



The Motion of Rockets.

MESSRS. EDITORS:—The illustration given by your Cincinnati correspondent T. W. B., in the *SCIENTIFIC AMERICAN*, February 8th, of "a cylinder containing steam, or other gas, surrounded by compressed air, &c.," is not strictly applicable to the *modus operandi* in question. If we could suppose the shell of the rocket to be perfectly tight, without any vent at the choke, and that the projectile motion thereof commences by an explosion, whereby the vent is burst open, and the inflamed gas liberated, we should have a case, wherein the said illustration might be applied in explanation of the first, or initial impulse, given to the projectile; but it will not hold good any further; it will not elucidate the cause of motion of the rocket, when the choke is open, as is the case invariably, whilst the same is in motion. The inference or conclusion drawn by T. W. B., from the illustration given is, "that in a vacuum the action would be perfect;" that is we suppose this conclusion to mean, that the force acting against the closed end of the cylinder, in this case, would be the greatest possible, and consequently that a rocket would fly with the greatest force and velocity in a vacuum.

Without wishing to make, as suggested, an intricate question of this matter, but simply to elicit the truth in reference to the subject, let us suppose, for instance, that the cylinder of T. W. B. to be the boiler of a steam engine, having a safety valve, steam gage, and other appliances convenient and suitable for the purposes of our proposed experiments. Let a regular and uniform fire be now kept up under this boiler, so that the quantity of steam formed therein, may be constantly blowing off, at the safety valve, into the atmosphere, while the steam gage during the time, indicates a uniform pressure in the boiler of any given intensity, say 30 lbs. to the square inch. Now while this operation is continued, let us suppose by some contrivance we are enabled to connect the safety valve pipe with a vacuum. Assume this connection to be made and let T. W. B. now cast his eyes on the steam gage, and then tell us whether it indicates a greater or a less internal pressure in the boiler. According to the illustration he has given, as the steam is now flowing from the boiler into a vacuum, its action should be the most perfect and the internal pressure greatly increased. Is it not plain, however, that as steam or any other elastic fluid, flows into a vacuum more rapidly than it does into the atmosphere, that the internal pressure of the boiler in this instance will be considerably reduced. The velocity of the efflux of steam of two atmospheres' pressure into a vacuum is about 1,978 feet per second. The velocity of the same into the atmosphere would be about 1,400 feet per second; so that it would pass off through the safety valve nearly 600 feet per second faster into the vacuum than into the atmosphere. Hence, by the supposition, the supply being the same in both cases, when the steam escapes into the vacuum it will pass off from the boiler more rapidly, and of course the intensity of the pressure therein will be reduced. This reduction would also be in proportion to the area of the aperture by which the steam flows from the boiler. Now, if we suppose the ignited composition of a rocket to form within its shell an inflammable gas of any given intensity, is it not obvious that said gas would flow into a vacuum much more rapidly than into the atmosphere? and consequently, as we have shown with the steam boiler, that the internal pressure or force acting to propel the same would be less in the vacuum than in a full medium.

A scientific writer on this subject, in commenting on the hypothesis enunciated by Desagulier (which is the same as that entertained by your correspondent T. W. B.), illustrates the action of the flame of gas within the rocket as follows: "Take a strong piece of whalebone and bend it in the form of a bow, by means of a bit of thread, or silk, fastened to each extremity; then if this bow be suspended by its middle, and two pieces of board, or two books, be set up, on their edges, each touching one end of the bow, and the string by which it is bent be cut, both books will,

from the elastic nature of the whalebone, be thrown down with considerable force. Now repeat the experiment, but set up only one book, bearing the other end of the bow entirely free; then cut the string as before, and it will be found that for the want of the reaction of the other book, no effect, or very little, is produced on the standing book. This we consider to be a very similar case to the action of the gas, on the rocket when shut and opened as supposed by Desagulier; and if so it shows very distinctly the inaccuracy of his hypothesis."

CHARLES POTTS

Trenton, N. J., Feb. 10, 1862. Civil Engineer.

Colburn's Hot-Air Evaporator.

MESSRS. EDITORS:—Could the public at large, and especially the mechanical portion, be led to more fully canvass the merits of your valuable paper it would not only always prove a mental but often a pecuniary benefit. A case in point. Some time since my attention was directed, in reading an account of inventions in your journal, to the need of supplying the hot, dry air of furnaces with moisture. From the hints advanced I set my wits to work to supply moisture by some other method than was usually employed—not from the furnace but directly from the registers. How far I have succeeded may be gathered from the fact that, after experimenting, I, finally, through your agency, obtained a patent for an evaporator, which has not only, by its extensive introduction, served the valuable purpose to those heating their houses by furnaces, in rendering the usual hot, dry air innocuous to health, and less damaging to houses and furniture, but has proved of considerable pecuniary benefit. I have already disposed of my invention for the States of Maine, New Hampshire, Vermont, Massachusetts, Rhode Island, Connecticut and Wisconsin, and also for the cities of Troy, Buffalo, Erie, Cleveland, Detroit and Chicago; also, a half interest in New York.

Newark, N. J.

[That the air of rooms heated by stoves or furnaces will cause the doors and furniture to shrink and crack is universally observed, and our most experienced physicians say that the effect on the lungs and other organs of the inhabitants is not less marked.

There can be no doubt that the principal cause of the injury resulting from stoves and furnaces is the dryness of the air. Warm air will hold more moisture than cold. Prof. Henry ascertained that a cubic foot of air at zero will absorb less than half a grain of water, and at 100° it will absorb more than 25 grains. Hence cold winter air, though it has but little moisture in it, is not drying, as it may have all the moisture that it will contain. But if it is heated, its capacity for water increases, and it becomes exceedingly drying—taking water from the wood of doors or furniture, or from the skins, tongues or lungs of people if it comes in contact with them.

To remove its drying powers it should be supplied with the moisture which it so eagerly craves. The arrangements in general use are entirely inadequate for the purpose, and we are glad to see that Dr. Colburn's apparatus is coming into so extensive use. We have tried it ourselves, and find that it makes a manifest improvement in the air, rendering the air of a furnace-heated room more agreeable to the feelings and doubtless less injurious to health.—Eds.

Freewill Offering of Patentees.

MESSRS. MUNN & Co.—I am thankful to you gentlemen for the dispatch and zeal with which you have always conducted my cases entrusted to your care, and you may rest assured that I avail myself of every opportunity to recommend you to my friends who have business to transact at the Patent Office. I have, in several instances, advised my friends to apply to you for assistance, after having had their cases rejected at the Patent Office, and they have been universally gratified at your success in obtaining for them a grant of Letters Patent after other agents had given the case up as hopeless.

Very respectfully,

JOSEPH LOFENDAHL.

Boston, Mass.

MESSRS. MUNN & Co.—I received your letter announcing the granting of my application for a patent. I have recommended your agency to two parties in Salem about to apply for patents, and one of them has, I believe, already availed himself of it. Another is fully satisfied that you saved him the price of an English patent by the preliminary examination made, through your agency, on his invention. I shall always take pleasure in recommending an agency so prompt and efficient as yours has been in my case.

I am yours, gratefully,

J. A. BASSETT.

Salem, Mass., Feb. 13, 1862.

MESSRS. MUNN & Co.—The skill and energy with which you have done the business command my most hearty thanks. I have taken your paper for ten years. Last spring I lost my employment and feared I might have to stop it, but thought I would not until I was obliged to. What the result has been you know. I saw a call in your paper of November 30, 1861, for a number of new inventions. I selected one and marked it out, and through your agency a patent has been allowed me. You have made the tie which binds me to you and your paper stronger than ever, for which my gratitude to you is unbounded.

Yours, &c.,

CHARLES GOLDTHWAIT.

South Weymouth, Mass., Feb. 10, 1862.

Volcanoes and Whirlpools in the Sea.

It is stated in the late news from Europe that during the recent eruption of Mount Vesuvius eleven craters were in active operation, emitting sulphurous vapors. The first appearance of the eruption is thus described by a correspondent of the *London Athenaeum*:—"When I first saw the eruption I was walking with a friend, and happening to look over the inclination of a mountain which cut the sea and the distant prospect, I saw what appeared to me to be a vast pine, and yet I said, rubbing my eyes, I do not remember one on that spot; it cannot be a pine, it must be smoke from Vesuvius; and so it was; and at this, the commencement of the eruption, we could see the mighty mass from the roots, which were fixed in the base of the mountain, growing up with wonderful rapidity to a gigantic tree which touched the very heavens, and then spread its branches south and east and west, until the coast, sea, every thing, was hidden from view."

A whirlpool, some three hundred and sixty feet in diameter, has been formed in the sea near Torre del Greco, by the late eruption of Vesuvius. The sounding gave twenty-three fathoms of water, and the plummet brought up sand and sulphur. From a part of the circumference, a tail, so to call it, about sixty feet in width, runs away in the direction of Sorrento, and is of a beautiful light green color. All the water here was tepid, had a strong sulphuric smell, and many fish have been destroyed.

It has been supposed by many persons that the eruptions of this volcano are caused by the sea finding access to vast deposits of pyrites under the mountain. The whirlpool seems to favor this theory.

European Armies and Navies.

The following, according to the *Almanack de Gotha*, was the state of the disposable land and sea forces of the Great Powers of Europe in 1861:—

France: Army on war footing, 767,770 men, 130,000 horses; peace footing, 414,000 men, 72,850 horses. Navy, 600 vessels afloat, building, and under transformation, carrying together 13,353 guns. Out of that number there are 373 steamers, of which 56 are iron-cased. The crews of the fleet, who on a peace footing amount to 38,373 men, may in case of war be increased to 60,000. The seamen forming part of the maritime inscription are 170,000 in number. The effective strength of the marines is 22,400 men in peace, and 26,879 in war. Custom-house officers or coastguard, 25,591 men.—Great Britain: Army, 212,773 men, 21,904 horses. Navy, 893 vessels, carrying 16,411 guns. The crews number 78,200 men, of whom 18,000 are marines, and 8,550 coastguard men.—Russia: Army, 577,859 men regular troops, and 136 regiments of cavalry, 31 battalions, and 31 batteries of irregulars. Navy, 313 vessels, of which 242 are steamers, carrying together 3,851 guns. The Russian government has also 474 vessels acting as guardships at different places and for transports.—Austria: Army, 587,695 men. Navy, 53 steamers, 79 sailing vessels, carrying together 895 guns.—Prussia: Army, peace footing, 212,649 men; war footing 622,366 men. Navy, 34 vessels, of which 26 are steamers.—Italy: Official effective strength of the army on the 10th of June, 1861, 327,290 men, divided into 68 regiments of infantry, 26 battalions of bersaglieri, 17 regiments of cavalry, 9 of artillery, 2 of engineers, and 3 wagon trains. Navy, 106 vessels, carrying 1,036 guns, and 18,000 men.

New Method of Giving Chloroform.

The *British Medical Journal* says:—At a recent meeting of the Obstetrical Society, Dr. Simpson described a plan of administering chloroform which he has now adopted in preference to that at present in use here. The present mode is to fold up a handkerchief and pour into the hollow a quantity of chloroform, and then hold it at some distance from the face, so as to admit of atmospheric air being inhaled along with the vapor. The new plan is to lay a single layer of handkerchief over the face, and let the chloroform fall on it drop by drop. The advantages are these: 1. That there is less danger to the patient from the small quantity applied at a time. 2. That anaesthesia is more speedily produced. 3. That the quantity of chloroform required is less. Various gentlemen who had made trial of the plan confirmed the value of this process; and Dr. Young, in particular, stated that he had kept a patient narcotized for ten hours with two ounces and a half of chloroform.