



J. H. D., of Mass.—According to the census returns of 1860 the property of the people of this country was worth \$16,000,000,000; the national debt, when all the bills come in, will amount to about \$3,000,000,000. Consequently, to payoff the debt everybody must contribute one-fifth part of his property; this nobody is willing to do. The debt can and will be rapidly paid, but it must be done by vigorous taxation.

C. W. H., of Conn.—It has been demonstrated that a balloon cannot be navigated by muscular power. The muscular force of a man could not at the utmost cause a balloon large enough to support him in the air to deviate from the direction of the wind more than four miles in an hour.

Clarendon, of Tenn.—We have perhaps been too accommodating in republishing articles two or three times at the request of correspondents; however, we give you again Capt. Hall's cure for drunkenness: sulphate of iron, 5 grains; magnesia, 10 grains; peppermint water, 11 drachms; spirit of nutmeg, 1 drachm—twice a day.

E. S., of Ill.—Iron is galvanized, as it is improperly called, by being immersed in molten zinc. For a minute description of the process see page 243, vol. XI.

I. M., of N. Y.—A patentee is not obliged to show his patent, but you can procure a copy of it from the Patent Office.

J. M. C., of Fla.—We do not think you can purchase in this market a machine capable of sawing down standing trees. Such machines have been invented but have not proved successful so far as we can learn.

I. L. F., of R. I.—We neither buy nor sell patents, therefore must decline to purchase your horse shoe.

G. W., of Mich.—You say that a certain party has obtained a patent for an invention which you and others have publicly used for upwards of ten years, and wish to know if the patentee can now stop you from continuing to use it. We answer no; the invention is public property.

O. H. B., of Ind.—Augers to bore hard wood are made from one to two feet in length, and can be had at most tool stores in large cities. Car-makers use them.

C. H. B., of Mass.—For your small boat, 18 feet long, 4½ feet beam and 12 inch draft, you can use a screw of 12 inches diameter and 20 inches pitch. You may use a larger screw by putting the shaft as low in the boat as the crank will allow, and attaching a shoe or guard to the keel behind the screw, so that its blades will not strike in shoal water, as they would if the diameter of the screw was greater than the draft. As to the form, make it a true screw; as to the blades, use three; as to the velocity, run it as fast as you can.

P. K., of Tenn.—We are pleased to hear from you. Iron ore is so abundant that it is of no value in the bed except in favorable positions.

W. A. L., of Ohio.—Giffard's injector will work with steam at a less pressure than 40 pounds.

D. K., of N. Y.—Gun cotton is sometimes decomposed by long exposure to air and moisture, but we never heard of its burning by spontaneous combustion.

G. C. B., of Iowa.—A horse-shoe magnet weighing 1 pound has been so charged as to sustain a weight of 26½ pounds. The attraction of magnetism passes freely and without diminution through all known substances.

R. E., of Mo.—The *London Builder* is a paper of very high character. There is no paper in this city devoted exclusively to architecture and building.

H. H., of N. J.—Dr. Trimble, the naturalist, of your city, will tell you how to catch humming birds.

T. T., of D. C.—J. W. Stevenson's turbine gave the largest yield of power at the great competitive trial at the Philadelphia Water Works. His address is No. 100 Broadway, N. Y.

SPECIAL NOTICES.

Robert Bates, of Philadelphia, Pa., has petitioned for the extension of a patent granted to him on the 30th of September, 1851, for an improvement in instruments for the cure of stammering.

Parties wishing to oppose the above extension must appear and show cause on the 11th of September next, at 12 o'clock, M., when the petition will be heard.

Stephen P. Ruggles, Boston, Mass., has petitioned for the extension of a patent granted to him on the 23d of September, 1851, for an improvement in hand stamps.

Parties wishing to oppose the above extension must appear and show cause on the 4th day of September next, at 12 o'clock, M., when the petition will be heard.

Joseph H. Moore, Chicago, Ill., and Wm. P. Parrott, Boston, Mass., have petitioned for the extension of a patent granted to them on the 2d day of December, 1851, for an improvement in steam carriages for railways.

Parties wishing to oppose the above extension must appear and show cause on the 20th day of November next, at 12 o'clock, M., when the petition will be heard.

Copper Cartridges in Cold Weather.

MESSRS. EDITORS:—My communication in regard to the effect of severe cold upon copper cartridges has naturally excited a good deal of attention, and a considerable amount of testimony, verbal and written, has reached me since its publication. I have regretted that my correspondents did not send their communications directly to you, and have waited in the hope that your columns would contain further evidence than the letters of Messrs. Plaisted and Perry, which thus far are the only published replies I have seen, and both of which are simply negative and prove nothing. Mr. Perry's testimony has rather a formidable look in consideration of the great number of cartridges he has fired, but its weight is destroyed by the fact that the ammunition was kept and fired under cover, being used in proving Spencer rifles. Mr. Plaisted has fired from one to two thousand cartridges, has had but two miss-fires, and is convinced neither of them was owing to cold. Very few men have been equally fortunate, I cannot tell how many thousands I have fired and seen fired, but I am sure the proportion of misses has been very much larger than his, though it never occurred to me at the time to attribute them to cold weather. I always turn a cartridge when it misses, and try again, sometimes with a successful result, oftener not.

By the kindness of Major Laidley, I have been furnished with a carefully-prepared report of an experiment which has been tried at the Springfield Armory, for the purpose of testing the question, and which seems clearly to prove that the cartridges are not affected by cold. A quantity of cartridges were placed in a refrigerator from which they were taken and fired at different times, none being less than an hour, and the greater portion forty-four hours in the freezer, exposed to degrees of cold varying from 30° above to 2° below zero. Five hundred and twelve cartridges were thus fired without a single miss, and Mr. Porter (the foreman by whom the report was prepared), says in conclusion, "I could see no difference between those which had been in the freezer the greatest length of time and those that had not been in at all."

This testimony would seem to be conclusive against the opinion I advanced in my former communication, which, it will be remembered, was based upon what I had learned from others. On the other hand I have the assertions of perfectly reliable men—two of whom are scientific men—as well as sportsmen, that they find these cartridges so unreliable in severe cold weather in Canada and Michigan, though taken from the same lots, which prove perfectly reliable in summer, that, as one of my correspondents says, "I have had to lay them aside as useless and should not think of taking them on any future winter expedition." He adds, moreover, "But almost invariably, on warming those which had missed, in the hand or pocket they have exploded." I have verbal and written testimony to the above effect from different sources entirely unknown to each other, and whose interests would certainly prompt them to make the best of the only ammunition they could use in the guns with which they had provided themselves. I cannot withhold my belief from their testimony, and I can only express the hope that we may have further light upon the subject which will enable us to decide a question which is certainly a very important one.

H. W. S. CLEVELAND.

Danvers, Mass., June 7, 1865.

The Perpetual-motion Clock.

MESSRS. EDITORS:—Your New Zealand and also Harrisburg, Pa., correspondents are both mistaken in assuming the so-called perpetual-motion clock described by them to be "new to all the world." My father, Col. S. Boon, of Hamilton, Madison Co., N. Y., in the year, 1842, invented and constructed a clock operating upon similar principles, viz., the expansion of fluids made upon the same principle as a thermometer. A large sphere was the receiver into which was placed a metallic cylinder; a piston was placed in the cylinder; upon the cross-head of the piston rod was attached a double rack with suitable guides to keep the piston rod straight

with the cylinder. Upon the cross-head were also placed weights of 25 lbs. each. He filled the ball or sphere with oil, which kept every thing lubricated, and obtained the power necessary to wind the clock by the contraction and expansion of the fluid. The weights carried down the piston rod and the expansion carried it up—winding the clock both by expansion and gravitation, by means of racks and ratchet wheels. The clock wound from the center of the spring, on the same principle that American watches are now made. It is unnecessary to explain further.

I would simply say that it was examined by many prominent gentlemen, and to satisfy the incredulous that it was wholly destitute of deception, we obtained certificates from Dr. Nott, Prof. Silliman, Prof. Finney and many others, who witnessed its operations and pronounced it unlimited in its power, excepting in strength of machinery, and would continue to run without aid from man as long as the material of which it was composed would last. It was on exhibition at the American Institute, in New York city, in 1843. I have many portions of it now in my possession, which I can exhibit to any inquirer.

ALONZO Z. BOON.

Galesburg, Ill., July 1, 1865.

The Government Flying Machine.

MESSRS. EDITORS:—In looking over your valuable journal I saw a statement concerning a new flying machine, in process of construction at Hoboken, to be propelled vertically and horizontally through the air by screw fans; propelled by a steam engine placed in a cigar-shaped car with one fan above and one below the car and one at each end. Now the thing looks very squally to me. How can they give a rotary motion to the lifting fan without causing the car to rotate in the opposite direction without having a fan to act against it? If the rear fan was left off, the front fan falling through the air would prevent it more or less, but not sufficiently, and the lower fan would have a tendency to equalize the thing. It looks to me as though the motion would be more like a Boomerang than anything I know of. If the propelling power was communicated from the earth, as Prof. Mitchell's experiments were, it would look more plausible; for then the engine would have a solid foundation, or a momentum given to it before it started independent of itself like the child's toy.

S. D. ENGLE.

Hazleton, July 1, 1865.

Water Wheels by Night and Day.

MESSRS. EDITORS:—In your issue of the 1st inst., I see some remarks on the mysterious effects of water on wheels, in the day time and in the night. I also see you infer from the communication from the Cumberland Valley Mills, that the mystery is only imaginary. Years ago I was placed in positions so that the fact exhibited itself to me. On investigation I found that a sluice or opening for the water to pass through in the day time would be 10 inches wide, while in the evening the opening would be 9 inches to give the same motion by the usual kind of governor and running the same machinery. On following up the investigation it was discovered that the contraction commenced, in clear weather, two or three hours before the sun set and continued until midnight, then remained until day light without change, then commenced to enlarge and continued until noon; then no change until two or three hours before sundown. In clear weather there is not so much change experienced. The philosophy my mind has settled down upon is that the sun's rays rarify the air in the day time thereby changing the center of attraction of the earth so that the same column of water would require a larger capacity to pass through while the sun is on the horizon than when not on the horizon. The results are as above related, the philosophy is my individual opinion only, as nothing has come under my observation giving me any light on the subject. I should be pleased to see an explanation of the laws by which the phenomenon is produced.

ANDREW R. ARNOLD.

Newark, N. J., July 5, 1865.

[We publish this communication out of respect for the writer, who is a remarkably skillful and successful manufacturer; but the account of the observations is not sufficiently detailed and definite to give us a particle of confidence in the conclusions. We