Ship Builders and Ship Building.

The following is the letter in Mr. Griffiths' work, and to which reference was made in his communication in last number of the Scientific American:

Mr. J. W. Griffiths—I am truly gratified to know of your intention of publishing a treatise on the subject of Naval Architecture. It is a work much needed. Your labors in this cause already merit the thanks of the profession, and I trust that your present undertaking, as it deserves well, so will it fare well at their hands, and of the public generally, whose safety and interests are so deeply involved in everything which has for its object the promoting of scientific knowledge in relation to this subject.

I suppose that there is no class of mechanics in the world who have labored under such disadvantages in the practice of their profession as ship-builders. Although ship-building, as a practical art, has been in existence for thousands of years, yet, as a matter of science, little or nothing has been done in its favor until quite lately. It is still true, that, with the exception of those conflicting rules of tonnage, and that ill-advised dictation of owners, by which he is hampered and vexed, rather than assisted, each individual modeller has little else besides his own taste and eye to guide him. That the subject is capable of being brought under more general rules, like other departments of mechanics—in other words, that the subject of Naval Architecture may be made a science as well as an art, no builder of experience has the least doubt. And ship-building can never be on a par with other practical professions until such is the case.

Doubtless here, as in other departments, practical men ought to look for a certain degree of information from the labors and studies of scientific men. The general laws of the resistance of bodies in fluids; the laws of motion; of the application of forces; the laws of gravity and dynamics, are fixed laws of nature, and should be as familiar to the ship-builder as the laws of heat and steam to the steam-engine builder. They should, indeed, be especially familiar to him, from the very fact that the conditions and circumstances of their application, in this case, are so variable—almost infinitely so. This it is that makes the problem of modelling so uncommonly difficult. The question, in each particular case, is involved (besides the preliminary conditions) with so many possible accidents, altogether beyond the builder's control, and which must, nevertheless, come into the consideration of his model. When a mechanic builds a steam-engine, a sugar or a cotton factory, as soon as his work is put up it is fixed and done. But when a builder launches a ship, it is entirely different; the thing is to be both at rest and in motion, liable to a thousand varying circumstances. His vessel is required to be strong, to be swift, to be capacious; to act well in sudden and rough weather, as well as in smooth; and to act well also upon the possible and often actual conditions of misplaced weight, loss of spars, and mismanagement or incapacity of those in whose hands she is. In addition to all this, she is often required to be previously modelled, in accordance with the fancy of some conceited owner, who, having made, perhaps, a single voyage in a ship—and perhaps not even that,—thinks he knows more than all the builders in the world, and becomes ambitious of having his ships pass for his own, not only as owner but as inventor and builder also. Then, too, the ship-builder is not always at liberty to carry out his own idea as regards the sparring; but after submitting his list of spars, is often put to the mortifying necessity of making changes, which he knows must injure the action of the ship. Thus, not only his general art, but his individual reputation, is at the mercy of those who have no more than a mere smattering of knowledge. Of those who, while they think they know everything, are, in reality, so unskilled and ignorant as to be unable to detect differences in a model sufficient to alter the character of a vessel.

It is not ship-merchants, nor is it always ship-captains, that are possessed of that cultivation of the eye which is necessary in order to pass judgment at a glance, upon the merits of any particular model. This is a thing which is only to be acquired by the practice, not of *looking at*, or being ever so conversant in other respects with a ship, but of *making* ships. It may be safely said that his judgment of a model is not worth much, who cannot make a model. And those who are so unwise as to think they are qualified to control the mind of a builder in these respects, should learn to be modest enough to admit the truth of the above observation. They would find it vastly to their interest to do so. We shall never generally get first-rate vessels until owners and others shall be willing to remain in their own departments, and give builders the credit of being sufficiently informed in theirs. Let them give us the size, that is, the capacity, and the object of the vessel they wish to contract for, and then let us alone. This is all we ask, and we will pledge ourselves hereafter to give them better ships, without their assistance, than has hitherto been done with it; and the result will very quiekly show it to be so.

It appears to me, therefore, that the main thing to be done in order to promote the science of ship-building, is to get rid of those unnecessary restraints which have been heretofore cramping the labors of builders, and preventing them from carrying out their own ideas in the practice of their profession. In the first place I would advise the advocacy, by your treatise, of an International tonnage law. Let the rule of measurement be that which takes in the actual capacity of the vessel. This is the only sensible rule, and the only one which will leave modelling free. How perfectly absurd is it, that a builder should, at this day, be subjected to a rule of tonnage measurement, which, if he were to follow it, would require the general proportions of his vessel to be the same that were in vessels at the time of Cromwell!

In the next place, let builders be left free of the fancies and conceits of owners and others. Let them be supposed to know their own business best, and have no other requirements except the general terms of the contract to hamper them. Then would they be on a par with other mechanics, to make observations, and to adopt the results of experience. I have said that the builders are to look to the labors of science for assistance. In many respects they are, but by no means to the same extent as other practical men. All science depends upon experiment; but the only *adequate* experimenters in this matter, are the builders themselves, together with the assistance which they derive from captains and sailors. It is not in the power of an experimenter, with cut blocks in a pond of smooth water, and with artificially applied forces, to determine the best model for a given end. It is a very easy thing to build an ideal ship that shall be perfect; but to build a ship to go to sea, and carry cargo, and be exposed to the accidents of shore and ocean, is a very different thing. Scientific experiments upon land, of the kind mentioned, are certainly in their place, and have helped us to decide many important questions, and properly conducted will help us to decide more. But still the only adequate experimenters in ship-building are those who make and sail ships. The only sufficient elements in the experiment are with the ships themselves; and the only fair scene of experiment is the ocean upon which those ships are to sail, and to whose accidents they are liable. The great thing to be accomplished is, that ship-builders should be left free as possible to observe those experiments, learn from the results of them, and apply that knowledge to each successive model. Then will the art of building be, at the same time, the science of building; and then will the interests not only of individuals, and of the nation, but the safety and prosperity of men, generally, be promoted to a degree not easily calculated.

Concerning my views on sparring, for which you inquire, I am prepared at present only to say, that while I have some views on that subject which I have never yet been at liberty to carry fully into practice, I have not had that opportunity for experiment and reflection which would warrant me in expressing, at this time, those points in which I should vary at all from the common practice.

With the best wishes for the success of your present undertaking, I remain, yours,

David Brown.

(For the Scientific American.)

Sea Steamers.

Your paper, Messrs. Editors, is my constant companion, as it should be that of all those who indulge in speculative thoughts on the useful arts or sciences, because it is the focal point, or ought to be, and probably will be, at which all new projects should meet, be they practicable or not; for there they will be subjected to a severe and profitable ordeal. Indeed, is it not desirable that a grand centre should be established for the meeting of the rays of science from all the civilized nations of the earth, from whence they would be reflected back, improved by a judicious collation of the whole mass? Is not the grand Exhibition about to take place in London somewhat of this character?

Projects, practicable or not, may be useful,—first, if devoid of a philosophical basis, as beacons to warn the ignorant; then, if pursued in the right path, as indicators of something new, and useful, and possible. In this view, when Alexander Everett went on his mission to China, I gave him a commission, which he would have attended to if he had lived: it was to look into the various processes—mechanical and chemical—of that very ancient nation, to see whether any of them originated in *different principles* from our work for the same purpose, regardless of greater or less perfection in the instruments or the execution. My idea was, that if any radical difference were discovered, we, with our greater fund of knowledge and experience, might use to advantage principles which they have allowed to lie dormant and without improvement. I have since given the same commission to Captain Forbes, now in China, an enterprising gentleman, better able, perhaps, from his mechanical taste, to do justice to the commission.

The object of this communication is to call the attention of the speculators on steam navigation to the increasing difficulty of welding the shafts, and some other heavy parts of steam engines, which must increase with the dimensions of the ships. Some instruction on this subject might be had from an examination of the broken shaft of the Atlantic. Sixty years ago I saw, in a Spanish arsenal, a broken anchor of one of their largest ships, (the Salvador del Mundo, I believe), in the centre of which there were loose bars of unwelded iron. Now the shafts of our steamers are much larger than the largest anchors, and may there not be difficulties not easily overcome in welding such masses? And even if welded to their centres, may not the welding or cooling be unequal and defective? May not, indeed, the over-heating necessary for the purpose, injure the tenacity of the iron, and assimilate it to cast iron? I have no practical knowledge on this subject, and merely suggest these notions for the consideration of others who have. If it should be found by experience that a good welding cannot be had beyond certain dimensions, we must then find some other expedient, such as coupling parts together and hooping, as with large masts; or, finally, by reducing the machinery and multiplying the wheels of the steamers. If this last mode of making large shafts should be thought of, there appears to be one circumstance in its favor, and that is, so much of the iron as is contained in the hoops will give its strength in the most favorable form, viz., longitudinally. The idea of four wheels to the projected large and long steamers is suggested on another ground; it is that which gives some advantage to a wagon over a cart. When one of the cart wheels meets an obstacle, one half of the whole load is to be raised; whereas, when one of the wheels of a wagon meets a similar obstruction, but one quarter of the whole load is to be raised; and there are three chances that one or more of the other wheels may de descending from an obstacle overcome at the same time, or may be on a plain. Speculations on *true* analogies are legitimate, but as there is between immovable land and movable water a great difference, and other discrepancies which may occur to experienced mariners,—experience alone must be had to test this question. My only object is to incite bold speculation on this important subject.

Many years ago I witnessed in France some of Fulton's experiments, and believe that full justice has never yet been done to that great inventor; I may allude to the cases at another time.

W. F.

Boston, 19th Feb. 1851.

[We will publish, next week, an illustrated description of Nasmyth's system of Forging; it was brought before the notice of the last meeting of the "British Association." We intended to publish it before, and are glad that our correspondent recalled the subject to our memory.—[Ed.

Improvement in the Manufacture of Starch.

By our worthy contemporary, the London Patent Journal, we learn that Mr. James Colman, of Stoke, Norfolk Co., England, has recently taken out a patent for a new improvement in the manufacture of fine starch, which appears to be of no inconsiderable importance. The following is an extract from the published specification:—

Take one ton of rice, either whole or broken, with or without the husk, and submit it to the action of caustic alkaline ley, in the manner at present performed, using soda in preference to potash, as affording a less deliquescent product. Wash the rice so prepared, and then pass it through the grinding or levigating mills in the usual manner, so as to reduce the starchy matter to a pulp, in a fine state of division. The washed pulp so obtained is next to be placed in a churn, together with 40 gallons of a solution prepared in the following manner:—Take 20 lbs. of borax, and dissolve it in such a quantity of hot or cold water as will suffice to form a cold saturated solution; for which purpose about 20 parts of water are requisite for 1 part of borax; pour 40 gallons of clear solution of borax thus made on a bushel of unslacked lime, placed in any suitable vessel; stir the mixture, and add to it enough water to make up the quantity used to 50 gallons. Allow the undissolved portions in the mixture to precipitate, draw off the clear supernatural solution, and place it in the churn with the starch pulp, prepared in the manner before mentioned. The contents of the churn are next to be subjected to agitation for two or three hours, so as to bring each particle of the starchy matter in communication with the alkaline solution. When the desired effect has been produced, the mixture is to be run from the churn into the separating vessel, and about as much water as the churn will hold added to it, (dimensions or capacity of churn not given); the whole is to be now well stirred, and the starch washed, boxed, and dried in the usual way. Instead of borax and lime, as above mentioned, the same quantity of solution of borax alone may be used, or a solution of bitartrate of potash and lime, or a solution of bitartrate of potash alone may be employed. In either case, the process is to be conducted as above described. In the case of any other farinaceous or liguminous substance than rice being employed, the material used must be reduced to a fine pulpy state, as in the case of rice, proceeding as above directed.

California Gold.

By the latest news from California, we learn that the golden prospects are brighter than ever. A new gold region, it seems, has been discovered at a place called Klamath, on the sea shore, where, along a whole beach twenty-seven miles in length, gold has been discovered in great quantities, mixed with black sand. There is a range of rocks behind the beach, called Gold Bluffs. It is stated that one pound of the sand contains about $1,25 of gold.

It is estimated from official and other sources, that the immigration to the United States, during the last two years, with a view to permanent settlement on our territory, approximates to the enormous amount of 650,000 souls.