Mechanics magazine

Ruffin, Sc.

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Member of the French Institute &

and Founder of Mechanics Institutions in France.

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A Scott.

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"The transmutation of the baser metals into gold and silver, is a small affair compared with changing darkness into light, want into plenty, misery into happiness; yet Science can do all this."

ANON.

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vernment had sunk so deeply, that he could not get rid of the notion, that evil is a natural disposition of all government, as T. M. B. says, "the love of blood is of a tiger."

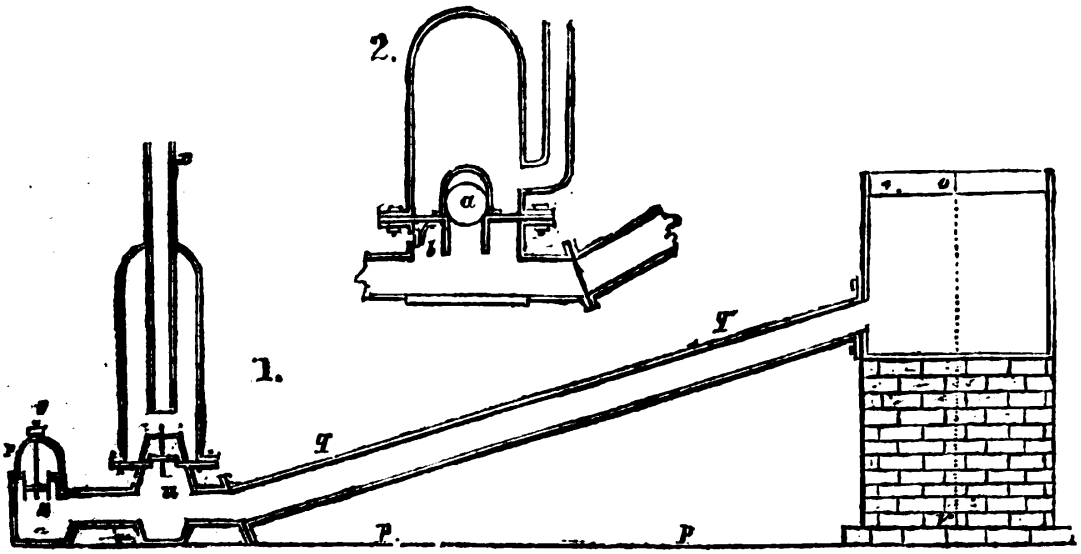
"The phrase "change-house" is a shiboleth which gives me another link of knowledge in the character of your correspondent, and leads me to fear, that he will not consent to carry on this controversy in a good spirit. Well, well! at any weapon I am content to engage him, confident of victory under the shield of truth.

My next letter will, I suppose, be on the subject of dwellings for the poor. I shall be glad to hear of the objections, which will facilitate the details of execution perhaps. As to the principle, whenever it becomes the fashion to lodge each soldier under a seperate roof, I shall be content to give it up.

Yours, &c. JUNIUS REDIVIVUS.

Dec. 20, 1831.

MONTGOLFIER'S HYDRAULIC-RAM.



Sir,—I must confess I was very much surprised at the communication of your Staffordshire correspondent, W. O—s, on "a cheap and efficacious plan for raising water," (p. 105) seeing it is nothing more than the water-ram of M. Montgolfier, in its very rudest state, so rude indeed, as to be incapable, in that form, of fulfilling the design of its contriver. I had supposed, that every tyro in the science of hydraulics was familiar with this ingenious machine; as it appears, however, that there are some among your numerous readers to whom it is as yet unknown, I subjoin a description from the treatise on hydraulics, published by the Society for the Diffusion of Useful Knowledge, from the pen of Professor Millington:—

"The *water-ram*, or *bélier hydraulique*, as it was called by its inventor, M. Montgolfier, of Paris, is a highly useful and simple machine, for the purpose of raising water, without the expenditure or aid of any other force than that which is produced by the momentum or moving force of a part of the water that is to be raised; and is one of the most simple and truly philosophical machines that hydraulics can boast. The action of this machine depends entirely upon the momentum that is generated whenever a body is put into motion, and its effect is so great as to give the apparatus the appearance of acting in defiance to the established laws of hydrostatic equilibrium; for a moving column of water of small height is made to overcome and move another column much higher than itself.

"The form and construction of the water-ram is shown at fig. 1. Suppose *o* to represent a cistern or reservoir, or the source of a spring, which is constantly overflowing and running to waste, by means of a channel a few feet lower than itself, as at the level line *pp*. Instead of permitting the water to run over the sides of *o*, let it be conducted to the level *pp*, by means of iron or other pipes, *qq*, connected with the side of the reservoir, and terminating by an orifice *r*, in which a

conical or other valve, *s*, is placed so as to be capable of effectually closing the pipe when such valve is drawn upwards: *t*, is an adjustable weight fixed on to the spindle of the valve *s*, by means of which the valve is kept down and open; any water therefore that is in the cistern *o* will flow down the pipe *qq*, and escape at the orifice *r*, so long as the valve remains down, but the instant it is raised and shut, all motion of the water is suspended. Thus situated, the adjustment of the weight *t* must take place, and by adding to or subtracting from it, it must be made just so heavy as to be capable of sinking or forcing its way downwards against the upward pressure of the water, the force of which will depend upon the perpendicular distance from the surface of the water in *o*, to its point of discharge at *r*, (represented by the dotted line *ov*.)

"But the water by moving acquires momentum and new force, and consequently is no longer equal to the column *ov*, to which the valve has been adjusted, but is superior to it, by which it is enabled to overpower the resistance of the weight *t*, and it carries the valve up with it, and closes the orifice *r*. This is no sooner done than the water is constrained to become stationary again, by which the momentum is lost, and the valve and weight once more become superior, and fall, thus re-opening the orifice and permitting the water to move again; and as the pressure of the water and the weight of the valve each become alternately superior, the valve is kept in a constant state of vibration, or of opening and shutting without any external aid whatever. Such is the principle upon which the motion of the water in the pipe *qq* is produced: but the momentum generated cannot be instantly annihilated; and it is not only of sufficient power to raise the valve *s*, but likewise to burst open the lower end of the pipe *qq*, unless a sufficient vent be provided by which this accumulated force can escape. Accordingly, a second valve *u* is placed near the lower end of the pipe *qq*, and is made to open upwards into an air-vessel having a discharging-pipe *x*; and, consequently, whenever the valve *s* is closed, the water, which otherwise would have flowed from the orifice *r*, now opens the valve *u*, and enters the air-vessel, until the spring of the contained air overcomes the gradually decreasing force of the momentum, when the valve *u* closes, and that at *s* opens to permit the water to make a second blow or pulsation, and in this way the action of the machine continues unceasingly without any external aid, so long as it is supplied with water and remains in repair.

"A small running stream is necessary for this machine, as the water at *o* should be kept at one constant elevation to insure the perfection of its action.

"A much greater quantity of water likewise escapes at the orifice *r*, between the pulsations, than can be raised in the delivering-pipe *x*, particularly if it extends to any considerable height, for the comparative quantity of water discharged through *x*, and permitted to run to waste at *r*, must always depend upon the respective perpendicular heights of the pressing column *ov*, and the deliverer or resisting column *ux*, and the rapidity of the pulsations will likewise depend on the same circumstances.

"A very insignificant pressing-column *ov* is capable of raising a very high ascending-column *ux*, so that a sufficient fall of water may be obtained in almost every running brook, by damming up its upper end to produce the reservoir *o*, and carrying the pipes *qq* down the natural channel of the stream until a sufficient fall be obtained for a considerable length of descending-pipes from *o* to *r*, is necessary to insure the certain effect of the machine, since, if the column *qq* is not of sufficient length, its water will be thrown back into the reservoir, instead of entering the air-vessel, which requires to be replenished with air, and this is admitted into it by the self-acting shifting-valve, shown at *b*, fig. 2, which is an enlarged view of the air-vessel in an improved form; its valve is made by a ball at *a*, having a bridle over it, to prevent its rising too high."

The hydraulic-ram was invented by M. Montgolfier, about the year 1797; from which time, down to the year 1816, a series of improvements have been made upon it, that have brought it into a state of great practical perfection. The pulsations of the valve vary from 50 to 70 in a minute.

When the fall of water *ov* is 5 feet, and the pipe *qq* 6 inches in diameter and 14 feet long, and the other parts duly proportioned, it will raise water to the height of 100 feet. It expends about 70 cubic feet of water per minute in working it, and will raise about two-thirds of a cubic foot per minute to the height of 100 feet. Professor Millington elsewhere observes, that one of these machines is said to have raised 100 hogsheads of water in 24 hours, to the height of 134 feet, by a fall of 4 feet and a half.

The *bélier hydraulique* is employed by many noblemen and gentlemen at their seats, in various parts of England, where

it may be seen in full work, affording the inmates of the dwelling a plentiful and continuous supply of one of the most useful necessaries of life.

Yours, &c. WM. BADDELEY.

Nov. 15, 1831.

FEMALE SKATING.

Sir,—Your correspondent, Mr. Macerone, must be totally unacquainted with the whims and vanities of the fair sex, to propose such an invention as appeared in your Number for last Saturday; for what lady would be seen skating on the Serpentine enclosed in a wicker bell? It would not only be highly ridiculous, but in a great degree dangerous, for supposing the fair skater were to be too venturesome, she would in the event of the ice giving way, find herself not a little incommoded by Mr. Macerone's bell. (Query, belle-coop?) It appears to me that skating is not an amusement *exactly* suited to a lady; but if her mind be bent on such masculine exercise, let her clothes be well padded with cotton, or some other soft substance, which will not attract particular attention, and at the same time will have the effect of breaking the force of her fall. A cape, formed of two pieces of silk, and stuffed with ground cork, (of which some were lately exhibited at the National Repository) might help to keep her afloat until assistance could be obtained.

Yours, &c. GEOFFREY WILKINSON.

Holborn, Dec. 20, 1831.

THE STEAM-NAVIGATION ENQUIRY.

We give in this Number, along with the remainder of the Minutes of Evidence, the Report of the Select Committee of the House of Commons, "appointed to take into consideration the frequent calamities by Steam Navigation, and the best means of guarding against their recurrence." We perceive from the Parliamentary notices, that this Report is to be immediately followed up by a Bill of Restraints and Penalties, and regret that want of room compels us to defer till next week, a statement of our reasons, for thinking this a most uncalled-for and mischievous proceeding. We shall, in the mean while, content ourselves with denying most positively, that any case has been made out for subjecting steam-vessels to any regulations to which sailing-vessels ought not to be equally subject. If the threatened Bill is but like the Report on which it is founded, we venture to foretel that it will be a most abortive affair. A worse drawn up public document than this said Report we never read; it is inaccurate, confused, contradictory, absurd; and, in point of language, absolutely barbarous.

HISTORICAL ANNUAL.

We are glad to learn, that another important addition to the useful Annuals will shortly appear under the title of the Cabinet Annual Register, and Historical, Political, Biographical, and Miscellaneous Chronicle, for the year 1831. It will correspond in size and appearance with Dr. Lardner's Cabinet Library. We like the design of the work, and have no doubt, that if compiled with care and impartiality, it will meet with a welcome reception.

NATURAL AND ACQUIRED DISPOSITIONS.

Sir,—When I read in one of Paley's works, that all individuals were born with equal powers of acquirement, I thought it the most unphilosophical observation I had ever seen; and one the most decidedly contradicted by facts. But our friend, Junius Redivivus, goes still further; he fancies that the dispositions of every animal is educational; and having travelled to Waterloo Bridge, and seen some beasts and birds of prey gorged to a state of sluggishness, and shut up in a cage with the animals they are most accustomed to feed upon, he goes home thoroughly convinced that by proper training a tiger might be rendered as harmless and as undesirous of blood as an unweaned calf. I have not the least doubt that with a little consideration, Junius would feel positively certain that a bramble might be cultivated into an oak tree.

I cannot pretend to know the feelings with which a tiger or a bull enters this world, or what appetite they may feel, or how far they may be capable of being influenced by education. Nor will I undertake to demonstrate the impossibility of feeding a pair of tigers upon grass until they brought forth young bulls. But