Scientific Museum.

Bronze.

Bronze is a compound metal, consisting of copper and tin, to which sometimes a little zinc and lead are added. The alloy is much harder than copper, and was employed by the ancients to make swords, hatchets, &c., before the method of making iron was understood.—The art of casting bronze statues may be traced to the most remote antiquity; but it was first brought to a certain degree of refinement by Theodoros and Rœcus of Sarnos about 700 years before the Christian era, to whom the invention of modelling is ascribed by Pliny.—The ancients were well aware that by combining copper with tin a more fusible metal was obtained, that the process of casting was therefore rendered easier, and that the statue was harder and more durable; and yet they frequently made them of copper nearly pure, because they possessed no means of determining the proportions of their alloy. and because by their mode of managing the fire, the copper became refined in the course of melting, as has happened to many founders in our own days. It was during the reign of Alexander that bronze statuary received its greatest extension, when the celebrated artists, Lysippus, succeeded by new processes of moulding and melting to multiply groups of statues to such a degree that Pliny called them the mob of Alexander. Soon afterwards enormous bronze colossuses were made to the height of towers, of which the isle of Rhodes possessed no less than one hundred.

The Roman consul, Mutianus, found 3,000 bronze statues at Athens, 3,000 at Rhodes, as many at Olympia, and at Delphi, although a great number had been previously carried off from the last town.

In forming such statues the alloy should be capable of flowing readily into all the parts of the mould, however minute; it should be hard, in order to resist accidental blows, be proof against the influence of the weather, and be of such a nature as to acquire that greenish oxidized coat upon the surface which is so much admired in the antique bronze. The chemical composition of the bronze alloy is a matter therefore of the first moment. The brothers Keller, celebrated founders in the time of Louis the Fourteenth, whose *chefs d'œuvre* are well known, directed their attention towards this point, to which too little importance is attached at the present day. The statue of Desaix, in the place Vendome in Paris, are noted specimens of most defective workmanship from mismanagement of the alloys, of which they are composed.

On analysing separately specimens taken from the bas-reliefs of the pedestal of this column, from the shaft, and from the capital, it was found that the first contained only 6 per cent. of the alloy, and 94 of copper, the second much less, and the third only 0.21. It was therefore obvious that the founder, unskilful in the melting of bronze, had gone on progressively refining his alloy by the oxidisement of the tin, till he had exhausted the copper, and that he had then worked up the score in the upper part of the column. The moulding of the several bas-reliefs was so ill-executed that the chissellers employed to repair the faults, removed no less than 70 tons of bronze, which was given them, besides 300,000 francs, for their work.

The alloy most proper for bronze medals, which are to be afterwards struck, is composed of from 8 to 12 parts of tin, and from 92 to 88 of copper; to which if 2 or 3 parts in the hundred of zinc be added, they will make it assume a finer bronze tint. The medal should be subjected to three or four successive stamps of the press, and be softened between each blow by being heated and plunged in cold water.

Bell Metal.—The bronze of bells or bell is composed in 100 parts of 78 copper and 22 tin. This alloy has a fine compact grain; is very fusible and sonorous. The other metals sometimes added are rather prejudical, and merely increases the profit of the founders.—Some of the English bells consists of 80 copper, 10·1 tin, 5·6 zinc, and 4·3 lead; the latter metal when in such large quantity is apt to cause insulated drops, hurtful to the uniformity of the alloy.

The Chinese gongs are composed of 78 parts copper, and 22 parts tin. This alloy when newly cast is as brittle as glass, but by being plunged at a cherry-red heat into cold water, and confined between two discs of iron to keep it in shape, it becomes tough and malleable.—The Chinese cymbals consist of 80 parts copper, and 20 parts tin.

Common Metal—Consists of about 90 or 91 copper, and 9 or 10 of tin. Never less than 8 or more than 11 parts of tin in the 100 should be employed.

Speculum Metal—One part of tin and two parts (or more exactly 100 parts tin and 215 parts copper) from the ordinary speculum metal of reflecting telescopes, which is of all the alloys the whitest, the most brilliant, the hardest, and the most brittle. The alloy of 1 part tin, and 10 of copper, is the strongest of the whole series.

The bronze founder ought to melt his metals rapidly, in order to prevent the loss of tin, zinc, and lead, by their oxidizement. Reverberatory furnaces have been long used for this operation, the best being of an elliptical form. The furnaces with dome tops are employed by the bell founders, because their alloy being more fusible, they do not require so intense a heat; but they also would find an advantage in using the most rapid mode of fusion. The surface of the melting metals should be covered with small charcoal or coke, and when the zinc is added it should be dexterously thrust to the bottom of the melted copper. Immediately after stirring the melted mass so as to incorporate the ingredients, it should be poured out into the moulds. In general the metals most easily altered by the fire, as the tin, should be put in last. The coating should be as quick as possible in the moulds to prevent the metals separating from each other in the order of their destiny, as they are very apt to do so. The addition of a little iron, in the form of tin-plate, to bronze is reckoned to be advantageous.

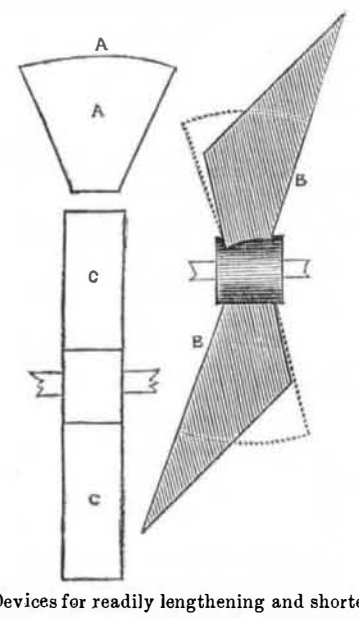
History of Propellers and Steam Navigation.

[Continued from page 288.]

Mr. Ewbank's (commissioner of patents) experiments.

Having presented the main points of the Report of Mr. Ewbank, Commissioner of Patents, so as to convey a clear idea of his experiments and the conclusion at which he arrived, as to what constituted the best form of blades for propelling vessels, we will now conclude our extracts from the same with the following illustration :—

Fig. 57.



Devices for readily lengthening and shortening the arms, so as to vary the dip with the changing draught of a vessel, and accurately to adapt it to the power of her engines, are worth adopting.

The principle is of course equally applicable to stern submerged propellers, revolving sculls or screws. In these the ancient forms are the latest also. Those last patented were proposed over a century ago. A is an outline of Woodcroft's patented here in 1846, and in England previously. Those of Stevens, Loper, Ericson, Smith, and a host of others, have the same sectorial form. Their resemblance to the tails of slow-swimming fish is obvious to every eye. Would it not be better to make each more like the lobe of the most agile and swift, as at B B? A rectangular blade—not unlike one belonging to a paddle-wheel attached to the axis endwise, as at C C, has also been recommended, though on what grounds it is not easy to perceive. The Great Britain steamship had blades resembling those figured at C C.

Although we have not presented all the figures in the Report spoken of, there is not an essential one left out. A full and complete idea of its features is set forth.

He believes that thick blades are a drawback to speed, and that thin metal blades should be substituted—[oblique metal blades have been proposed before, as we shall show by and bye.] We have seen many reviews of this part of Mr. Ewbank's Report, which, in our opinion, were not candid ones. The whole of the Report is based upon experiments, and these are presented, and what can be more fair than this? Experiment is the only way to test a principle.

Mr. Ewbank endeavors to inculcate the lesson of following *nature* in mechanical philosophy, as being the best guide and in reference to propulsion, he says, "if ever nature took extra pains to teach engineers a lesson, she has done it here, and let them never forget that nature and natural philosophy are *never* at variance." While we subscribe to the latter sentiment, we would state that the only difficulty in the way of following after nature, lies in our acquaintance with, or ignorance of, *nature's laws*,—and more than this, man must look to more than the sight of his eyes to follow after in nature, so as to guide him in mechanical philosophy. The God of Heaven has given him reason to lead him above a mere copyist—to be a *creator* in his own world, himself—because he is formed in the image of his Creator, who created him and made him *lord* of the world.

If man had never soared above natural presented objects, he never would have constructed a carriage to move on wheels. The first locomotive was constructed with legs like a deer, because the swiftest of animals used such propellers, but such a method of propulsion was not equal to rolling wheels; and in what part of nature's labrynth did Stephenson get his first lesson of the "Rocket." The same kind of reasoning is applicable to the paddle wheels of steamboats. No fish or fowl uses rotary propellers—all of them employ reciprocating propellers, and it was copying after nature which led the ingenious Earl of Stanhope to employ what is termed the "Duck's Foot Propeller." It is well known, as we have shown in the preceding parts of our history of propellers, that the devices for this purpose are "legion," while none have been able to maintain the field against the oblong rectangular blades of the paddle wheels as they are at present constructed. We must look to every obstacle which has to be overcome, and when we consider the mighty storms of the Atlantic—the huge waves beating against the vessel's sides like battering rams, we must look to strength in construction, as well as to the best form for speed. The race horse for the race-course, the hunter for the wood and the wild. The Report is unfavorable to the use of split paddles, but by the recent voyage of the Atlantic to Liverpool, she having whole blades, is a sure evidence that the split paddle is the best for strength, and the experience of the foreign steamships corroborates this assertion.

We believe, however, that our screw propellers should adopt the ideas presented in the above engraving—the improvement appears to be like a self-evident axiom, requiring no debate.

A saturated solution of acetate of lead, in distilled water is an excellent test, detecting the presence of the minutest quantity of sulphuretted hydrogen, and more convenient than the carbonate, from its complete solubility.

The Rothschilds.

It is said that the fortune of the Rothschilds is not less than seven hundred and thirty-five millions of francs, or twenty-nine millions four hundred thousand pounds British money, about one hundred and forty-five millions of dollars.

Literary Notices.

The New Testament, (Illustrated.)—Messrs. Hewett & Spooner, 106 Liberty street, have just published the most beautiful edition of the New Testament that has ever been published. It is full of embellishments, illustrative of the various scenes that are recorded in the New Testament, and the letter-press of it is superb. It appears before the public with the full approbation of the clergy, many of the most prominent of whom have furnished the publishers with testimonials. The illustrations of this Testament are from paintings of the most celebrated artists, among whom we notice the names of Raphael and Reynolds, they being, probably, the two best delineators of Bible scenes that have ever been copied.

The Graefenberg Co., 214 Broadway, have laid upon our table a copy of the "Manual of Health," beautifully bound in cloth, for which they charge only 75 cents per copy. Since our former notice, we have read this work carefully, and we can say unqualifiedly, that a better digest of disease and its proper treatment cannot be found. It presents to the reader a careful comparison of the different systems of practice, besides an able and well written history of the Science of Medicine and Pharmacy, together with hundreds of receipts. This edition is designed for the library.

Specimens of the Stone, Iron, and Timber Bridges &c., &c. of the U. S. Railroads. By George Duggan, Architect, and C. E.—Part V. contains beautifully executed plans, elevations and sections of the pine timber Viaduct across the Canewacta Creek, at Lanesboro', Pa., and the details of the Starrucca (stone) Viaduct near Lanesboro', Pa., on the line of the N. Y. and Erie R. R., with specifications, estimates, &c.

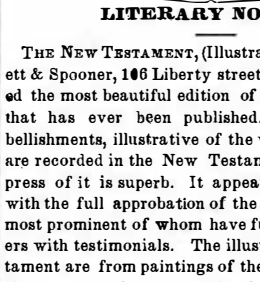
No. 16 of Shakespear's Works, published by Phillips, Sampson & Co., Boston, has been sent us through Dewitt & Davenport, Tribune Buildings. It contains the tragedy of "Macbeth," and a splendid engraving of Lady Macbeth. Price 25 cts. per No.

We are indebted to the same Publishers for the 4th vol. of their excellent edition of Gibbon's History of Rome. Vols. 1, 2, 3, and 4 are for sale by Dewitt & Davenport, at 62½ cts. per vol., bound in cloth.

Godey's Lady's Book, for June, is upon our table with the compliments of H. Long & Bro., 43 Ann st. It is richly embellished, and contains a great amount of choice reading from the first authors.

Holden's Dollar Magazine, June Number, appears upon our table, arrayed in its best garb both in matter and illustrations, evincing a steady improvement in all respects since its commencement.—A more high toned monthly cannot be found in this or any other country.

Nine lectures of John B. Dods, upon the subject of the Philosophy of Electrical Psychology. This subject relates to the reciprocal action of matter and mind upon each other, and is treated by Dr. Dods in a most brilliant manner. Published by Fowlers & Wells, price 37 ½—can be sent by mail.



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