Correspondence.

A Word from an Old Reader.

To the Editor of the SCIENTIFIC AMERICAN:

After an acquaintance with the SCIENTIFIC AMERICAN of over half a century, I feel like expressing my indebtedness to it for its many excellent features. I read it weekly from the first page to the last, including the advertisements, and am always struck with its versatility and grasp of the subjects it handles. The editorial page is remarkable for its accurate forecasts, and orthodox mechanical analyses when commenting upon engineering matters. I am apt to be a sharp critic in this direction, for, having had more or less to do in this line for over sixty years, I have come to insist upon exact expressions upon such subjects, instead of vague surmises timidly put forth. If I had a young son I should give him the SCIENTIFIC AMERICAN as a safe guide in physics in general; the illustrations are germane to the subjects and very much assist the reader to see all sides of the topic discussed. After reading your paper continuously I do not think any young man would be apt to say, when asked what his lecturer talked about in the morning: "It was the sub-acetate of something—but I forget what." If a youth cannot learn much that will instruct him from the SCIENTIFIC AMERICAN he must be obtuse. I will close by wishing more power to you, and many years of usefulness in your especial field.

EGBERT P. WATSON.

Elizabeth, N. J., December 13, 1905.

Lubricating the Underwater Surface of Ships.

To the Editor of the SCIENTIFIC AMERICAN:

A correspondent in your issue of December 23 puts forth what seems to be an excellent idea with reference to lubricating the underwater surface of ships by air bubbles driven down a tube by means of a force pump.

It strikes me, however, that the air pump would not be needed. Would not a series of tubes passing down the bow, opening just above the water line in front, and at various points under the ship, serve the same purpose? Of course, when the ship was at rest, the water would fill the tubes to the same level as outside. But when the vessel was in rapid motion, the motion would create a suction that would empty the bottom of the tubes, and the vacuum thus produced would be filled with air that would rush in at the top of the tubes. This air in its turn would instantly be drawn out by the suction and distributed under the vessel, and thus a continuous air cushion would be formed upon which the vessel would glide forward as if floating in air, with far less resistance than would be caused by the friction of the water. At least, it seems so to me, and that your correspondent is right.

Then, if over one or more of these tubes was placed a can of kerosene with a small perforation at the bottom, the dripping of the oil would be drawn down the tube and prevent the formation of barnacles, as your correspondent suggests, and still farther lessen the friction by the glutinous coating it would produce.

E. P. FOSTER.

Cincinnati, Ohio, December 25, 1905.

Electric Propulsion for Inland Waterways.

To the Editor of the SCIENTIFIC AMERICAN:

I have not seen the suggestion from any quarter as to the use of electricity generated by the turbo-electric or gas-electric systems for the propulsion of craft on our inland waterways. To my mind this is a field rich in possibilities for future development.

There are a few advantages arising from this use of power:

1. More energy from a given amount of coal than by old methods, which saving admits of greater speed to the boat, or a greater freight-carrying capacity.

2. There would also be certain advantages in the arrangement of the boat's machinery. The energy being conveyed to a motor directly connected to the shaft of the propeller wheel by wire eliminates friction, thereby saving power, and makes possible a greater latitude in the application of the power. Two or more side wheels on each side, or both stern and side wheels simultaneously, could be readily used. This would have a beneficial effect in permitting a reduction of the draft without a corresponding loss of power, always an advantage on river craft. On towboats power thus generated could be conveyed by wire to barges having propeller wheels, arranged alongside of the tow, giving great propulsive effect as well as adding much to the manageability of the tow. These motor barges could have wheels on one or both sides at will. This suggestion may have value also as regards ocean towing, for from one engine room power might be conveyed to several barges trailing behind the towing vessel.

3. Another distinct advantage of the use of electric propulsion would be in the centralization of responsibility in maneuvering the boat. The pilot would have absolute control of the power independently of the engine room, a very apparent advantage. Wheels could be started, backed, or stopped with no more effort than is now required to ring up the engine room, a point of vast importance in the management of a boat on a river.

4. Lastly, passenger boats could be so constructed that they could be backed with great ease. By the simple movement of a lever the control of the boat could be shifted to a pilot house in the stern, and a landing could be made without the delay of "rounding to" which is so annoying an incident of a journey *down* a river.

J. LOGAN IRVIN.

Americus, Ga., December 9, 1905.

The Mosquito Theory of Yellow Fever.

To the Editor of the SCIENTIFIC AMERICAN:

The question recently propounded through the SCIENTIFIC AMERICAN by William F. Wilson, M. D., impressed me as quite apropos to the subject of yellow fever, especially this one: "Where is the inceptive—in the man or the insect? Is there not a commencement?" The proposition that the mosquito is the sole cause has always appeared to me as very much unfounded. They say a mosquito, before it can transmit the germ, must first bite an infected man. Now, whence comes the first infected man? That is, the very first, and no guessing allowed. They have demonstrated that mosquitoes do transmit the germ—but to the conclusion that nothing else does would seem a very long, foolish jump.

They may say that bogs and filth are not unhealthy; they do say this of bogs. It is simply an absurd subterfuge to uphold the very picturesque theory that the mosquito is the sole cause. They even hold that impure water conveys no malarial germs, but admit it might convey typhoid. This looks technical. They have declared war on the mosquito, and it seems like they are sinking all other considerations and defenses before it. S'death to the mosquito! Drink impure water! Eat impure food! Neglect sanitation! There is no Devil but Mosquito!

As an evidence of the unhealthfulness of low lands, take notice of persons living on such (even in river towns and cities). They are never so healthy as those living on higher ground. And this holds true in the winter, when the mosquitoes are dead. Do they continue their wickedness after death? Will the learned doctors never let up on the *Anopheles* and *Stegomyia?*

Well, then, what is your theory? It is this: The bogs and the filth and the mosquito are three causes; there may be others. Dr. Wilson suggested another idea: "If filth is not a factor, why the preliminary cleaning up?" etc. The fact is, there are doctors so imbued with the beauty (?) of the "mosquito theory," they argue that filth is no factor. Doubtless, in New Orleans, there were some of these, of high standing, of like persuasion. Consequently, there was little, if any, cleaning up, with the natural result of a severe scourge of yellow fever. This will happen again and again so long as the ridiculous idea of the mosquito being the sole cause of yellow fever is not uprooted.

L. P. PALMER.

Paducah, Ky., November 30, 1905.

Build the Canal at Sea Level.

To the Editor of the SCIENTIFIC AMERICAN:

I have been a constant reader of the SCIENTIFIC AMERICAN for many years, and have been interested in no series of articles which you have published more than those on an isthmian canal. The pains you took to obtain accurate information regarding the two projected routes, Nicaragua and Panama, and the clearness and perseverance you exercised in placing these facts before the public, were admirable, and should be acknowledged through all coming time by a grateful country.

I have been further profoundly interested in the late discussion about a sea-level canal. There is no question in my mind of the ultimate necessity of the sea-level type for that famous waterway, nor is there any question concerning the wisdom of its present adoption. The judgment of the foreign members of the expert commission ought to settle that in the public mind, as the American members could not but be, though unconsciously, influenced by the fear that our people would not sanction the added cost immediately; and this I say with all due belief in their professional sense of honor. The present construction of a lock canal, and a later change to sea level, entails an excessive cost in time, money, and annoyance incidental to the change. My family once lived in our house while it was being raised and a new story built underneath us, and you don't catch me submitting to any similar ordeal again or advocating anyone else doing so, not even the directors of a public canal. We have got to pay the bills for a sea-level canal some day, and by far the cheapest and best way is to incur those bills now.

Where shall we get the necessary funds? We are bordering on bankrupt expenditure in our feverish desire to have the biggest navy in the world, and can wisely and should determinedly retrench along this line. The building of ships whose known effective service will be for but five years, and the extreme limit of whose life is but twenty years, should be wisely limited. Money so saved will go far toward the extra cost of the canal. The country's prosperity will do the rest. A well-built canal, properly cared for, will last for all time. The devotion which the predominating elements of this nation have shown, are showing, and are likely to show, in advancing the interest of mankind in general is worth more for our protection and peace than all the navies of the world combined. The same may be said of every nation which exalts itself by intellectual attention to truth of all kinds. For the latest proof of this doctrine recall the battle of the Sea of Japan. Houses are needed to live in, but their chimneys don't need to be tall enough to knock down the stars. Navies are needed for police duty, and may do some service as scarecrows, but it is not necessary that, bow to stern, they should form a cordon entirely around our coast. To be sure, we need the canal at the earliest practical moment, but we need to exercise patience quite as much, and we need thoroughness and business prudence even more. Let us cultivate these virtues.

GEORGE B. KILBON.

Springfield, Mass., November 21, 1905.

Some Interesting Experiments with Acid and a Coiled Spring.

To the Editor of the SCIENTIFIC AMERICAN:

A number of years ago I had occasion to do some work on a motor, the motive power being derived from a coiled spring, which in this case was coiled in a barrel. It was run down, and the larger part was expanded tightly against the barrel. I used common muriatic acid to clean the motor, applying it with a small piece of cloth. While cleaning the barrel, an ominous clicking attracted my attention, seeming to come from the spring inside. Investigation showed that the acid, which I had taken no special precaution to keep from the spring, trickled through it more or less, causing it to crack and snap, in probably a hundred pieces, in lengths from half an inch up. I saw at once the spring was ruined, and as it was quite interesting to me, I, after a while spent in watching the peculiar demonstration and it had got quieted down a little, applied a little more acid, when it would at once start up again. This spring was two inches wide, and quite heavy. The only part that was affected, however, was the outer part, which pressed with all its strength against itself, and against the barrel. A few inner convolutions were not at all affected, there not being strain enough on them, probably.

This episode proving so interesting, I did a little experimenting. Snipping some pieces from an old clock spring, then after bending it between thumb and finger to get a good strain on it, I immersed the bent portion in the acid. Simple contact with the acid was sufficient to cause the piece of spring to snap violently, scattering the acid in all directions. Taking a piece of a smaller spring, about a quarter of an inch wide and two inches long, and after bending it between thumb and finger, to the shape of the letter U, simply wetting the *outside* with the acid, at the bend only, would cause it to snap at once. By holding a piece in the acid a few seconds, and then attempting to bend it, the same result was obtained.

Putting a piece under the same tension by bending as before, then applying the acid to the *inside* of the bend, brought no disastrous results. The acid was applied with a match, care being taken not to allow it to run over the edges, thus wetting the outside.

A piece which was twisted to quite an extent, then held in the acid, showed no ill effects. Not enough strain on it, probably. In fact, pieces of different springs were not all alike as regards their sensitiveness. This I accounted for by assuming they were not of the same temper, or the same degree of hardness. The treatment had no effect on annealed springs.

Perhaps these experiments may help settle the coiled spring question as to what becomes of the energy, etc. My answer would be that the energy is there all right, and when the attempt is made to dissolve the spring or eat it up with acid it would make itself manifest.

These experiments were made about forty years ago. Since that time I have seen the question, What becomes of a coiled spring's energy? asked many times, I think a few times in the SCIENTIFIC AMERICAN in years gone by. Perhaps here is a good place to say that we have had the SCIENTIFIC AMERICAN in the family since the early fifties.

CHARLES D. MOWRY.

Middletown, Conn., December 23, 1905.

A test of the McLean automatic gun was made from the deck of the United States revenue cutter "Mohawk," some 30 miles off Sandy Hook. The gun is a one-pounder. From 75 to 100 rounds were fired very successfully, it is reported, and the distances ranged from 1,000 yards to three miles. In the trial the gun, weighing but 540 pounds, was mounted on a tripod. There was no apparent recoil to the gun, it is said, when fired at the rate of 100 shots a minute.