A Wind Mill Operating a Propeller.

MESSRS. EDITORS—In the correspondent's column of last week's SCIENTIFIC AMERICAN I notice an answer to the communication I addressed to you in regard to running a vessel directly against the wind that propels it.

You seem to think it just as impossible as pumping water back by the wheel it drives, to keep using it all over and over again, but the two cases are not alike, as one would be perpetual motion, but the other is not. I am not a "perpetual-motionite," and am in no way "related" to that "tribe."

Water can be forced above its original head by the hydraulic ram, that is, part of its volume at the expense of the balance, and a vessel can be constructed to go directly against the wind that propels it by a sacrifice of speed. At first this may seem impossible, but no more so, I think, than a hydraulic ram would seem, throwing water higher than its original head, a well known fact.

Suppose a vessel to be constructed with a large wind wheel, whose shaft runs directly across the boat on a level with its deck, so that one-half its surface is below the boat's top (so as not to be acted upon by the wind.) Now suppose the wind blowing, at the rate of 12 miles per hour, and acting with a force of 1,000 lbs. against the bow of the boat, and the upper surface of the wheel (above its center) the surface of the wheel that is exposed to the wind, being equal to the boat's surface acted on this, leaves 500 lbs. force acting against each, but as the wheel yields to the wind, the wind would not really act with its full force to drive the vessel backward. But to favor you all we can, we will suppose that it does exert all of the 1,000 lbs. force as though the wheel was rigidly fixed. Then we have 1,000 lbs. force to drive the vessel backward at the rate of 12 miles per hour.

To counteract this we have a force of 500 lbs. operating against the surface of the wheel, which geared to a water wheel (at the stem of a boat) which is one-fourth the size of the wind wheel, or if both wheels are of the same size, then let them be geared in the proportion of four to one. Then the 500 lbs. force exerted against the wind wheel, will exert a force of 2,000 lbs. upon the other at one-fourth the speed, or at the rate of three miles per hour against the wind, with a force of 2,000 lbs., from which deduct the whole pressure of the wind against the boat (1,000 lbs.) which leaves it operating against the wind at the rate of three miles per hour, with a clear force of 1,000 lbs., but as the water wheel is acting upon a yielding medium, we will throw away one-half, to allow for slip, which leaves it moving against the wind at the rate of one and a-half miles per hour, with a force of 1,000 lbs., in spite of what you have said to the contrary, and by sinking the boat to nearly its deck it would do still better in point of force, as there would be still less surface of the boat for the action of the wind, and nearly its whole force would be expended to drive the vessel forward, instead of backward. As to the utility of such a vessel, that is another question, what might be gained in one way would be more than lost by its complicity, and the room it would occupy, so that it would be only a left-handed improvement after all. I only say that the thing can be done. A shaft with pinions on it, meshing into a rack, with water-wheels attached to the ends of the shaft, and longer than the pinions, will run up an inclined plane, with the water rushing down against the wheel; here is a body moving directly against the power that drives it, up hill and all; this experiment I tried years ago; are you convinced?

GEO. W. STEDMAN.

Vienna, N. J., March 14th, 1855.

[We have published the above letter—being the second we have received from Mr. S.—in order to answer it and some others, at once, for all. Mr. Stedman has presented an exceedingly simple way of proving that he is right, by demonstrating that he is wrong. He presents the example of a vessel having its wind wheel operated by a *wind force*, equal to 1,000 lbs. pressure on the vessel (and directly against it) and moving with a velocity of 12 miles per hour, the momentum of which is $12 \times 1{,}000 = m12{,}000$; and yet he moves the vessel against this at the rate of 3 miles per hour, with $2{,}000 \times 3 = m6{,}000$—only half the momentum. If he is not a believer in perpetual motion, he is unwittingly the strongest advocate of such a doctrine we ever knew. He has confounded two ideas, that of a vessel standing direct in the course of the wind with its machinery working at a certain velocity (3 miles per hour) and a certain pressure (2,000 lbs.,) for this vessel moving against the wind. In the very case he has presented, his vessel must drift directly before the wind at the rate of 6 miles per hour, instead of moving directly against it. We have seen a vessel with all its sails set and a fair wind, carried backwards by a rapid tide; his example is a similar case. The cases of the hydraulic ram, and the water wheel and rack (which is somewhat confused) are entirely foreign to the question, and any comparison to be correct must be appropriate. If we had said a stationary wind wheel on the side of a canal or river could not be made to propel a boat on the water directly against the wind, then his examples would have been appropriate. But this question is entirely different, and he does not seem to have discovered its abstract character.

Carriage Bolts, Rivets, Staples, &c.

> "With bolts and rivets firm and strong,
> Repairs the breach. The pliant thong
> All needful aid supplies."—EDWARDS.

It is many times truly surprising to witness how totally ignorant, and unmindful many people are, of the advantages and facilities there are within their reach, to render them needed aid in a needful time. Many people, and particularly farmers, are placed in circumstances many times, when, if they were compelled to stop, but for a short time, it would be attended with many dimes, and even dollars, disadvantage and damage to them; and when some little article, of only a few cents value, might eventually save a vast amount of labor and expense. It is no uncommon occurrence to see farmers, who profess to be very economical in their expenses, paying four or five times as much for an article, or to have a broken implement repaired, as it need to cost him. The truth is, many farmers go blundering along through the world, with their eyes, as it were, completely closed against their own interest. There are scores of little articles within the reach of every farmer, which would often greatly facilitate his operations, and save dollars of needless expenses I will mention a few of them.

CARRIAGE BOLTS, from one inch and a half in length, to eight inches long, well made, with turned heads on one end, and a nut and screw on the other end, may be obtained at almost every store in the country, costing only from two to four and five cents each, and which are very convenient and handy, and exactly adapted to the innumerable uses of bolts, in repairing a broken implement, or in making new ones. Such bolts farmers must have, from some source, and often a large number of them; and when made by a blacksmith, they usually cost four or five times more, and often are not half as good. I know blacksmiths will endeavor to persuade their customers that the iron of such bolts is worthless. True, it is sometimes of rather a poor quality; but all things considered, they are better bolts than common blacksmiths will make; and in the majority of instances they are infinitely better than many of our country blacksmiths can make. Carriage bolts are made by machinery, straight, smooth, and true; about one half the length of the bolt is made square, and the other round, just as they should be, to prevent their turning around, when putting on the nut—with a thread cut on them, and not worn on, by worthless dies, and with nuts neatly fitted. Bolts that are made by common blacksmiths, are usually made of the poorest kind of round iron, with round heads, and the nuts often so imperfectly fitted, that they will hold just nothing, or so tightly, that they cannot be turned on, unless the heads are grasped in a vise, to hold them from turning round.

The next article is RIVETS, which may be obtained of almost any size and length, at twelve to fifteen cents per pound; and in one pound there are a goodly number. A common blacksmith wants from six to fifteen cents for one rivet; and many times they are often put in so carelessly, and ignorantly, that they are totally uselsss. The holes for them may be too large; and then the rivet is bent in the stick that it goes through; and although the cap and head may be on good, the rivet does not hug or draw the parts together as it should. There are many parts of implements that must be riveted that are often neglected on account of the cost; whereas, if they are bought by the pound, the expense is trifling.

Another very useful article is staples, which may also be had per pound. But before using them, they should be annealed, by putting them in the fire, when there are coals enough to heat them red-hot, and then allowing them to remain, until the fire has gone out. This process makes them very tough, and they will seldom break.

TIRE BOLTS, neatly made, with turned heads, and nuts well fitted, are often useful for many other purposes, besides fastening the tire on the wheels of wagons; they may be bought two inches and two and a half long, for one and two cents each.

WASHERS, of all sizes, may be obtained for twelve to fifteen cents per pound; and a common blacksmith wants six to ten cents for a single one.

Another very valuable article is cut wrought nails, for only five and six cents per pound; a blacksmith wants three cents each for them; and then, they are often such ill-shapen things, that they will split every thing, through which they may be driven, and are often brittle as glass. Cut wrought nails are of quite recent introduction; and where they cannot be obtained readily, common cut nails will bend, and the points will clinch about as well as wrought nails, if they are annealed by putting them in the fire (when the fire is going out,) and allowing them to become red-hot, and cool gradually. I have always practiced putting them in the stove at night, when the fire is renewed for the last time, and in the morning found them tough as annealed wire.

It is always best to purchase such articles by the pound, or by the dozen; we may rest assured that a few shillings can be invested no other way more economically, than in obtaining a supply of these little necessaries.

But when will one dispose of a dozen or two carriage bolts? I will tell when: in making a strong harrow, put in a carriage bolt, near every tooth, where there should be a rivet, and screw it up firmly. A few cents may thus save a dollar in expense. In making, or repairing a cultivator, or a scarifier, a dozen or so of bolts may be used very advantageously. A broken implement may often be mended, for the time, if a few bolts were at hand, and save the time and expense of going miles to the smith's shop. In making a hay rigging, or shelvings for either cart or wagon, they are just the article needed; far better than rivets, because when the timber shrinks they can be quickly tightened. There are numerous other little articles, which cost but little—which it is well to have always on hand. The best of implements will often break, or some part give way; and where a farmer is performing a piece of labor, when he can justly reckon his time at $5 to $8 per day—which is often the case—and is obliged to stop all hands and team for the want of a little five-penny article, wisdom would dictate, that all needful preparation should be made, before hand, for any such exigency.

S. EDWARDS TODD.

Lake Ridge, N. Y.

Muntz Metal for Ship Sheathing.

MESSRS. EDITORS—I read the article on the abovenamed subject in the SCIENTIFIC AMERICAN of the 10th February, with much interest, and I thought that my mite of general information on the subject might be of some use.

It is well known to jewellers and others, that an alloy of gold and silver, when digested in nitric acid, has all its silver taken up by the acid; the gold being left retaining its former shape, but so weak that it can easily be crushed between the thumb and finger. A like action, in my opinion, takes place with the brass sheathing of ships, when exposed to salt water. The combination of any two metals which are fusible at different temperatures, such as copper and zinc, appears to be merely mechanical. When brass is heated to about the melting point of zinc, it crumbles to pieces very readily, and I think if it were subjected to great pressure at that temperature, the zinc could be squeezed out of the copper. L. F. M.

Le Roy, N. Y.

Food of the People of England.

In the days of Queen Elizabeth substantial diet was confined chiefly to persons of rank and wealth. A plowman was often compelled to dine on "water gruel." The food of the laborers was coarse and deficient; their clothing was incomparably more so, and their lodgings were rude, dirty and uncomfortable. The houses even of the wealthy were mostly destitute of glass windows and chimneys. The floors of the peasants houses were of clay, and filled with the accumulated filth of many years. The luxury of linen was confined to the rich and high-born. Their woolen cloth was all of domestic manufacture. Tea and coffee, and to a great extent, sugar, were unknown. Beer was the universal beverage. The higher classes of society lived chiefly on salted meats. The common people seldom ate meat in any form. The ordinary fare of working men, then, would produce a riot in a workhouse now. Potatoes and turnips appeared about this time. In earlier ages, the people fed entirely on bread and meat. As late as 1750, out of a population of 6,000,000, in England and Wales, nearly one half were sustained by rye, barley, and oats. Now, the same class of persons are consumers of wheat. The use of the potato as the principal article of food has been confined to a few districts.

McCulloch remarks: "We are not of the number of those who regard the potato rot as a manifestation of divine wrath, and who suppose that its continuance will be ruinous to the poor. On the contrary, we do not hesitate to say, that, judging of its influence, in time to come by that which it has hitherto exercised, we should look upon the total extinction of the plant as a blessing, and not as an evil." The same author observes that the number of sheep and cattle consumed by the citizens of London, has not increased more rapidly than the population; but *the size of the animal is more than double.* In 1750, the average weight of cattle sold in Smithfield market, was 370 lbs.; of sheep, 28 lbs. Now, the average weight of beeves is about 800 lbs., and of sheep, 80 lbs.—Hence, every person consumes much more butcher's meat than during the last century. The entire amount of food consumed in England and Wales, in 1846, was estimated at £180,000,000 ($900,000,000,) making about £9 (45) to each inhabitant of 20,000,000.

Fish Breeding.

In a recent visit to the fish hatching establishment of M. Coste, in Paris, the French minister of agriculture, commerce, and public works, found there two hundred and fifty thousand newly hatched fish, one hundred and fifty thousand of which had only just been brought up from the establishment at Huniguen. All this large number were conveyed to Paris at the same time, and without a perceptible loss. The fish comprised common trout, trout from the lakes, salmon from the Rhine, and trout from the Swiss lakes.

Manufacturing in Lowell.

The Lawrence Manufacturing Company have contracted for the erection, during the coming season, in connection with the five mills now run by them, of the following brick buildings:—1 mill 52 feet by 86, 5 stories high; 1 picker-house, 52 by 101, 4 stories; 1 cotton-house 44 feet by 210; 1 cloth-room 34 feet by 115, 2 stories.