Correspondence.

Small Steamboats.

To the Editor of the Scientific American :

I have taken your valuable paper for some years, and the accounts of small steamers and answers in the correspondent column have interested me a good deal, as it is in my line.

There is one thing in which I think you make a mistake, and that is in advising people to use vertical boilers for steam launches. I have tried both vertical and horizontal in the same boat, and find the latter superior in many respects. The vertical boiler gets steam up to 80 lbs. pressure on the square inch in three quarters of an hour, but when the engine was running, even slowly, it primed so bad that we could never tell how the water stood without stopping altogether, as the gauge glass looked as if it was full of soap bubbles; when we stopped at a wharf the steam would rise at a fearful rate, even with the fire almost out and the door open. I have seen it go up from 40 lbs. to 90 in less than five minutes.

The horizontal boiler takes about two hours to get 60 lbs. from cold water, but when running the water does not stand more than ½ inch higher in the glass than when standing, and never foams at all. Another advantage which this boiler has over the vertical one is that it stands much lower in the boat, the top of the dome being level with the gunwale, whereas the vertical stood some 18 inches above, which made the boat very crank and hardly safe in a sea.

The engine was built by my brother and myself, most of it of an evening after we were home from work and on holidays; we made our own drawings and patterns, and had the casting and forgings done at the foundry.

The cylinder is 4½ inches diameter, with 5 inch stroke of piston, cutting off at ¾ stroke; pump ⅝ inch diameter by 5 inches stroke. We usually ran her at 300 or 400 revolutions a minute with 75 lbs. steam. The boiler is horizontal, 2 feet 6 inches diameter and 3 feet long, 4 feet over all, with a 6 inch smoke box at each end; there is a flue right through the boiler, 15 inches diameter, and return tubes which are also 3 feet long, 1¾ inch outside diameter. There are 18 tubes, but the boiler would have been better if there were 6 more. The boat is wood, diagonal built, 24 feet keel, 26 feet 5 inches over all, 5 feet 8 inches beam over bead, 3 feet 9 inches deep; built with very fine lines both fore and aft.

The propeller is 2 feet diameter and 3 feet pitch. With a 4 bladed propeller, 3 feet pitch, we ran the measured mile (6,080 feet) with tide, carrying 80 lbs. steam, in ten minutes. Not being satisfied with this performance, we cut two blades off, when, with 2 bladed propeller, 3 feet pitch, we ran the same distance, with the same pressure, in slack water, in 8 minutes and 40 seconds. In this case the tide had just turned and was slightly against us.

We also tried a three bladed propeller, 2 feet diameter, 2 feet 10 inches pitch, when she ran the mile in 8 minutes and 55 seconds with the tide, carrying 75 lbs. steam. From the above it will be seen that the 2 bladed screw gave the best results.
S. FIRTH.

Auckland, N. Z.

[It is scarcely fair to condemn the vertical boiler, in general, on account of the bad performance of a single specimen. It is true that each form has some special advantages, but one can be made to furnish as dry steam as the other, when properly proportioned. We are glad to receive the account of your boat, which will be of interest and value to many readers.—ED.]

Life Preservers.

To the Editor of the Scientific American :

The loss of life at sea, and the river accidents of almost daily occurrence, should stimulate inventors to produce some simple life-saving apparatus. The difficulty is to set the inventive fashion in this direction; and as everybody's business is usually nobody's business, there is no interest in this matter except at the time of an accident, or during the nine days' wonder excited by a calamity. Most of our steamers and sailing vessels are supplied with circular buoys, air cushions, and cork life preservers, but at the moment of collision or upset these articles are not accessible, or are with difficulty attached to the person. The suggestion of a "circlet of waterproof cells," in a recent article in the SCIENTIFIC AMERICAN, is a move in the right direction. Some modification of Boyton's swimming gear, or of Cleburne's air hammock, might be made simple, cheap, and portable. After the Huron disaster, Medical Director Cleburne, of the Navy, suggested the use of "air-tight waterproof hammocks" for seamen (made of light, flexible, impervious material, free from the objectionable features of rubber cloth), so that in case of shipwreck each man would be provided with a life-saving apparatus capable of supporting in the water three to four hundred pounds, and by a simple arrangement a number of these beds could be attached together to form a life raft capable of saving the entire crew. We do not know if the Navy Department has taken the hint to supply war ships with these hammocks, or whether it is waiting for another Huron calamity to develop the idea. The Doctor has suggested the use of the same material for the hoods of waterproof cloaks or wraps, for crinoline, and for ladies' long boas (which could be instantly put around a child's body under the shoulders), and for the inside lining of coats, etc.—the lining to be double and quickly inflated by an automatic valve. It is important to utilize articles of dress, beds, and hammocks for life-saving purposes, as travelers are not willing to burden themselves with special life preservers.

Who will take the hint of the SCIENTIFIC AMERICAN, and provide the public with a simple, cheap, and reliable life-saving apparatus?
J. E. PARKER.

Philadelphia, October 9.

Bishop Ferrette on the Cedars of Lebanon.

To the Editor of the Scientific American :

In connection with the article which has appeared in the SCIENTIFIC AMERICAN (November 2, 1878), questioning the great antiquity of the big trees of California and other places, may I be permitted to give to the public, through your intermediate, a parallel fact which fell under my observation with regard to the cedars of Lebanon?

I visited the cedars for the first time in the summer of 1860, and was struck by the similarity of cedars to fir trees. A cedar is in fact nothing but a big fir tree, of which there are many species, all closely related to each other. Having been born in a fir tree country, and knowing that those trees are not generally among those which take many years to attain their full size, I conceived some doubts as to any of the cedars, even the most enormous, being as old as Solomon's time.

But the next year I was able to set that question at rest, to my satisfaction at least, for I must confess that I am not in any special sense a botanist. I revisited the cedars in 1861, and found one of the five or six principal giants, at whose stupendous proportions I had wondered the year before, lying on the ground, having been rooted out by the snows and storms of the winter. Monks were busy sawing it into pieces, and had already severed from the trunk one of the two nearly equal stems into which it branched at about ten, certainly not more than twenty feet from the ground. I counted the rings at that place, and to my surprise they were only two hundred or thereabouts.

I confess it was difficult for me to believe that that enormous branch was only two hundred years old; and if it was only that age, the whole tree could not have been much older, for fir trees, so far as I am aware, never grow new branches below older ones; and when that branch was first projected, at twenty feet or less from the ground, the tree could not have been much more than twenty years old.
JULIUS FERRETTE.

P.S.—It might be useful to add that my conclusions in this respect are not influenced by my theology, according to which any tree might be as well ten thousand as two hundred years old.

Cambridge, Mass., 26th October, 1878.

Early Manufacture of Steel Pens.

To the Editor of the Scientific American:

I write to inquire if you can give me information concerning the manufacture of metal pens in this country. I may be vain in the supposition, but I am almost persuaded, that my people—the Shakers—were the originators of metal pens. I write this to you with a silver pen, "one slit," that was made in the year 1819 at this village by the Shakers.

Two or three years previous to the use of silver for pens, our people used brass plate for their manufacture, but soon found silver preferable. Some of our people, now living, sold these pens in the year 1820 for 25 cents each, and disposed of all that could be made at that price.

The machinery for rolling the brass and silver plate was a home invention; also the shears for cutting the pens; these we still have in our possession. At the above date the inventor writes: "I now have my new shears, with which I have cut 292 pens in 14 minutes; this is doing it with dispatch!" The metal used was melted silver coins; and at one time the worker says, "I melted up $55.00 or $60.00 of silver money." I find the following in a late Boston paper:

"English steel pens are almost entirely made by women. In 1828–29 the first gross of 'three slit' steel pens was sold wholesale at £7 4s. the gross. In 1830 they had fallen to 8s. and in 1832 to 6s. the gross. A better article is now sold at 6d. per gross."

I leave you to judge the merits of this pen, from the appearance of my chirography; and can assure you it has seen nearly sixty years' service. The two I have in possession are equally good writers, and were presented to me by my venerable friend, D. A. Buckingham, who, 58 and more years ago, engaged in the sale of pens. By giving me what information you are able I will be under many obligations. I neglected to say that the handles to these pens were made of both wood and tin; the tin one I have is tubular and closes the pen telescopically.
G. A. LOMAS.

Shakers, N. Y.

[We find no record of the manufacture of metal pens in this country as early as 1820. At that time Gillott had begun to make steel pens in England. As early as 1803 barrel pens of steel were made by a Mr. Wise in England. Evidently Mr. Lomas writes with a good pen.]

Advantages of Experimental Study.

A paper read by C. M. Boutelle, at a late meeting of the Minnesota Educational Association, contains the following summary of the advantages that result from experimental work in natural science:

1. The ability to follow directions sensibly; this is something of which we see the need every day in our schools, and it is readily acquired by a course of experimental work.

2. The ability to construct and use apparatus comes from a use of the experimental method of study and teaching. When a teacher or a student understands the use of tools many articles of great use can be made at a very small expense. Students or teachers will be gainers by being thrown upon their own resources. A complete and well arranged laboratory may be so used as to cramp the ingenuity and independence of an experimenter, and so be a positive disadvantage.

3. The actual seeing of a phenomenon, or the handling, tasting, and smelling of some chemical substance, carries with it a knowledge obtainable in no other way. The student who learns a printed statement is likely to forget it, for the imperfect knowledge has gone into his mind in but one way, and second hand at that, while the thing itself once known may, whenever encountered again, appeal for recognition to all or to nearly all of the senses. There are odors, for instance, common in the chemical laboratory, that once known are never forgotten, which are beyond the power of words to describe.

4. Apparatus in books always works well. In practice there are accidents the educational value of which the student of physical science cannot afford to miss. If things will burn, or break, or explode, there is no way of knowing it better or remembering it longer than by experience.

5. The reality of some slight change, some variation in the weight, color, or temperature, comes home only to the student who observes the change itself.

6. The cultivation of a scientific faith, of a belief in things understood but not seen, is not the least of the advantages of the study of experiments. Pupils can be led to recite glibly book statements which they do not believe in the way that facts should be believed. Students will look with genuine wonder at a few ounces of water supported in an inverted goblet over the mouth of which a slip of paper or of glass has been placed, but will state without hesitation that the atmosphere presses with a force of nearly fifteen pounds to the square inch and in every direction.

7. The habit of associating phenomena with their descriptions and explanations will be acquired after a time. Students at first find a genuine difficulty in this matter.

8. The habit of seeing what is going on in the world around us grows as we use the method of experiment. There are many things happening all about us from which the skillful teacher can draw illustrations for the use of his classes. Some great advances have been made in science because men saw what happened, how it happened, and all that happened. Things had swung, in nature and in art, ever since the world began, but an observing young man (20 years old, only), a man with eyes and the habit of using them, discovered the principle of the pendulum, before unknown.

9. To one who does experimental work, and loves it, there cannot but come a habit of looking for the reasons of things. "What?" is the question asked of nature by the experiment. "Why?" is the question the mind sets itself to answer. Science has always been the gainer by this habit; right or wrong, every theory that attempts to explain a group of related phenomena is of benefit. The theories, now known to be false, mere names long ago, marked steps in scientific progress as truly as do the accepted theories of to-day.

10. The culture that comes from a use of scientific work will have a tendency to enable men to see what there really is in the everyday and commonplace. It is too late for a falling apple to suggest anew the law of universal gravitation; it is too late for us to attempt to produce, from the fact that if a certain kind of vibration produces a certain sound, repeating the vibration repeats the sound (a fact, by the way, as old as speaking and hearing), a machine like the phonograph or the telephone; but it is not too late for the pupils in our schools to study science and to keep their eyes open.

A Gas Clock.

It is said that there is a clock in the Guildhall Museum, London, of which the motive power is hydrogen gas, generated by the action of diluted sulphuric acid on a ball of zinc. The clock itself resembles a large colored glass cylinder without any cover, and about half full of sulphuric acid. Floating on the top of this acid is a glass bell, and the gas generated forces forward this concave receiver until it nearly reaches the top of the cylinder, when, by the action of a delicate lever, two valves become simultaneously opened. One of these allows the gas to escape, thereby causing the receiver to descend, and the other permits a fresh ball of zinc to fall into the acid. The same operation is repeated as long as the materials for making the gas are supplied, and this is effected without winding or manipulation of any kind. The dial plate is fixed to the front of the cylinder, and communicates by wheels, etc., with a small glass perpendicular shaft, which rises with the receiver and sets the wheels in motion.

Special Senses in Insects.

The eminent French naturalist, Père Montrousier, details the following experiment that he has made. He immersed a long-snouted weevil so as to cover it, all but the tip of the antennæ, with a coating of wax. On presenting to it oil of turpentine it became violently excited and endeavored to escape. Another now had the tips only of its antennæ coated with the wax, and neither turpentine nor any other strong smelling substance at all affected it.