Combined Steam and Ether Engines.

MESSRS. EDITORS—In the SCIENTIFIC AMERICAN of February 9th, you published an article relative to Ether Engines. You appear to distrust Du Tremblay's ether engine, because the Company has lately paid a dividend of 40 per cent.

Having resided here many years, and being quite aware of all that is taking place, I can give you correct information on this point. It is quite true that the Ether Co. has paid a fair dividend of 40 per cent., independently of a large reserve fund which has been laid by to meet eventualities; but this large profit is not wholly due to the use of Du Tremblay's ether engines. In the first place there have been such vast quantities of military stores transported from Marseilles to the Crimea, at such extravagant freights, that all steamboat companies have gained large profits; in the next place the Ether Co., were fortunate enough to meet with a steamboat builder who, miscalculating his estimates, sold them two 300 horse power vessels at about 20 per cent. under their real cost, and as the constructor was also beyond the time stipulated for their delivery, the Company took advantage of a penal clause in the contract to get about £7000 in cash out of the builder.

All these circumstances have tended to swell the dividends of the Compaay, but still the ether invention has largely contributed to the profits. Your readers will easily understand this on examining the principle of this invention. Du Tremblay's plan consists in a pair of engines conjoined; the first cylinder is worked by ordinary steam in the usual way. When the steam has exerted its mechanical effect, it escapes into a tubular condenser, enveloping the tubes in which ether is contained. Of course there is no communication between the interior and exterior of the tubes in the tubular condenser. The vapors of water and ether never mix. The ether absorbs the heat of the steam with great rapidity—the latter is condensed, while the former is converted into steam.

This ether-steam drives the second engine, and of course all the power generated by it is clear profit.

After the ether-steam has exerted its mechanical effect, it is reduced to a liquid state in a tubular condenser, which is cooled by passing among and around the tubes a large volume of cold water. To complete the operation, the condensed water is returned to the boiler, while the condensed ether is returned to its vaporizer; this vaporizer being at the same time the condenser of the water-steam.

As to the practical results, it is now about three years since the first trial of this system was made in the Mediterranean—a small boat of about 60 horse power was constructed, which has been navigating since then so much to the satisfaction of the Company, that they had two 300 horse steamers built, in 1853, and they have now on the stocks three vessels of 200 horsepower, and two others of 420, all on the ether principle.

The ether cylinders of the boats now navigating, give about 60 per cent. of the power of the water-steam cylinder. So many improvements have been introduced in the last twelve months, that there is every reason to expect that the ether-cylinders will indicate a power equal to the water-cylinder, the saving of fuel then, would be exactly 50 per cent.

The waste of ether is almost zero—so little, that the smell even is scarcely perceptible in the engine room.

The boats navigating are the *Du Tremblay*, 65 horse power; *France*, 300; *Brazil*, 300. Those now building are the *Zouave*, 200 horse power; *Kabyle*, 200; *Sahel*, 200; *Ville de Lyon*, 420; *Amerique*, 420.

You have alluded to a patent taken out by H. G. Pecoul, of Paris, "for generating power in steam engines, by passing steam from the boiler through spiral copper tubes, which converts ether in a cylinder into vapor, and it then actuates the piston to give it motion."

No doubt this would work, but there would be no economy; the patentee would obtain in practice no more power than if he applied his water-steam directly on the piston. Theoretically there would be an economy of 9 per cent., because the specific heat of ether is 91, water being 100: but in practice he would lose *more* than he gained, by leakage, by inefficient vacuum, &c., besides uselessly introducing into his engine a highly volatile and inflammable ingredient. This was M. Du Tremblay's starting point about 15 years ago.

A SUBSCRIBER.

Marseilles, France, March 5, 1856.

[We are obliged to our correspondent for his information. We were positive that all the reputed profits of the Ether Engine Co., were not made by the superior economy of their engines; our correspondent's letter is confirmatory of our suspicions. It seems that the engineer who built engines for them made a miscalculation, and failed to meet his engagements at the time specified, and the managers of the Ether Co. profited, in this case, not by the saving of fuel in their engines, but by shaving the engineer. We have been of the opinion that the comparisons made between the combined ether engine and the simple steam engine, so favorable to the former—by its friends—have not been just to the latter. We cannot perceive how such a saving can be effected, as that described in the foregoing communication.

The way the great saving is stated to be accomplished in the combined ether engine, is by applying the heat of the exhaust steam to generate the vapor of ether, which is used to actuate a piston in an auxiliary engine. The ether coil forms an outside condenser for the steam engine; the condensed steam is employed to feed the boiler, and the condensed ether is employed over and over again, in the generator. The arrangement involves the expense of two engines in all their details, excepting a boiler for the ether one; and thus the expense for the machinery must be at least fifty per cent. greater than for a simple steam engine. The force of the ether vapor generated by the exhaust steam cannot be greater than that of the exhaust steam itself—this is the law; therefore it appears to us that the friends of the ether engine mistake a transfer of power by the heat of the exhaust steam for an increase of force. The exhaust of both the steam and ether cylinders must be greatly prolonged by the method of condensation, thus causing *back-lash*. A steam engine worked with high pressure steam, and the expansion principle carried out to its utmost limits, we think, will, on the whole, work as economically.

Falling Water—Form of the Orifice—Water Wheels.

MESSRS. EDITORS—Considering ourselves in some measure the cause of the publication of your recent articles on the power of falling water, now that they are finished, we desire to offer a few general remarks on the subject, not in a fault-finding disposition, but that we may be the means of communicating the results of our experience to others, when they can exercise their own judgment as to whether or not we are correct.

The question was, as we understand, the quantity of water which would pass through a turbine water wheel when in motion, with a given head and area of openings, but the calculations related to the quantity which would pass through the same size of aperture when at rest,—which we consider a very different matter. We are nearly agreed with the rules laid down in your articles, to calculate the power of a given qnantity of water passing in a given time, and under a given head, but the difference is in determining the *real* quantity of water which will fall in a given time, through a given sized opening, and if our experience is correct, the results as given in the articles, will, in all ordinary cases, be found to be altogether too high, for though we are aware that an aperture may be constructed which will pass 100 per cent. of its area, we know that one of the same size may be constructed, which, from its form and location, will not pass more water than 50 per cent. of its area. We have tested one wheel built on the re-action principle, and running in unlimited water, which, when at maximum speed, would pass 150 per cent. of its area, and we never tested one which did not pass as high as 125 per cent. of its area. The same wheels, while standing still, would pass from 80 to 90 per cent. of their area of openings. We find the Jonval wheel, built by us, with buckets well polished, will pass, when running, about 100 per cent. of the water; and when standing still, about 73 per cent. Again, we have tested others of the center discharge class, which, from the peculiar shape of the floats or buckets, would pass more by about 10 per cent., when still, than when running, (which at most did not exceed 90 to 95 per cent. of their area of openings.)

From these, and a long course of similar experiments, we have been led to the conclusion that no rule can be given which will be of general application, except we take into account the form and position of the aperture (whether in motion or at rest,) and the degree of contraction to which the fluid vein is subjected in passing through it. And the coefficient for the different shaped apertures, we think, can best be ascertained by allowing the same quantity of water which will pass through each, to flow over a notched board or weir, placed further down the stream, when the quantity, we think, may be very correctly ascertained by using tables taken from the results of experiments made in Scotland, and which were published in Vol. 6, SCIENTIFIC AMERICAN. We think the New York engineer mentioned by you was deceived by the party who told him that his 25 horse power engine performed the same work of a 70 horse power water wheel, and we could tell you of a similar case.

COLLINS & GILBERT.

Troy, N. Y.

[The rules in the articles referred to by our correspondents, had no reference to water passing through a turbine wheel at motion or rest. In them it is plainly stated that they are given, for water flowing out of a stationary orifice in a gate, or over a weir. All writers on hydraulics are agreed that the form of the opening has much to do with the quantity of water discharged in a given time. We did not suppose that the form of the openings and their position in wheels could make such a difference as that stated by our correspondents—ranging from 150 to 125 90·80 73 and 50 per cent. of discharge in the same area of openings.

Advice to Electrotypers.

MESSRS EDITORS—Supposing that any fact calculated to benefit the mechanic would be acceptable to you, I do not hesitate to inform you in relation to a discovery of mine, made several years since, and which I have repeated frequently, and can vouch for as perfectly successful. In plating articles by the electrotype process, you are aware that the articles to be plated are placed in a sort of wire basket, which is immersed in a solution composed of nitrate of silver, cyanide of potassium, bicarbonate of soda, or some other substances equally injurious. You are probably also acquainted with the fact that the operator frequently suffers very much from taking the articles from the bath, his hands becoming impregnated with the poison, causing them to inflame very much, burst open, and discharge an acrid humor, which excoriates the parts with which it comes in contact. The basket is attached to the negative pole of the battery, and consequently its contents, and the hand also, while in contact with the articles contained in the basket, become affected electro negatively, and consequently receive the poison into its tissues. To prevent this disease, platers are in the habit of anointing their hands with a pomade made for the purpose, or using an india rubber globe. The first of these quickly impairs the quality of the bath, and the other is somewhat inconvenient and troublesome. The plan adopted by myself is this :—If at the same instant the operator introduces his hand into the solution, he grasps an iron stirrup connected with the positive pole of the battery, the current will proceed from himself, and consequently his tissues will not absorb any of the poison. The stirrup must be surrounded with linen saturated with salt water. Long experience has made me familiar with this operation.

M. VERGNES.

New York.

Treating Timber to make it Durable.

MESSRS. EDITORS—I am not aware that the following is generally known, at all events it is not practiced in this locality. In Germany it is known and practiced extensively. The matter is this :—Hard wood, such as hickory, beach, dogwood, &c., is impregnated with the liquid of stable manure, and afterwards submitted to the influence of heat, and thoroughly dried, for the purpose of imparting to it good preservative qualities and rendering it tough and solid.

Wood intended for axe handles, mallets, &c., is steeped in this liquor for several days, and afterwards hung up over a fire and exposed to the influence of heat arising therefrom: two or three days is sufficient to render it thoroughly dry. It is then said to possess greater toughness and solidity than when subjected to any other process.

The farmers of Germany use mallets made of hard wood, which is prepared as above, for the purpose of driving iron wedges to split their timber; the wedges are usually made with a head about two inches or two and a half, and the mallet suffers no indentation from the percussion.

If the process imparts to the wood such qualities spoken of, the knowledge of the fact may be interesting and profitable. It is certainly a simple and convenient process, and some one may be disposed to test it, and compare its effects with those obtained by other methods.

GEORGE KILGOUR.

Cumberland, Md., April, 1856.

The Best Form of Sailing Vessels.

MESSRS. EDITORS—Out of a great number of experiments with different sized models the following was the most satisfactory: With a 20-inch model (2-inch beam) I tried the relative values of straight and curved floors, and I am constrained to believe that the latter is the best. With the straight floor and keel the model was drawn through still water 60 feet by a 7 lb. iron sinker—the line passing over a horizontal staff—in 10 seconds. The sinker was then changed for a four pound lead, which required 14 seconds to accomplish the same result. The model was then cut down to convex curves, and the length divided into sevenths; forward three-sevenths shaped to a curve whose circle would be 600 inches in circumference, and aftermost four-sevenths to the curve of a circle of 840—nearly a parabolic curve—that is, in a ship 200 feet long the curves from forward to *center of motion* and abaft that, would be respectively 1000 and 1400 feet radias. The model when so altered was drawn through the water by the 7 lb. sinker in 9 seconds—a gain of one-tenth—and by the 4 lb. sinker in 12 seconds—a gain of one-seventh The buoyancy of this floatant was incomparably superior to the straight keel.

INVESTIGATOR.

The Inventor of the Steam Fire Engine Boiler.

MESSRS. EDITORS—Be pleased to correct a mistake which you have made in regard to the inventor of the boiler used in the fire engine exhibited in the Park at New York last week, and oblige the real inventor,

THOMAS PROSSER, C. E.

Brooklyn, April 3d, 1856.

[We were informed that Mr. Lee was the inventor of the boiler in question, and made no *mistake* in stating this.

Useful Suggestion.

MESSRS. EDITORS—I have seen a circular saw, the shaft of which run in zinc boxes, and although exposed out doors, uncovered, for years, and frequently not used for months, it never was touched with rust—neither the saw nor its arbor. The zinc boxes generated an electric current, which prevented the iron from rusting. Might not the rails of railroads be prevented from rusting by being connected with zinc plates.

P. R.

Hannibal, N. Y.

To Prevent Ships Sinking at Sea.

Place vulcanized india rubber tubes of sufficient size in the hold and underneath the deck of a vessel, and if it becomes disabled and leaks let these tubes be inflated by a powerful air pump, and they will keep the vessel afloat.

J. TATE.

Mountain Island, N. C. 1856.

Prunes.

This fine fruit has been very successfully cultivated in Pennsylvania, by engrafting on plum trees. Prune trees have also been raised in Indiana.