main essential save the dimensions. This being the case, it is obvious that an improvement in method or design or an innovation in apparatus which has been devised and experimented with at any one plant may, if tried and not found wanting, safely be adopted at all the other plants without additional expense or experiment or loss of time for further investigation.

A case in point is found in the history of the new "arch" type of construction which has but lately been introduced in the construction of the largest class of fresh water cargo carriers. When late in the year 1903 the experts of the American Shipbuilding Company set to work upon the designs of the steamer A. W. Wolvin—a vessel of 10,000 tons' carrying capacity which ultimately broke all records and inaugurated a new era in lake navigation—they decided to dispense with the ordinary hold stanchions and to substitute in their place a system of girder arches to support the upper deck as well as the sides of the vessel. Also to construct the cargo hold in the form of a gigantic hopper with sloping sides in order to facilitate unloading by means of automatic grab buckets and other mechanical means. Both these innovations proved to be unqualified successes, and immediately upon the demonstration of this fact, were universally adopted as standards for future construction; something that would not, of course, have been possible had there been no sympathetic community of interest to exert influence simultaneously upon all the parties concerned.



Electric Crane for Handling Steel Plates at Lorain, Ohio, Ship Yard.

The system of building vessels at the lake ship yards under consideration is radically different from that prevailing elsewhere in this country or abroad. After the estimate of weights on all parts of the vessel has been prepared, a model block of soft pine is obtained, large enough to take the half model of the ship on the scale of a quarter of an inch to the foot. This block is built up of one-half-inch strips solidly glued together with lampblack mixed with glue and therefore shows black water lines two feet apart. At intervals of ten frames saw cuts are put in the block at right angles to its length, and into these cuts are fitted slips of soft red cedar.

It will be appreciated from this that the designer while finishing the model has two sets of lines to guide the eye—the water lines and the cedar sections—and the inaccurate and tedious caliper-ing of the model is avoided since the cedar molds can be easily slipped out at any time and wnen placed on paper and a pencil run around them give a perfect body plan in a few minutes. When this part of the operation is concluded a final body plan is made and scaled and a table of dimensions from it is sent to the mold loft. In the loft all of the keel, center vertical keelson, frames, bulkheads, side and deck plating, etc., are laid off and punched from the molds entirely, thus further contributing to the economy of time. Power riveting attained its first great development in the yards on the Great Lakes, and in no other section of the industrial world was there earlier or more extensive utilization of electrical power for the operation of cranes, etc., and, by means of individual motors, for the operation of machine tools of various kinds.

An economical advantage which has been gained by this combination of ship yards is found in the feasibility of a plan for the construction of three or four standard classes of stock ships with a view to keeping in steady employment the plants engaged on new work. This procedure has not as yet been carried out to any great extent, but the saving in cost of designs and in many other items strongly commends it. Moreover, it is predicted that the introduction of such a policy would eventually in great measure restrict orders for ships to the stock or standard sizes adopted, since the ship owner in need of a vessel would be appealed to by the fact that he could find a stock vessel well along toward completion at almost any time, and might also have the benefit of some advantage in price over the quotation for a wholly new type of vessel on independent lines.

Something New in Transmission

Daniel Abrey of Philadelphia, Pa., is the inventor of an improved hoisting and power transimtting machine.

The invention relates to mechanisms for transmitting power from the shaft of an engine or motor to a distant point through the instrumentality of endless or other cables running upon a drum or drums driven by worm gearing directly connected with the shaft of the engine or motor. The object is to impart motion to the winding drum or drums through worm gears engaging opposite sides of the worm. The invention comprises a worm with the opposite sides of which worm gears mesh. The worm gears are carried by shafts, a gear wheel being mounted on the shaft of one worm gear. A third shaft carries a gear wheel in mesh with the first-mentioned gear wheel.