as the velocities will be in the inverse ratios to the forces, and the descending column of 120 inches must expend itself forty times to raise the ascending one to the height of twelve inches, as proposed :—

10 ft. or 120 in. × by 40 = 4800, lifting force or power.
400 in. × 12 = 4800, opposing force, resistance, or weight.

Here is an equilibrium, and nothing gained to overcome friction or the weight of the atmosphere on the piston of the pump. Were it possible to annihilate both friction and atmospheric weight, even then, unless the power exceed the weight, the power would not be a moving one.

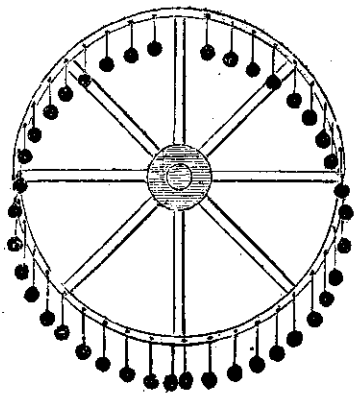
---

31. The Marquis of Worcester's Scheme of Perpetual Motion (vol. 13, 1830).—A correspondent, alluding to the construction of the Marquis of Worcester's invention, No. 56, says :—

The pretensions of the Marquis in his description of this wonderful piece of ingenuity may be very simply effected; that is, they may fall out to the distance of 1 foot in passing the vertex of a wheel of 7 feet radius, or, as he has it, 14 feet over; and, on the contrary, they would fall in passing the vertical diameter at the bottom, or, as he has it, on the lower side move a foot nearer. I shall give what I consider to come as near to the Marquis's plan as the words of his description can suggest to one who has travelled much farther than him in this mazy road. I have no doubt but the following drawing exhibits the principle of the Marquis's wheel. It will be observed that he particularly mentions the weights shifting their position in passing the diameter line of the upper and lower sides, meaning, as I have taken it, the vertical diameter (though the shifting may be made to take place in any part of the circumference on the opposite sides); but this circumstance most probably induced him to overlook that, though the horizontal distance was greater in the upper descending quadrant than in the lower ascending one, or opposite end of the respective diameters, still the reverse takes place in the remaining half of the wheel, and when

each weight has taken its new position at the shifting point, equilibrium is preserved.

I beg leave to add that it is not by such crude notions as this, or any other I have seen published as expositions in support of the prejudices entertained against this subject, that the question can be decided; I believe there are principles, could they be brought into action, which would effect the desired purpose, and the difficulty is mostly in the practical application.

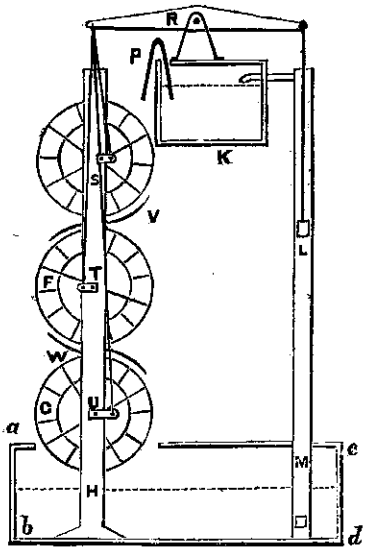


EXPLANATION OF THE ENGRAVING.—The diameter of the Marquis's wheel is 14 feet, and its circumference 44, very nearly, which, divided into 40 portions of 1 foot each, for the weights to move in, leaves 4 feet, or 48 inches, for the intervals of space to stay the weights, and allows of iron pins of about $1\frac{1}{6}$ in. in diameter, as represented; the rest of the figure needs little explanation. The mode of attaching the weights may vary; but as the Marquis's words are, "they hung," I have represented them as so doing in the grooves of the wheel on a pulley, running on the two rims of iron composing the circumference thereof; and if the weights are divided in two parts, one half being on each side the wheel, the lateral pressure thereon will be prevented. The only motion that would take place on this plan would be a vibra-

tion to the extent of about 10 degrees of a circle, on the wheel being slightly agitated either by design or accident, unless a moving force were applied in either direction sufficient to cause it to revolve on its axis. It is probable the Marquis designed that the space the weights moved through should be chords of the arc, or a direct line, and not portions of the circumference; still this alters not the case.

---

32. PERPETUAL WATER-WHEELS AND PUMPS (vol. 14, 1831).—A correspondent gives a description of a plan which he says he believes to be entirely original, and not without considerable claims to plausibility, thus:—



Let *a b c d* represent a wooden cistern, or trough, half filled with water; E F G, three overshot water-wheels, supported by the upright piece; H K is another cistern, or

trough, filled with water up to the dotted lines; P is a syphon to convey water from the lower to the upper cistern K; R is a beam supported from the cistern; S T U are moveable cranks attached to the horizontal shafts through the centre of the water-wheels,—each crank has a connecting-rod to the beam R; V W are two curved spouts to convey water from one wheel to another. It may be well here to premise that each water-wheel has a pump and beam, as only one is seen in the section.

Now, in order to put the machine in motion, it is only necessary to draw a portion of water from the syphon over the wheel E, which immediately revolves, consequently the pump L M draws water from the lower to the upper cistern K. Now, the water passing over the wheel E, is collected by means of the curved spout V, and is conveyed upon the middle wheel F, which also gives motion to another pump, and draws water in like manner. Again, the water passing over the middle wheel, is collected as before by another curved spout W; consequently, the lower wheel is put in action, accompanied with another pump. Hence it is obvious that three water-wheels and three pumps are worked by one stream of water from the syphon. What more is required to perpetuate its motion?

JOHN LINLEY.

Wicker Sheffield, May 28, 1830.

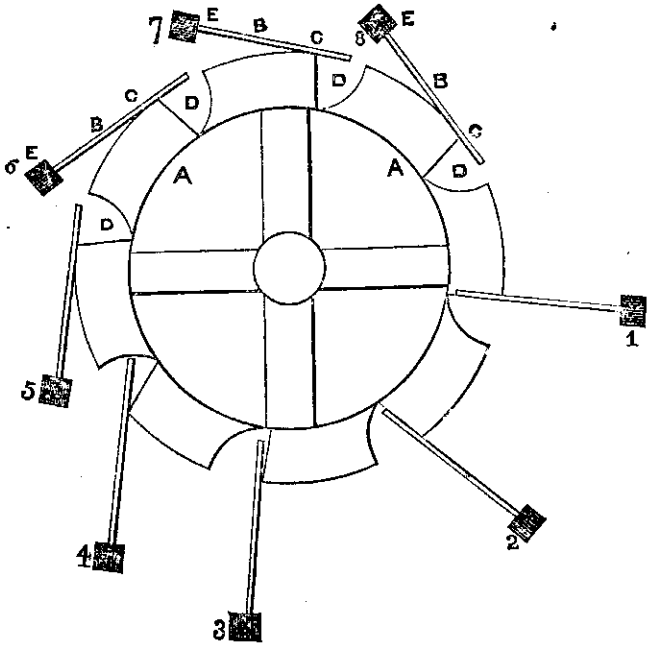
---

33. WHEEL AND WEIGHTS.—A correspondent (vol. 14, 1831) writes:—

The description of the design for a perpetual motion invented by the Marquis of Worcester, described in one of the recent numbers of your Magazine, has recalled to my mind an attempt of a similar kind which occurred to me some time ago, and which I have had by me ever since. It may cause some amusement amongst your readers, and may call forth the exertion of some ingenuity to discover the mistake under which I am labouring in supposing it to be perpetual.

DESCRIPTION.—A A A is a ring of thin wood; B B B, several spokes, moveable round the fixed points C C C, and only allowed to move one way by the construction of the openings D D D; E E E, heavy weights fixed to the ends of the spokes.

From the position in which the wheel is at present, it is evident that the weights on the right-hand side (1 and 2) acting at a greater distance from the centre than those



(4 and 5) on the other side, will cause that side to descend until the spoke 1 reaches the position 3, when it will exert no moving influence, but by which time the weight 8 will have fallen into the position 1, when a similar effect will take place, and so on with the rest.

---

34. SELF-ACTING PUMP.

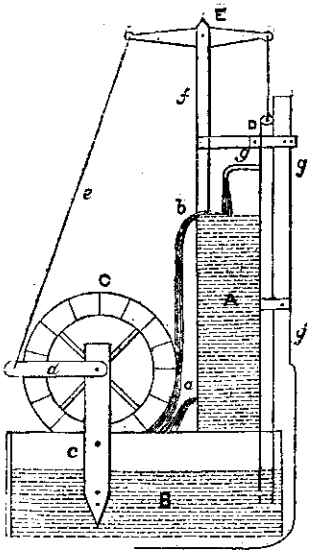
Observing that persons no less distinguished than Bishop Wilkins, the Marquis of Worcester, &c., have amused them-

selves with such things as perpetual motion, it may be some apology for a humble individual residing as I do in a very retired part of the country—scarcely within reach of much society—to confess that, by way of a little rational amusement and relief to the mind, I have at times, amid a variety of other investigations and inventions, amused myself, amongst the rest, with this of perpetual motion. The result I will, with your permission, lay before your readers. That I trespass upon your pages, you are indebted to your correspondent, Mr. Linley, whose invention, p. 104, vol. 14, I thought might partially lead to an anticipation of one of my own, a model of which I constructed a short time ago. The system which first came to my mind, as likely to lead to the accomplishment of perpetual motion, was that of the syphon; experimenting with which, opened discoveries that might prove useful in hydrostatics. Amongst these was a mode of equalizing the horizontal surface of the water in two separate vessels of different altitudes. The following sketch will afford an idea of my invention.

Let A be a vessel, having two orifices, one at the bottom of it, *a*, and the other open at the top for waste water, *b*, filled to the brim. B, a reservoir, so far filled with water as not to come in contact with the bottom of the great wheel C, whose axle turns in the wood *c*, attached to the side of the reservoir; *d*, a crank fixed to the axle of the great water-wheel, which turning moves up and down the rod *e*, attached to the beam E, which works the pump D, having its cylinder inserted in the reservoir B; *f*, an upright attached to the upper vessel A, to form a support for the beam E; the whole, together with the cylinder of the pump, being supported and tied together by the wood-work *g g g*.

To produce the motion, draw the plug from the orifice *a*, from which the water gushing out with considerable force will immediately turn the water-wheel, which communicating motion, by the crank *d* and rod *e*, to the beam E, will cause the pump D to be worked, the water from the spout passing into the upper vessel A. Now, the cylinder of the pump, if one only be used, must be of suitable dimensions, or the velocity of its movement so increased by means of a multiplying-wheel as to enable it to discharge water into the upper vessel A faster than the same escapes through the lower orifice *a*; consequently, the vessel A will soon overflow from

the capacious opening at *b*, to which a trough is attached, which collecting the waste water, causes it to descend also upon the circumference of the water-wheel; thus contributing to its movement, and at the same time tending to preserve an uniform supply of water in the reservoir for the continued action of the pump. Hence you have a perpetual motion, so long as the whole keeps in repair and in good order, which is all that can be expected of any perpetual motion, constructed as it must be of perishable materials.



But of what use are all the perpetual motion machines, if they can perform no other work than that of keeping themselves in motion? For it is evident, in the case of my machine, that if I wish to increase the power of the wheel, fixed as it is in size, radius, &c., I must increase the jet of water, and consequently the pumps must be made of corresponding dimensions, or exert a corresponding increase of

force or velocity to replace the water; so that it is evident, neither Mr. Linley's machine nor mine, in their present fixed state, can perform more than the simple operation of pumping their own water.

And this is the case with all the perpetual motion machines I have ever observed—they can exert no useful or disposable power beyond that of keeping up an equilibrium, or getting beyond the point of equilibrium. * *

Yours, &c.,

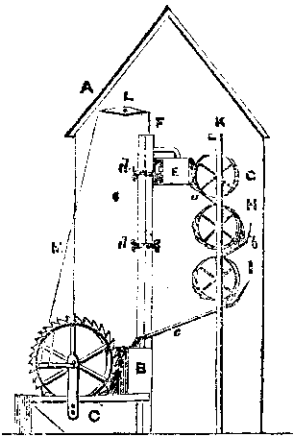
AUTHOR OF THE "VOICE OF REASON."

---

35. PERPETUAL WATER MILL (vol. 14, 1831).—The inventor says:—

I propose to endeavour to show how my plan of perpetual motion could be applied to practical and useful purposes. With a view to this, I give the prefixed sketch, with the following description of its construction and use:—Let A represent the side-wall or gable-end of a house, from 40 to 50 feet in elevation; B, a cistern, filled with water, having an orifice near its bottom, and another open at the top, for the ready escape of waste water, as before; C, a reservoir, so far filled with water as not to come in contact with the bottom of the water-wheel D, which, being an undershot wheel, may, of course, be of such radius as is suitable for the power required to raise the water. Let E be another cistern, filled with water, equal to and provided with orifices as in cistern B, both orifices together discharging water faster than it escapes from the lower orifice of the cistern B; F, two (or more, as the case may require) pumps, or expressing-fountains, supported against the wall by ties *d d*, and having their cylinders inserted in the reservoir C, and their lower suckers fixed at a little less than 32 feet above the surface of the fluid in the reservoir C. These expressing-fountains discharging their water into the cistern E a trifle faster than it escapes from its lower orifice, at an elevation of at least 33 or 34 feet above the surface of the water in the reservoir C, will afford space for water-wheels, supported against the wall by the upright K, say three water-wheels, G H I, of at least eight feet in diameter each, or two only of greater diameter. The upper wheel G being an undershot one, if not of greater radius

than four feet, which it might be, may have its axle fixed at an altitude of at least 30 feet, and allowing the space of a foot between each water-wheel for the troughs *a* and *b*, which collect and convey the water from wheel to wheel, will give a space of 22 feet, occupied by the three water-wheels, leaving 10 feet for the descent of the water by the trough *c* to the cistern B (which may be four or five feet in depth), and thence to the reservoir C, which may be three or four feet in depth; also the cistern E may be four or five feet in depth, and all of other corresponding dimensions *ad libitum*. To



produce the motion, remove the plugs or stoppers from the lower orifices of the cisterns E and B; the water rushing from the latter turns the great water-wheel D, which works the expressing-fountains into the upper cistern E; from the orifices of which, the water escaping turns the undershot wheel G (which may be of larger diameter, if required); whence being collected by the spout *a*, it shoots over and turns the wheel H; being collected by the spout *b*, it turns the overshot wheel I; whence being collected by the spout *c*, it is conveyed into the cistern B, from thence to the water-

wheel D, and, finally, into the reservoir C, from which it is raised again by the fountains into the upper cistern E; and so on as long as you please, or as long as the whole keeps in repair and in good order. The apparatus may with facility be stopped for convenience at any time without fear of derangement, because the fountains carrying water faster than it escapes from the lower orifices, the cisterns will be always full; and it may be again set in motion with equal facility. With the above proviso, it cannot stop till the prevailing natural causes which gave it motion—viz., the pressure of the atmosphere and the descent of water, which in their nature and tendency are of themselves perpetual—shall be diverted. Thus you may have the power, free and disposable, of three water-wheels in perpetual motion, to be applied to such useful purposes of machinery within the building as its inmates may require. A supply of water-mills might be thus provided in any situation—in the centre of the metropolis or other large towns—in places subject to a deficiency of rivulets suitable for mills on the common system. Neither would there be any necessity for resorting to rivers, or raising immense buildings upon their banks; wherever there was a convenient house, it might be readily appropriated with little further expense than machinery.

Yours, &c.,

Jan. 10, 1831. ED. "VOCIS RATIONIS."

A FEW REASONABLE CONSIDERATIONS addressed to the Author of the "Voice of Reason" (vol. 15, 1831).—Two correspondents offer the following remarks on the preceding plans. The first says:—

I have considered with attention the plan for a perpetual motion, invented by the author of the "Voice of Reason."

In the plan laid down by your correspondent, it requires one entire revolution of the water-wheel to produce a single stroke of the piston; and, by the same rule, the water expressed by one operation of the piston must furnish the

impulse for an entire revolution of the wheel. The pistonic operations might, indeed, be multiplied by the introduction of a pinion revolving to the water-wheel in the proportion of 2 or 3 to 1; but just in proportion to the number of revolutions made by the pinion, there must be an increased expenditure of momentum on the water-wheel,—it being an invariable law in mechanics, that what is gained in time is lost in power; therefore, there would be nothing, in reality, either gained or lost by this manœuvre.

We will suppose the barrel of the pump to be six inches in diameter, and that every stroke of the piston will produce a cylindrical column of water two feet in length. I put it to the good sense of your correspondent, whether it be possible to employ this inconsiderable force in such a manner as to cause a wheel of such magnitude to revolve with all its appurtenances, and a weight of water attached to it sixteen times heavier than the impulse.

If it be answered that a constant stream will be accomplished by the small aperture at the bottom of the cistern, I reply, this does not meet the objection; for a constant supply is only a succession of parts which do not push each other; and whether a portion of the water be suffered to gush out of an aperture at the bottom, or the whole be allowed to fall over the tumbling bay at the top of the cistern, no real advantage will be obtained, for no more than a two-feet column of water can be brought into action till the wheel has completed its revolution.

The wheel and crank being a lever of the first class, in order to balance a weight equal to 32 (the column of water in the pump) by a pressure equal to 2 (the water drawn by a stroke of the piston), the arms of the lever must be in the proportion of 16 to 1; now, to accomplish a two-feet plunge into the barrel of the pump, the crank, or short arm of the lever, must be one foot from the fulcrum, or axis of the wheel,—consequently, the radius of the wheel must be 16 feet (exactly the height of the pump); and then what becomes of the intermediate machinery of the three water-wheels, &c.?

If the radius of the wheel be increased, it must be raised higher; and I ask again, how can so feeble an impulse be employed to give an entire revolution to such a ponderous body resting on its axle? * * * *

The second gives the following demonstration of the impossibility of a Perpetual Water-wheel:—

"From this example you may see how desirous people are to reach their object in their own way—what need there often is of enforcing on them truths which are self-evident—and how difficult it may be to reduce the man who aims at effecting something, to admit the primary conditions under which alone enterprise is possible."—GOETHE.

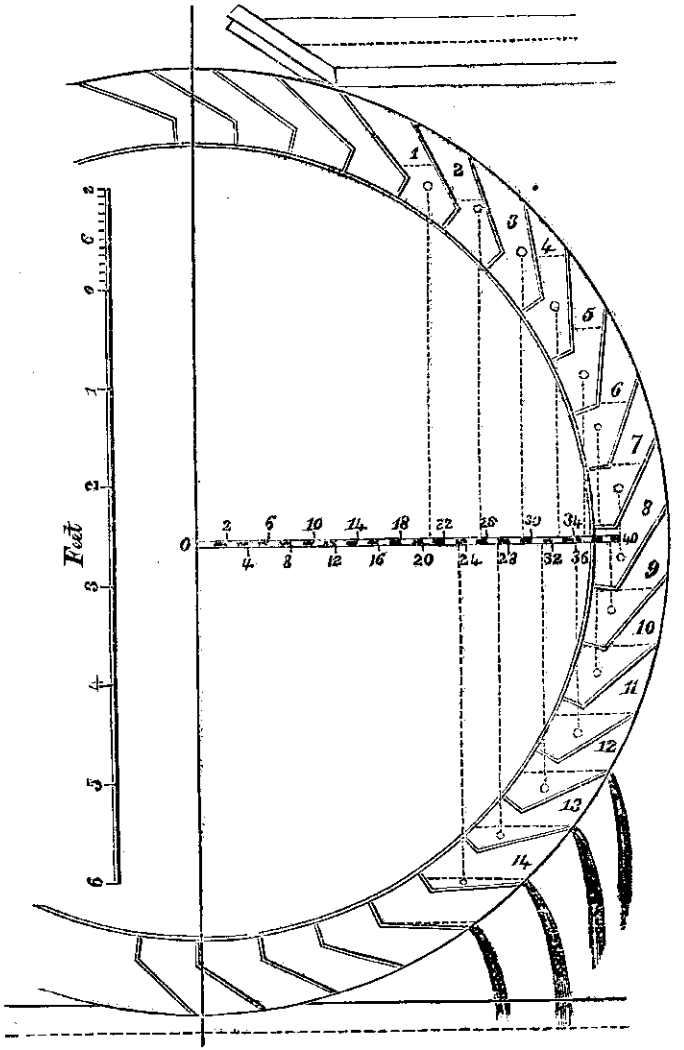
I am induced to make an attempt to demonstrate the utter impossibility, under any circumstances, of making a water-wheel that will supply itself instead of having any surplus power.

The accompanying drawing represents part of an overshot wheel in section, the buckets only part filled, by which the whole of the water expended continues to act through a greater portion of the circumference than it otherwise would do. The area of the vertical section of the complement of water to each bucket is made 40 inches; and taking the breadth of the wheel at, say $28\frac{2}{3}$ inches, gives 40 lbs. as the weight of water in each bucket; therefore, as there are 12 buckets containing 40 lbs. each, No. 13 30 lbs., and No. 14 only 20 lbs., altogether making a total of 530 lbs. acting on the wheel at the same time;—to show clearly all the effect that can be expected from this, I have divided the horizontal radius into a scale of 40 equal parts (there being 40 lbs. in each bucket); and from the gravitating centre of the fluid contained in each is drawn a perpendicular to the scale, where the effective force, or weight in each bucket, may be read off as on the arm of a common steelyard. The weights will be found as follows, viz.:—

No.	lbs.		No.	lbs.
1	$21\frac{1}{2}$	..	8	40
2	$26\frac{1}{4}$	..	9	$39\frac{1}{2}$
3	$30\frac{1}{2}$	..	10	38
4	$33\frac{3}{4}$	..	11	$35\frac{3}{4}$
5	$36\frac{2}{4}$	..	12	$32\frac{1}{2}$
6	$38\frac{1}{2}$	..	13	21 *
7	$39\frac{3}{4}$	..	14	12 *

It is therefore quite evident that, although we have 530 lbs. acting on one side of the wheel, a column of water weighing

* Two-thirds of the value of No. 13 and only half that of No. 14 are here taken, as the contents are respectively 30 lbs. and 20 lbs.


Fuß
0
1
2
3
4
5
6
2
4
6
8
10
12
14
16
18
20
22
24
26
28
30
32
34
36
40
1
2
3
4
5
6
7
8
9
10
11
12
13
14

446 lbs. re-acting at the same distance from the centre, on the opposite side, will exactly balance the whole 530 lbs. contained in the buckets; so that about a sixth of the expenditure rests on the axis without producing any useful effect, and the wheel so loaded must remain in a state of rest. Now, in spite of friction and the *vis inertia* of matter, if we suppose the wheel at work, it can raise only 446 lbs. at the expense of 530 lbs.; but even if it could raise the whole 530 lbs., we should then be but little nearer the mark, for we must remember that the gravitating centre of our power falls through a space of only 8 ft. 11 in., while the water must be raised at least 11 ft. before it could be laid on and delivered clear of the wheel.

As a further means of coming at the end I had in view at the commencement of this letter, I will conclude with a simple rule for calculating the quantity of water a wheel of this kind will raise:—Multiply the number of pounds expended in a minute by the height or diameter of the wheel in feet, divide the product by the height (also in feet) of the reservoir to be filled, and two-thirds of the quotient will be the answer required. Example, for the wheel above described, making six revolutions per minute;—

42 buckets on wheel.
6 revolutions per minute.

252 buckets filled per minute.
40 the weight of water in each bucket.

10080 lbs. expended per minute.
10 feet height of wheel.

11) 100800 momentum, dividing by 11 feet as the height of reservoir.

3) 9163·636 dividing by 3.

3054·545 multiplying by 2.
2

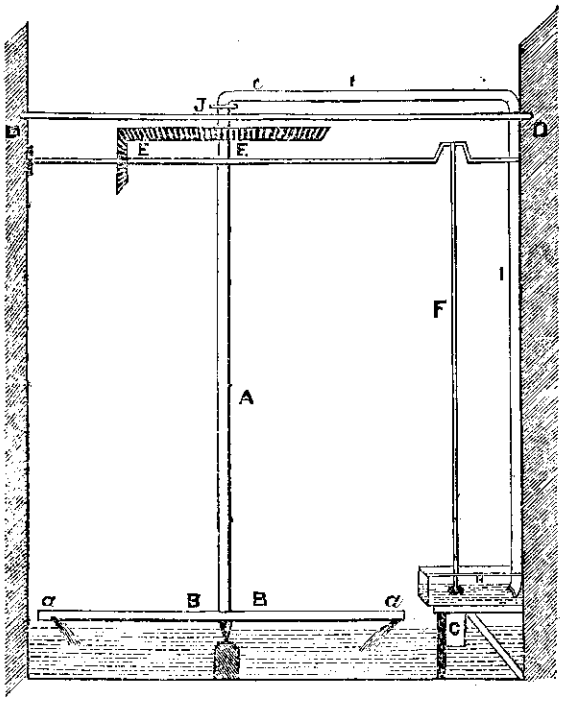
6109·09 answer in lbs.

So that for every 1008 gallons expended on the wheel, we only gain sufficient power to supply 611 nearly.

---

36. SCHEME OF AN HYDRAULIC MOVER, on the principle of Barker's Mill (vol. 15, 1831).—The inventor offers the ac-

companying sketch, with description, of an Hydraulic Mover, for communicating power to machinery, and recently invented by him:—



A is a hollow cylinder or pipe, forming the upright shaft of a mill on Barker's well-known and effective centrifugal principle.

B B, the lateral pipes from ditto; *a a*, the jets of water, whose centrifugal force gives the motion.

C, beam to support the machinery, built at each end into the wall D D.

E E, two cog-wheels to communicate the motion to

P, the rod of a pump (on Shalder's principle), which derives its supply from the well into which the water from the pipes is conducted, which it raises to

H, a cistern into which one end of a syphon, I I, is introduced, the other end of which is soldered with an air-tight joint into the top of pipe A, to which it thus supplies the water which is continually running from the pipes B B, producing a constant motion which may be given by carrying the horizontal rod F through the wall D, to machinery for any purpose. And, if the statement in the pamphlet on Hydrostatics, by the Society for the Diffusion of Useful Knowledge, as to the effect of Barker's Centrifugal Mill, be correct, the power gained must be very great.

The advantages of the invention are obvious. The whole of the machinery for a large factory may be contained underground, which, indeed, will be the most desirable situation for it, and valuable room will thus be saved; the expense of erection will not be great; and the saving in coals, &c., necessary for a steam-engine of the like powers, will be immense. I might, perhaps, have secured much benefit to myself by taking out a patent for the discovery, but I have no wish to profit by monopoly. All I desire is, that it may be recollected that the machine was invented by one who is

A JOURNEYMAN MECHANIC.

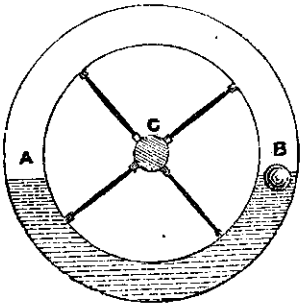
---

37. THE PARADOXICAL HYDROSTATIC BALANCE (vol. 15, 1831).—After describing it in one form, this correspondent applies it in another, observing:—

This hydrostatic balance, like the compound balance of Desaguliers, may be introduced to illustrate the impossibility of perpetual motion by a weight removed from the centre of a wheel.

Take the hollow-rimmed wheel A B; let it be air-tight and half filled with water. Let C be the axle; at B place a hollow ball loaded to near sinking. Such a wheel, however fine its axle may be, or however well lubricated, will not

make a single revolution, though the weight B occupies that part at which every deluded perpetual-motionist is desirous it



should be placed; concluding that, by such an arrangement, the production of another Orffyrean wheel must be inevitable.

---

38. A PROJECT (vol. 18, 1832). — A correspondent writes:—

Will you allow me a small space, to announce to the mechanical world a discovery I made upwards of ten years back, and which I now regret having so long kept to myself; but it has so much prejudice to contend with, that I had determined not to attempt to bring it forward until I could produce ocular demonstration of the fact. However, as constant employment in a totally different line of business will in all probability prevent my doing so for many years to come, I have resolved upon explaining the nature of it, and soliciting the advice of your readers on the subject. The discovery consists of a simple method of raising a weight, by the descent of an equal weight, to a height equal to the descent, which I believe has never yet been accomplished. But if that were the whole merit of the discovery, it would be of little consequence and less utility. The case is, however, otherwise, there being a considerable disposable power over and above what is required to bring up the weight. I am well aware that nothing short of ocular demonstration will

convince you and many of your scientific readers of the possibility of my statement being correct; but, if any of your numerous correspondents will point out a practicable method, whereby I can procure a moderate remuneration (bearing in mind that it is not in my power to take out a patent), I will engage to convince the most sceptical of the truth of what I assert.

---

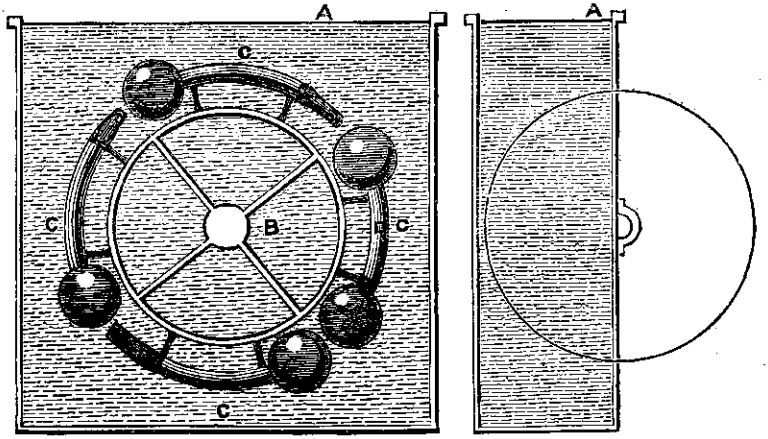
39. Two "certain" Plans for Producing Perpetual Motion (vol. 21, 1834).—A correspondent, under this title, writes:—

Very few young mechanicians escape being seduced into an attempt to produce a perpetual movement, by making gravitation counteract itself. They are not contented with being told by older men, that a cause can never be made to exceed its own power; yet gravitation is expected by them to lift up on one side more weight than sinks on the other, with some per centage of friction into the bargain. Nature, however, is too true to itself to be so taken in by all or any of the multitudes of various ways the inventive genius of man has contrived, and still keeps contriving, to circumvent her immutable laws, with no other effect than to render the case so complicated as to puzzle the judgment of the inventors, which ends usually in their firm belief that they have outwitted nature instead of themselves. I acknowledge that in my youth I was one of this class, and, for the benefit of the young, I beg to present you with two *certain* plans for producing perpetual motion, and compelling gravity to be frolicsome, and do more work than she ought.

Let A (Fig. 1) be a cistern full of oil or water, above 4 feet deep. Let B be a wheel; freely suspended within it, on its axle, let there be four wide glass tubes, 40 inches long, *c c c c*, having large bulbs, holding, say a pint, blown at the closed end. Fill these tubes with mercury, fix on an Indian-rubber ball or bladder, that will hold a pint, to each of them at the open end, and let them be attached round the wheel, as exhibited in the figure. As the pressure of 40 inches of mercury will exceed the atmospheric pressure, and also that of the four-feet column of water, when the Indian-rubber bottle is lowest, and the tube erect, as at D, the mercury will

fill it, leaving a vacuum in the glass bulb above. On the opposite side the mercury will fill the glass bulb, and the Indian-rubber bottle will be pressed flat, as will also be the case in the two horizontal tubes. Now, it is evident that the two horizontal tubes exactly balance each other; but the tube D, with its bulb swelled out, displaces a pint of water more than its opposite tube, and hence will attempt to rise with the force of about one pound; and each tube, when it arrives at the same position, must produce the same result, the wheel must have a continual power, equal to about one pound, with a radius of two feet.—Q.E.D.

(*Fig.* 1.) (*Fig.* 2.)



Let Fig. 2 represent a light drum of wood—one half of which is inserted into a cleft in a water-cistern A, which fits it, and from which the water is prevented from escaping by a strip of leather, which the water presses against the drum, and which thus operates as a valve, without much friction (especially if oil be substituted for water in the cistern). Now, as this drum is much lighter than water, it must ever attempt to swim, and thus, in perpetually rising, cause the drum to revolve forcibly round its axle.—Q.E.D.

I tried this last method thirty years ago, but it was so

obstinate as not to move one inch at my bidding, though it obviously is proved, to demonstration, that it ought to have gone on swimmingly. I have just heard that an Italian gentleman has hit upon the same plan; so it seems that the mania is not confined to England.

[The remarks of a correspondent respecting the foregoing, called forth the following observations from the Editor:—]

We think our correspondent, S. F., has entirely misconceived the scope of the playful account, given in our last number, of two plans of perpetual motion. The object of the writer seems to have been, to impress on the minds of young mechanicians the folly of wasting their time in vain endeavours to render the effects of causes greater than the causes themselves; or, in other words, to gain power out of nothing —a process without limit or value, were it not cut short by the want of all limit to its folly; and this he could not, perhaps, have done in any way so well, as by exhibiting a couple of infallible perpetual movers that would not stir at all, though they bade as fair for it as any of their kindred.

---

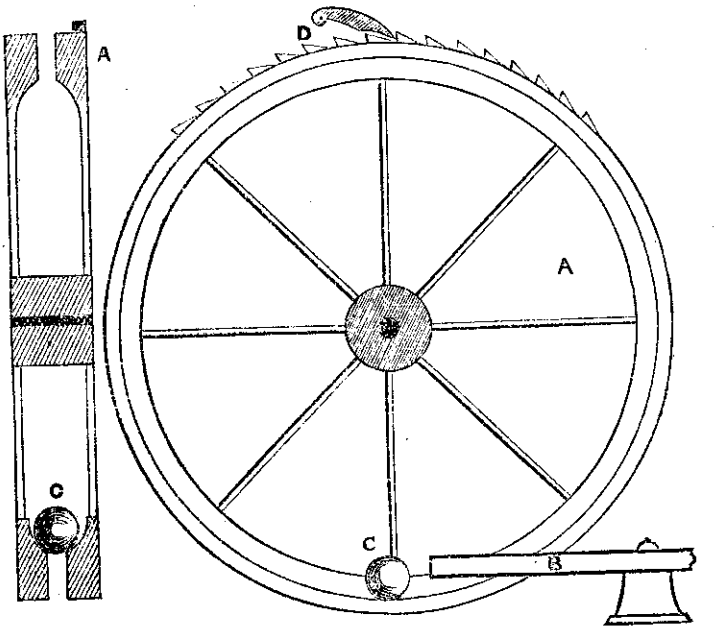
40. Essay at Perpetual Motion (vol. 26, 1836).—F. S. Mackintosh says:—

I herewith forward you a description of a machine which was constructed by me in the year 1823, with a view to produce a perpetual motion. With this machine, and the studies necessarily connected with it, first originated the suspicion that the planets could not continue in motion unless they gradually approached the centre of attraction.

In the first place, let us describe the machine. Fig. 1: A is a sectional view of the interior of the wheel, which is formed in two halves upon one shaft; each half or section is furnished with a projecting ledge, and an opening is left between the two ledges sufficiently wide to admit of a magnet being introduced between them, by which arrangement the magnet may be brought as near to the ball as may be necessary (see Fig. 2). B is a magnet, whose line of attraction acts at right angles with the line of gravity. C is an iron ball, under the action of two forces. The magnet continually drawing the ball up the inclined plane within the wheel, and gravity continually drawing it to the bottom, by their united

action it was supposed the wheel would revolve for ever, or till it was worn out; upon the same principle that a wheel revolves by the animal force or muscular action of a mouse or squirrel, which carries it up the inclined plane, whilst it is

(*Fig.* 2.) (*Fig.* 1.)



continually drawn to the bottom by the action of gravity, thereby causing the wheel to revolve by the weight of its body. The model was taken from the earth's motion round the sun; and the following process of reasoning seemed to justify the assumption that the wheel would move on till it was worn out:—

"The earth is carried round the sun by the action of two forces, one of which is momentum, which is not, in reality, a force or cause of motion, but an effect derived from an original

impulse; and that impulse, or the momentum derived from it, is not destroyed, because there is no resistance to the moving body—that is, there is no friction. Well, I cannot make this machine without having resistance to the motion—that is, friction; but to compensate for this, I have two real forces, two causes of motion, each of them capable of imparting momentum to a body: they are both constant forces; and from one of them, the magnet, I can obtain any power that may be required within certain limits."

This reasoning appeared conclusive, and the wheel was made; but when the magnet was applied, instead of the ball rolling up the inclined plane, the wheel moved backwards upon its centre. It occurred to me, that by placing a small ratchet upon the wheel, as shown at D, this backward motion of the wheel on its centre might be prevented, in which case the ball must roll up the inclined plane, and that a perpetual motion might then ensue; but this ratchet I never tried, having about that time begun to perceive that the idea of a perpetual mechanical motion, either on the earth or in the heavens, involves an absurdity; and that, therefore, the motions of the planets must necessarily carry them continually nearer and nearer to the centre of attraction.

TRIAL OF THE FOREGOING PLAN (vol. 26, 1836).—By R. Munro, who says:—

The result of Mr. Mackintosh's essay at perpetual motion might be attributed to the avoidable friction caused by the manner in which the iron ball is placed in the wheel. Curious to try the experiment, I proceeded, and, with the view of diminishing the friction, I placed two wheels on the axis of the ball, but the result was precisely that described by Mr. Mackintosh. I next applied the ratchet, as suggested, but with no better effect; the ball rolled towards the magnet, but did not give the required motion to the wheel. It is not unlikely, then, that the present ingenious attempt will not be realised.

---

41. AN ATTEMPT AT PERPETUAL MOTION (vol. 44, 1846).—An "Amateur" writes:—

The account of an attempt to realise this idea, though a

failure, may not be wholly uninteresting, as not only may experience be gained even from errors, but also trouble saved to others in enabling them to avoid them. Suppose, then, that the buoyancy in water of a flat piece of wood, when its surface lies either horizontal, or more or less so, is greater than that of a similar piece when perpendicular. Connect two thin floats of wood by a slip of wood turning on a centre; the floats joined to the connecting strip by hinges, so that the one descends on one side edgeways, but the other in its rise doubling up inwards against the connecting strip, draws down the other below its own level; at which point the power appears to be gained. Now, more floats added, equal on both sides, it might be supposed that they would draw one another round the extreme lowest point, and thus a continual rotary motion be produced; the same thing becoming alternately the greater and less power. Such, however, on experiment, proves not to be the fact.

Section IV.—*Claims to Discovery.*

1. Alleged Discovery of Perpetual Motion.—A correspondent in "Drakard's Stamford News" makes the following communication:—"Since the death of Sir Isaac Newton, it has been the study of thousands of little and contracted minds to discover the long-wished-for perpetual motion; but, doubtless in consequence of Sir Isaac's opinion, the completion of the thing has scarcely ever engaged the mind of a philosopher. However, when he has been immortalized for one century (which will be on March 20th, 1827), your present correspondent, a friend to society, will offer to the public (on contribution of the promised sum*) a motion that will then have continued eleven years. For its completion he has spared neither time nor expense, and, above all, has omitted that which the vulgar ever found to decay. It consists of that which is not foolish or nonsensical, such as springs, balance, and weights, but of materials which will continue a century as well as one day. No weight is too

* A vulgar error, we suspect. We know of no sum that is promised. —Ed. "Mec. Mag."

immense for its motion, and the mechanic's art shall be baffled at its velocity."—["Mec. Mag.," vol. 1, 1823-4, p. 252.]

---

2. A PERPETUAL MOTION ADVERTISED.—This subject has so frequently occupied your attention, and that of your contributors, that the following advertisement in the "Edinburgh Courant," 15th December, 1707, may probably be thought worthy of a corner in your valuable work:—"These are giving advertisement that in pursuance of some overtures given in by Mr. Robert Stewart, Minister of the Gospel, in January and February last, in the 'Edinburgh Courant,' concerning the *perpetuum mobile*, and for the further satisfaction of mankind, and clearing their scruples, anent the same; there was a curious model made at the charge of John, Earl of Breadalbane, which model will demonstrate the possibility, probability, and practicability of these three new discoveries, viz.: Firstly, a balance, by which an equal overcomes an equal at the same time. Secondly, that being granted, a weight always going down, and never going lower. Thirdly, these being granted, a clear idea of the *perpetuum mobile*. If any man doubts any of these propositions, the model is brought to town," &c., &c.—[Vol. 9, 1828, p. 432.]

---

3. ALLEGED DISCOVERY OF PERPETUAL MOTION BY RICHARD VAN DYKE.—(From the "Philadelphia Gazette.") —We were much gratified yesterday with the result of an examination of a self-moving machine, which may be seen at Bowlsby's Merchants' Hotel, in Slater Street, and which the inventor calls a perpetual motion. We have no doubt of its being nearer a perpetual self-moving principle than any invention that has preceded it, and as near as any we shall ever see. The great merit, aside from its practical uses, is its simplicity, and the certainty and readiness with which you perceive that it covers no trick or deception. It is little less than an illustration of one of the most obvious laws of nature. The agent is the atmosphere, bearing directly, by means of perpendicular boxes and oblique tubes, upon the buckets of a wheel, which is propelled with greater or less

velocity, but which is constantly propelled, and will continue to run, without the possibility of cessation, while the materials of which it is composed last, and the present laws of nature continue. The inventor is Mr. Richard Van Dyke, of Orleans county, in this State, who gives it as the result of five or six years' application to the subject. He is a venerable man, communicative and intelligent, and described as highly respectable by several citizens of the West, on whose representations entire reliance may be placed. He affects no mystery, but clearly and satisfactorily explains the arcana of the machine."—[Vol. 12, 1829-30, p. 55.]

---

4. ALLEGED DISCOVERY BY R. W. FRANKLIN.—I have read a great deal in your Magazine about perpetual motion, and have studied this disheartening question many years before your work began. In No. 319, I see there is an account of a perpetual motion invented by one Richard Von Dyke, of America. I do not suppose any one can understand what that machine is from such an account; but no doubt it was the best you was able to procure. I verily believe that I invented the same thing a few months ago, but was prevented from putting it to the test of experiment by great troubles in my family. If a few of your correspondents will favour me with their addresses, I will appoint a time and place to have their united opinions on my scheme. But I hope no one will apply to be of the number who does not know something about pneumatics: I do wish that person to be one who wrote on the subject, page 399, No. 312.—I remain, Sir, your humble servant,

R. W. FRANKLIN.

North Place, Wilsted Street, Somers Town.

P.S.—When the gentlemen have examined my drawings, I wish some one of them to give your readers an account of it.—[Vol. 12, 1829-30, p. 192.]

The following is from the same claimant:—

I have within the last three months made very great improvements in my plan, so as to increase its power fifty times, that is, by making the wheel to work in water only, instead

of water and air. Success is certain. Its power may be as easily calculated as the common overshot water-wheel, and a wheel on this plan may be made of fifty-horse power. Twenty years ago I had a good working knowledge of the five mechanical powers, and was always of opinion that a self-mover could not be made by any of them. I determined never to look for it anywhere but in the sciences of hydraulics and pneumatics. I had a short correspondence with Lord Stanhope on this subject in the year 1815. I have began to make my machine, and can defray the expense myself; it is now half finished; but I shall want the assistance of some person of property and ability to take out a patent. As I am obliged to proceed slowly, I think I had better look for that assistance at once. My machine will, in eight cases out of ten, abolish the steam-engine, and will not cost twenty shillings to work a year.

You have my address, and will probably be kind enough to take charge of any letters which may be addressed to me. —I am, &c., R. W. FRANKLIN.

August 29, 1830.

P.S.—If all my expectations are realised, it will be the most important invention this country can boast.—[Vol. 14, p. 13.]

---

5. SELF-WINDING CLOCK.—The "Connecticut Register" states that a person in that State has invented a clock which winds itself up, and keeps correct time, and strikes the hour regularly, and will continue to run until worn out, without the application of any power external to itself.—[Vol. 12, p. 255.]

---

6. WRIGHT'S PERPETUAL SPHERE.—It is related in Hutton's Dictionary that Edward Wright, the mathematician, made for his pupil, Prince Henry (son of James VI.), a large sphere, and "there was in it a work for a motion of 17,100 years, if it should not be stopped, or the materials fail." "This sphere," it is added, "though thus made at a great expense of money and ingenious industry, was afterwards, in the time of the civil wars, cast aside amongst dust and rubbish, where it was found, in the year 1646, by Sir Jonas

Moore, who, at his own expense, restored it to its first state of perfection, among his other mathematical instruments and curiosities." Query, Is this curiosity still extant?—[Vol. 15, p. 288.]

---

7. SELLERY'S HYDRAULIC SELF-ACTING ENGINE.—Mr. Charles Doyne Sellery has invented a new engine, which he terms the "Hydraulic Self-acting Engine." It works by the pressure of the atmosphere, and is said to possess a power equal to six times that of the steam-engine! Another remarkable character of this powerful engine is, that it neither requires fire, wind, nor water; and when once set going, works without any assistance whatever!—*Exeter Flying Post.* —["Mec. Mag.," vol. 17, p. 224.]

---

8. BUCKLE'S PERPETUAL MOTION.—A correspondent in North Berwick writes as follows:—"Mr. William Buckle, a respectable tradesman of this place, has, after many years' close study and observation of the celestial bodies, discovered the perpetual movement. He has not only discovered wherein longitude consists, but longitude itself to an azimuth. He has prepared tables by which his calculations can be carried to any extent, and by which he can, at any time, and under the most unfavourable circumstances, ascertain the longitude with the same facility and correctness as latitude is at present by the nautical instruments now in use. These latter are entirely superseded by the use of an instrument constructed by himself, of the most simple description. He has every confidence in being able to explain and defend the principles and correctness of his discovery to any one, and is, at this time, endeavouring to bring it under the notice of Government."—*Scotsman.*—["Mec. Mag.," vol. 19, p. 368.]

---

9. TOWNSEND'S PERPETUAL MOTION.—The announcement in our last number, by Mr. Wm. Pearson, that he has discovered a veritable perpetual motion, has brought us another to the same effect from a gentleman who, like Mr. Pearson, disdains to "shrink behind an anonymous signa-

ture," and glories (or hopes to glory) in the name of Thomas Townsend, of Chancery Lane, London. He twits Mr. Pearson with having never tried whether his machine would really go for ever—(Is not this asking too much?)—and says that he has actually made a model of his which has worked so well that he means forthwith to make one on a larger scale.—[Vol. 20, 1834, p. 304.]

---

10. Dr. Stringfellow's Perpetual Motion.—By the "Georgia (American) Messenger," we learn that a Dr. Stringfellow, of Macon, has actually discovered the long-sought and never-before-found perpetual motion. The Editor thus partially describes it:—"The machine is very simple, the whole consisting of a very few pieces, yet comprising the most ingenious and the most perfect principles of mechanism. It is comprised within a square frame of about eighteen inches, and the parts consist only of two perpendicular spindles and two horizontal cog-wheels, a trundle-head, three small suspension chains, a spiral spring and weight, and a small inclined plane."—*Weekly Chronicle.*—["Mec. Mag.," vol. 27, 1837, p. 160.]

---

11. Extraordinary Mechanical Invention.—A gentleman at Milton-next-Gravesend, who for many years carried on an extensive business at Ramsgate, after eleven years' study has succeeded in completing some machinery which will, when brought into use, he imagines, supersede the use of steam power. It may, he thinks, be applied to clocks of any description, requires no winding up when put together, and will continue going so long as the materials last.—(Correspondent of the "Times.") The writer of this announcement might, quite consistently, have added at the end of it—"and for some time after."—"Mec. Mag.," vol. 38, 1843, p. 48.]

---

12. Joseph Hutt's Perpetual Motion Machine.—A correspondent of the "Midland Counties Herald" says:—"A framework knitter of Hinckley, named Joseph Hutt has,

after twenty years' application and study, completed a machine which he calls a 'self-moving machine,' or 'perpetual motion.' He set it in motion the 26th August last, since which time it has continued to work with the greatest regularity. The motions of the machine are both quick and powerful, and may be greatly increased, and applied to any purpose. It does not require the aid of steam or any other power to keep it in motion, having one continual and regular movement of its own. Hutt, who is a poor man, is anxious to obtain assistance to enable him to test still further the value of his invention."

The best thing which the friends and neighbours of this "poor man" could do for him would be, to make him a present of some standard work on mechanics—(say Gregory or Moseley)—from which he would learn that the object he is aiming at is a positive impossibility.—[Vol. 47, 1847, p. 463.]

---

13. HENDRICKSON'S DISCOVERY OF PERPETUAL MOTION, IN AMERICA.—The following is an extract from the "Times" of Thursday:—"Mr. J. G. Hendrickson, of New Jersey, announces the discovery of the principle of perpetual motion. The success is obtained by the employment of arms and balls attached to a cylinder so as to keep the extra weight always on one side, and, therefore, to give the cylinder a constant inclination to turn round. The machine requires no starting. Take away the blocks, and it goes off like a thing of life. The 'Journal of Commerce' says of it:—'The model was in our office yesterday, and attached to some clockwork, which it turned without once stopping to breathe. We see no reason why it should not go until worn out! After a careful examination, we can safely say, in all seriousness, that the propelling power is self-contained and self-adjusting, and gives a sufficient active force to carry ordinary clockwork, and all without any winding up or replenishing.'" —[Vol. 61, 1854, p. 326.]

PERPETUAL MOTION—PATHETIC STORY OF ITS INVENTOR, HENDRICKSON.*—About fourteen years ago we

* This account, from an American paper, is here introduced to complete the foregoing article.

published the first description of a machine invented by Mr. James G. Hendrickson, of Freehold, N. J., "to go of itself." A model, which Mr. H. has made, after patient whittling for forty years, was brought into our office, and we found that it would go without any impulse from without, and would not stop unless it was blocked. The power was self-contained and self-adjusted, and gave a sufficient force to carry ordinary clockwork without any winding up or replenishing. In short, we saw no reason why it would not go until it was worn out. The inventor was an old man, who had spent his whole life in pursuit of the object he had now attained. He was invited to be present at various fairs and exhibitions of new inventions, and wherever he went, his machine formed one of the chief attractions. The professors were all against him. Accordingly, Mr. H. was seized at Keyport, N. J., for practising "jugglery," under the "Act for suppressing vice and immorality." To expose the supposed trick, an axe was brought, and the cylinder splintered into fragments. Alas! for the philosopher, there was no concealed spring, and the machine had "gone of itself." (He made a new machine.) His model once more completed, was constructed of brass, hollow throughout. (He sent a working model to the Patent Office, Washington.) The moment the blocks were taken out, the wheels started off "like a thing of life;" and, during ten months, it never once stopped. The inventor had perfected two new machines, and made a very comfortable livelihood exhibiting them, prosecuting his efforts meanwhile to secure his patent. Age crept upon him, however, before this point was reached; and last Saturday afternoon he breathed his last at Freehold. The night after his death his shop was broken open, and both models stolen. Fortunately, the drawings are preserved, and there is a little machine, one of the earliest made, now running in Brooklyn, where it has kept up its ceaseless ticking for nearly twenty years.—*New York Journal of Commerce.*—[Abridged from the "Scientific American," New York, 26th November, 1859, the Editor of which states:—"We saw the self-same story going the rounds of the press some eighteen months ago, and it is now revived with the sad intelligence of the inventor's death."]

---

14. CHENHALL'S PERPETUAL CLOCK.—[The following

letter is from a gentleman of undoubted honour, and who is above all interest in the ingenious tradesman of whom he writes.—Eds. M. M. :—]

I believe it has been the custom, from time immemorial, among nine-tenths of our scientific people, to view the hitherto occult theory of perpetual motion as a chimera, and to regard the remaining few, who will still, night after night, expend their midnight oil in efforts to bring the said occult principle to light, with as little sympathy as those who once dreamed away the better part of their existence while groping for the philosopher's stone.

In a small out-of-the-way street of Plymouth (Drake-street) there is exhibited, in the shop-window of a watchmaker named Chenhall, a clock of the size of an ordinary eight-day clock, with a novel and exceedingly simple movement, and which, simple as it appears, is nevertheless said to be gifted with the property of going as long as the durability of the materials permits, without the aid of weight or spring; in short, without any manual assistance whatever.

I beg to state that I have no personal interest in the affair whatsoever, nor am I even acquainted with the nature of the unseen agency which has been called in by Mr. Chenhall to effect his purpose, and which the latter does quite right in concealing from public view; but this I know, that the hidden part occupies but a very small space, and that one glance at the mechanism which is visible, seems to me sufficient to satisfy the most sceptical that Mr. Chenhall's assertions may be relied on.—A Subscriber. Plymouth, May 1, 1858.—[Vol. 68, 1858, p. 447.]

Section 5.—*Impostures.*

Perpetual Motion Impossible.—An impostor exposed. —A correspondent, who signs "Mactaggart," makes, among other, the following reflections on perpetual motion:—

* * * In vain did the ancient Egyptians employ their black arts to find it out; in vain did the mathematicians of the school of Alexandria club their thoughts together respecting it. * * * *

Yet, though this dark secret has never been found out, nor ever will, it has been of mighty use to the advancement of the arts; for mankind, in searching for it, have found many other things of very great value. * * *

Mystery has ever been a thing of great value to mankind; it is indeed the mother of curiosity. * *

Since, now-a-days, to all informed minds, perpetual motion seems at once a thing of entire impossibility to find out, it must surely be a great folly in any artizan or man of genius to waste his days and his substance in order to make the discovery: the thing is Nature herself, on one of her grandest scales; it is the utmost presumption, therefore, in man to dare to mimic her. The ocean, as it ebbs and flows, is a perpetual motion; death and life on the earth also are the same thing; and obvious to all are the ever-wheeling orbs in the firmament of heaven.

The Almighty has wisely ordered that nature should ever be in continual motion, never stable; the continual movement is therefore an invention of the Deity, for his rational creatures to contemplate and do little else with, as the causes by which it is actuated are concealed from our feeble comprehensions in impenetrable darkness: we may say they are gravity, attraction, and so forth; but what these are we know not; they are only names we give to causes, whose properties are unknown—the workmen, we may say, who do stupendous things, which set us a wondering, but to whom we are entire strangers. * * * * *

However, let us farther treat of man trying to imitate with his arts this grand moving spectacle of his Creator. The nearest approach he has ever made towards it (though, at the same time, we say it is just as far from it as any) is the simple pendulum; and were it possible to swing it free of friction, in a complete vacuum, it is likely the thing would be accomplished; but as this is not possible, a continual motion cannot be obtained.

Many have fancied that the elements of nature may be so brought to act on each other, that a movement of this kind may be had; but these trials, one after the other, have all failed; perhaps efforts with magnetism have oftener been tried than any, as it has both the virtue of attraction and repulsion; but these have been attended with no greater success than the rest, though many impostors have appeared

from time to time, who have reported that they had, with deep study and much difficulty, found out the important secret.

One of those quacks, a few years ago, so far imposed on the good people of Scotland, who inhabit the country places and small villages, with an article which he had made, purporting to be this famous motion, that he extracted a good deal of cash out of their pockets, by its exhibition. At length he had the hardihood to go to Edinburgh, the modern Athens, with it. Instantly his puffing handbills brought hundreds about him, all anxiously wishing to have a sight of the wonderful machine. Amongst others who paid to get in to behold it, was an ingenious young artist, who, after looking at it for a little while, like the rest, requested very politely the inventor's leave to examine it in his hand. It was a beautiful thing, certainly, to look at. An inverted glass bulb, about six or eight inches high, and about five in diameter at the mouth, was placed on a mahogany bottom, about the one-fourth part of an inch in thickness, round the side of the glass; in the interior stood six pieces of metal, which went under the name of magnets; in the centre of the whole, on a delicate pedestal, was seen something rather thicker than a needle, moving slowly round: and this was the perpetual motion.

The young mechanic began his observations upon it by examining minutely with a microscope round the thin edge of the mahogany bottom, and was not long before he found something like a hole, with a stop very neatly put in it; this stop he soon extracted, and holding it up to the crowd, said, "This is the place by which the key is inserted, that winds up a thin coiled spring, by which the motion is kept apparently perpetual."—[Vol. 1, 1823-4, p. 253.]

A Perpetual Motion Imposture, from America.—A person "just arrived from the United States of America," is going the round of our provincial towns, exhibiting what he styles "one of the grandest pieces of mechanism that was ever presented to the world," being nothing less than the "perpetual motion which was long sought for by the great Sir Isaac Newton, and since by men of all nations of the

very first talents in the arts and sciences." "This grand machine" is said to have worked ever since it was first invented—upwards of seven years—and will continue to work without any assistance whatever, but by the power of its own gravity, balance, and pivots, as long as the world stands; or, in other words (if the materials it is made of would last), for ever!" We are further assured "that it has been exhibited in the United States, and all the principal towns in the West India Islands; and is allowed, by men of genius, and by those who are acquainted with mechanical powers, to be one of the most wonderful and extraordinary pieces of machinery that was ever invented in the world, reflecting the highest credit on the inventor, for his patience and perseverance for upwards of fifteen years study on this invention."

The "inventor" of this wonderful wonder having lately honoured the city of Norwich with a visit—for "a short time" only, however, while he "waits the decision" of the Royal Society of London, to whom he has applied for "the premium offered by Government" (there is no premium)—the mayor thought proper to direct a friend in London to inquire whether Mr. Perkins knew anything of this American prodigy.

Mr. P. told the inquirer that he had once actually travelled 400 miles in America to see a piece of mechanism which he believed to be similar, but that having found it to be all a deception, it had been broken to pieces by the populace.

An intelligent correspondent at Norwich, who examined the apparatus, has explained to us pretty clearly in what the deception consisted; but without an engraving (which would be thrown away on such a piece of trickery), his deception would not be intelligible to our readers.

It may suffice, for the information of our country friends, to mention that the concealed cause of motion is thought to lie in the plinth, and that it seems to consist of "machinery attached to the lower part of the trundle, worked by a spring like the pocket-watch. The "planes, &c., upon the wheels are mere gew-gaws, to divert the attention from the real cause."—[Vol. 2, 1824, p. 361.]

ADAMS' PERPETUAL MOTION IMPOSTURE.—I beg to inform you of a Scotsman, much marked with the small-

pox, and whose name, according to his handbills, was Adams, about two years since exhibited, for eight or nine days, his pretended perpetual motion at this place, and, I believe, took the natives in for fifty or sixty pounds. Accident, however, led to a discovery of the imposture. A gentleman, viewing the machine, took hold of the wheel or trundle, and lifted it up a little, which, I suppose, disengaged the wheels that connected the hidden machinery in the plinth, and immediately he heard a sound similar to that of a watch when the spring is running down; the Scotsman was in great anger, and directly put the wheel into its proper position, and the machine again went round as before. The circumstance was mentioned to an intelligent person, who determined to find out and expose the imposture, and took with him a friend to view the machine; they seated themselves one on each side the table upon which the machine was placed; they then took hold of the wheel and trundle, lifted them up a little; there being some play or liberty in the pivots, directly the hidden spring run down. They continued to hold the machine in spite of the endeavours of the Scotsman to prevent them. When the spring had run down, they placed the machine again on the table, and offered the Scotsman fifty pounds if it could then set itself going. Alas! notwithstanding his fingering and pushing, it remained motionless. A constable was sent for, the impostor went before a magistrate, and there signed a paper confessing his perpetual motion to be a cheat. He was suffered to go at large upon promising to leave the town.—[Vol. 3, 1824-5, p. 364.]

THE FINCH LANE PERPETUAL MOTION IMPOSTURE.—I observed some time back in your excellent work, a supposed refutation of what was stated to be a perpetual motion, by a man in Finch Lane. This man stated that he could stop the machine (merely a ball hanging to a long spring), and that it would set itself agoing without his interference. The machine certainly did this, and at first puzzled me a good deal; and the reason of my writing to you now about it, is to expose the imposition in the proper manner. I may here remark that the man has shown considerable ingenuity (as I believe the idea to be quite new), though he certainly is an impostor. Below the ball was an orifice, and through this, the air from

without the room was conducted immediately upon the ball, which it set in motion, and continued to accelerate, until it had received, by continually passing over the hole, the full effect of the stream of air. The weather being warm, and yet observing a fire in the room on both my visits, was what led me to the discovery; and on endeavouring to keep open the door by which I entered, the man interfered; but I did so long enough to lessen considerably the motion of the ball, by partly destroying the current of air.—[Vol. 4, 1825, p. 302.]

REDHŒFFER'S PERPETUAL MOTION IMPOSTURE.*—In the year 1813, a belief in the delusive principle of perpetual motion was created throughout a considerable portion of the community of the United States, by a deceptive machine, constructed by one Redhœffer, and had gained sufficient character to induce an inquiry into its reality by the appointment of a committee of the Legislature of Pennsylvania. The attention of Mr. Lukens was turned to the subject, and although the actual moving cause was not discovered, yet the deception was so ingeniously imitated in a machine of similar appearance made by him, and moved by a spring, so well concealed, that the deceiver himself was deceived; and Redhœffer was induced to believe that Mr. Lukens had been successful in obtaining a moving power in some way in which he himself had failed, when he had produced a machine so plausible in appearance as to deceive the public.—*Franklin Journal.*—["Mec. Mag.," vol. 46, 1847, p. 239.]

MISCELLANEOUS JOURNALS.

Having thus concluded the classified extracts from the "Mechanics' Magazine," we now proceed with quotations from miscellaneous journals:—

PERPETUAL MOTION.—In an article on "Mental Delusions," in the "Penny Magazine" for 1841, the following, among other cases, occurs:—

In the reign of Anne, a gentleman named Stukely† left his

* See also "Gill's Tech. Journal," quoted in Chap. VIII., p. 222.

† See also Chap. VIII., p. 226.

practice as a barrister, and retired into the country to perfect his discovery of the perpetual motion, and never left it but once for thirty years, when he took the oath of allegiance to George I., and on which occasion, for the only time, he shaved, and changed his shirt and clothes. Before he died, he had abandoned his pursuit of the perpetual motion, and would laugh at his own folly in confining himself in-doors.—[New Series, folio, p. 409.]

On the Impossibility of Perpetual Motion, we take the following from the "Magazine of Science:"—

If by perpetual motion be understood a power which moves, and which will move to the end of time, without regard to the wear and perishable nature of materials, it is in vain to expect such can be made by human means and human intelligence, however much we may hope for future discoveries in science to aid us. In the works of God alone must we look for such perfection and continuity of motion. We can only abide by those laws already in action, and must therefore construct our machines according to these previously-arranged impulses; and unfortunately for the visionary schemer of the perpetual motion, these laws are too stubborn for him to modify, much less destroy. Even supposing he should content himself with an apparatus which would move only while its materials held together, the resistance of the air, the friction of the various parts, their *vis inertiæ*, and the general laws of gravitation, are impediments never to be overcome; and although all have failed, yet much ingenuity has been exerted, and talent called into exercise, by the many attempts which have been made to surmount them.

Mechanics, particularly the known properties of the lever, have given rise to innumerable schemes. One was called "The Valley Windmill." This consisted of a wheel with five arms, each arm made of two pieces connected end to end by a joint. When made to turn round, the jointed ends on one side fell back, or rather hung down from the end of the fixed part of the arm; rising to the greatest elevation, it hung close to the fixed arm; passing beyond this, it fell back towards the centre; and thus by its position making a shorter lever, it bore with less weight; but when it had gone a little

further, altering its centre of gravity, it fell down suddenly, when the moveable and fixed arm became one long lever, much heavier than in any other position, and this extra weight was to turn the whole. The machine had but one fault—it would not go. "The Wheel of Balls," described by the Marquis of Worcester,* was another scheme. This was a very shallow drum, divided into a number of compartments, into each of which a leaden ball was placed, and as the wheel turns round each ball rolls alternately to and from the centre of the wheel; and it would seem, from the principle of the lever, that, as the weights are always further from the centre on one side than on the other, a continuous rotatory motion must be produced; but it was found that though the balls were thus placed, yet a very few of them were away from the centre, while there were many near to it; thus, those on one side counteracted those on the other, and, as in the other instance, the machine would not go.

Hydraulics, pneumatics, and chemistry, all lent their aid, but in vain. Water-wheels were to throw up water enough to turn themselves. Pumps were to move by self-created power. Water-balances were alternately to rise and fall by each other's weight. Blasts of air were to work bellows, and the bellows were to produce blasts of air. Hydrostatic parodoxes became numerous. Barker's mills were in requisition.

[The article next proceeds to notice the results of electricity, giving an account of "De Luc's Dry Pile, or Electrical Column and Melloni's Rotatory Pile."]—[Edited by G. Francis, F.L.S. Vol. 1, 1849, p. 194.]

On the Impracticability of Producing a Perpetual Motion.—Perpetual motion is a motion which is supplied and renewed from itself, without the intervention of any external cause: to find a perpetual motion, or to construct a machine which shall have such a motion, is a subject which has engaged the attention of mathematicians for more than 2000 years; though none perhaps have prosecuted it with so much zeal and hopes of ultimate success as some of the speculative philosophers of the present age.

* The Marquis describes a very different wheel.

Infinite are the schemes, designs, plans, engines, wheels, &c., to which this longed-for perpetual motion has given birth; and it would not only be endless but ridiculous to attempt to give a detail of them all, especially as none of them deserve particular mention, since they have all equally proved abortive; and it would rather partake of the nature of an affront than a compliment, to distinguish the pretenders of this discovery, as the very attempting of the thing conveys a very unfavourable idea of the mental powers of the operator.

For among all the laws of matter and motion, we know of none which seems to afford any principle or foundation for such an effect. Action and re-action are allowed to be ever equal; and a body which gives any quantity of motion to another, always loses just so much of its own: but, under the present state of things, the resistance of the air, and the friction of the parts of machines, ncessarily retard every motion.

To keep the motion going on, therefore, there must either be a supply from some foreign cause, which, in a perpetual motion, is excluded:

Or, all resistance from the friction of the parts of matter must be removed; which necessarily implies a change in the nature of things.

For, by the second law of motion, the changes made in the motions of bodies are always proportional to the impressed moving force, and are produced in the same direction with it; no motion, then, can be communicated to any engine, greater than that of the first force impressed.

But, on our earth, all motion is performed in a resisting fluid, namely, the atmosphere, and must therefore, of necessity, be retarded: consequently, a considerable quantity of its motion will be spent on the medium. Nor is there any engine or machine wherein all friction can be avoided; there being in nature no such thing as exact smoothness or perfect congruity; the manner of the cohesion of the parts of bodies, the small proportion which the solid matter bears to the vacuities between them, and the nature of those constituent particles, not admitting it.

Friction, therefore, will also in time sensibly diminish the impressed or communicated force; so that a perpetual motion can never follow, unless the communicated force be so much greater than the generating force as to supply the diminution occasioned by all these causes; but the generating force

cannot communicate a greater degree of motion than it had itself. Therefore, the whole affair of finding a perpetual motion comes to this, viz., to make a weight heavier than itself, or an elastic force greater than itself; or, there must be some method of gaining a force equivalent to what is lost, by the artful disposition and combination of the mechanical powers: to this last point, then. all endeavours are to be directed; but how, or by what means, such a force can be gained, is still a mystery!*

The multiplication of powers or forces avails nothing; for what is gained in power is lost in time; so that the quantity of motion still remains the same.

The whole science of mechanics cannot really make a little power equal or superior to a larger; and wherever a less power is found in equilibrio with a greater—as, for example, twenty-five pounds with one hundred—it is a kind of deception of the sense; for the equilibrium is not strictly between one hundred pounds and twenty-five pounds moving (or disposed to move) four times as fast as the one hundred pounds.

A power of ten pounds moving with ten times the velocity of one hundred pounds would have equalled the one hundred in the same manner; and the same may be said of all the possible products equal to one hundred: but there must still be one hundred pounds of power on each side, whatever way they may be taken, whether in matter or in velocity.

This is an inviolable law of nature; by which nothing is left to art, but the choice of the several combinations that may produce the same effects.

The only interest that we can take in the projects which have been tried for procuring a perpetual motion, must arise from the opportunity that they afford of observing the weakness of human reason.

For a better instance of this can scarcely be supplied than to see a man spending whole years in the pursuit of an object, which a single week's application to sober philosophy would have convinced him was unattainable.

But for the satisfaction of those who may not be convinced

* The foregoing is an epitome of what has appeared, first in most of the German, and from them copied into English Encyclopædias.

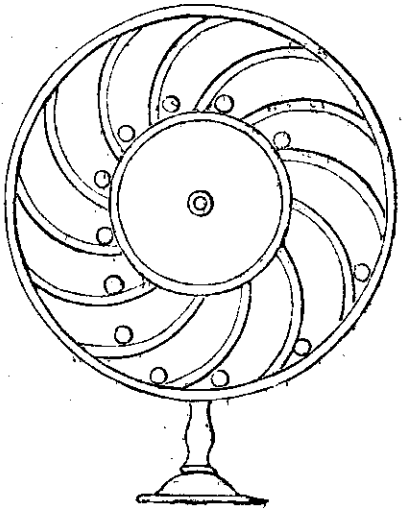
of the impossibility of attaining this grand object, we shall add a few observations on the subject of a still more practical nature than the above.

The most satisfactory confutation of the notion of the possibility of a perpetual motion is derived from the consideration of the properties of the centre of gravity; it is only necessary to examine whether it will begin to descend or ascend when the machine moves, or whether it will remain at rest. If it be so placed that it must either remain at rest or ascend, it is clear, from the laws of equilibrium, that no motion derived from gravitation can take place: if it may descend, it must either continue to descend for ever with a finite velocity, which is impossible, or it must first descend and then ascend with a vibratory motion, and then the case will be reducible to that of a pendulum, where it is obvious that no new motion is generated, and that the friction and resistance of the air must soon destroy the original motion.

One of the most common fallacies by which the superficial projectors of machines for obtaining a perpetual motion have been deluded, has arisen from imagining that any number of weights ascending by a certain path on one side of the centre of motion*, and descending on the other at a greater distance, must cause a constant preponderance on the side of the descent; and for this purpose weights have been made to slide or roll along grooves or planes, which lead them to a

* On this important point, the reader will do well to consult Bishop Wilkins, on the relation between the parts of a wheel and those of a balance, Chapter I., page 9 to 12; likewise Desaguliers's account of a compound balance, on which two bodies of equal weight may be variously suspended with respect to the centre, without losing their equilibrium, Chapter IV., pages 93 to 97; also noticed by Nicholson at page 79. At the conclusion of the Introductory Essay, the author has described the diagram of a model of his invention, perhaps still more convincing, as it forms an actual wheel, the rotation of which occasions all the weights on one side to protrude, yet without overbalancing; and, curious enough, on reversing the rotation the advanced weights all recede, and those nearest the centre are projected further from the centre, with no better result. No mechanic who has made himself acquainted with even these few facts, will feel justified in making models for plans of self-motive machinery, until he has first satisfied himself, by drawings made to scale, that the invention will bear the test of rigorous examination.

more remote part of the wheel, from whence they return as they ascend, as represented in the following figure*:—



Or they have been fixed on hinges, which allow them to fall over at a certain point, so as to become more distant from the centre; but it will appear, on the inspection of such a machine, that although some of the weights are more distant from the centre than others, yet there is always a proportionally smaller number of them on that side on which they have the greater power; so that these circumstances precisely counterbalance each other.

We have heard it proposed to attach hollow arms to a wheel by joints or hinges at the circumference, and to fill these arms with quicksilver or small balls instead of the plan represented by the above figure; but though we have never heard of it having been tried, we are perfectly convinced that

* In the model, the balls may be kept in their places by a plate of glass covering the wheel.

it would end as all other attempts have done; that is, in a total failure.—["The Artisan; or, Mechanic's Instructor." 2 vols., 8vo. London, 1824-5.]

A Scotch journal gives the following popular view of the subject:—

It is not many years since the discovery of the perpetual motion was a subject of grave discussion, and numerous individuals of high ingenuity wasted their time, and exhausted their means, in futile contrivances destined to realize a notion which nobody had shown to be impossible. A more general diffusion of sound knowledge has of late thrown popular discredit on pursuits of this chimerical nature, and replaced the delusions which occupied minds of an inventive turn, by projects of a more rational character. Still, however, the subject is now and again revived, by some young mechanical novices, who for a short period of their noviciate imagine themselves endowed with a higher degree of inventive genius, than ever before fell to the lot of any single contriver. A young man in the first year of his apprenticeship, struck with the beauty of the machinery which he sees around him, and as yet but ill-acquainted with the principles of its construction, and having heard a deal about a perpetual motion, begins to plan, and lights upon a project which he feels sure could not have been before thought of, and it must succeed. Many a sleepless hour it costs him, and it is only after a salutary exhibition of the absurdity of his scheme to astonish the world by his powers of invention, that he is cured of his self-idolatry.

It may not be difficult to see why the particular contrivance failed in producing the expected effect; but it is not therefore manifest that all contrivances would similarly fail, or that the problem is practically impossible; and, supposing the novice after his failure were to inquire at some of his own experienced acquaintances—some one, perhaps, whom he has heard ridiculing the notion in the strongest terms, as grossly absurd—would he receive a convincing statement of the insurmountable difficulty? Put the question broadly—why is a perpetual motion, in the sense in which mechanics understand it, impossible? It is not enough to say that great and

numerous attempts have been made to attain it, and all without success; for the question just occurs—why did they fail? If they failed for want of ingenuity, then a perpetual motion is possible; but that is denied,—then wherein consists the cause of failure?

It is in this way that we may suppose the experienced derider of perpetual motions to be "pushed home" by his young experimenting friend, and he will require some knowledge of mechanical principles to escape without humiliation. The attempt is not always successful: we have been witness to more than one case, in which the strength of the argument lay on the wrong side. We have even met with instances, where, at the same time that the notion of a perpetual motion was ridiculed in unqualified terms, exactly the same absurdity was admitted indirectly, as one of the most easy and practical things which could be imagined. As a palpable case, we have heard a gentleman of veracity state, and maintain the statement, that he had observed in the course of his travels, which were not very extensive, an apparatus, consisting of an overshot wheel and pump, for clearing a quarry of bed-water; and that the wheel was driven by a portion of the same water which the pump lifted. Now this is the very beau ideal of a perpetual motion. Here was a pump capable of lifting more water than was required to work it; consequently, the superfluous water, being so much extra power, might have been applied to do other work, as lifting stones and the like. And farther, the same apparatus might be erected over a tank of water, and it would work on so long as the machinery remained in good repair, and the power which it furnished after driving itself might be applied to any useful purpose. But what are the real facts of the case? Supposing the machinery once fairly set in motion, and supposing that its motion was retarded by no friction or other resisting cause, and that there was no waste of water by leakage, then would it continue to work for an indefinite time,—the pump would go on, lifting the water to the height from which it descended upon the wheel, but not the millioneth part of an inch higher.

In fact, as the pump obviously can give no power, the whole apparatus might be viewed as a single water-wheel, in which the ascending side received at the bottom, and carried up with it just as much water as the descending side received

at the top to carry down; and in such an arrangement, it is manifestly of no consequence whether the water ever leaves the wheel or not; that is, whether it be thrown off by the descending buckets at the bottom, and taken in by the ascending buckets at the same point, or be simply carried round with the revolutions of the wheel without displacement from the buckets into which it was first poured. And if this be true, it is not very difficult to see that the wheel would move *ad infinitum*, just as well without the water at all! Now, the real circumstances are these:—The effective power of the best-constructed overshot water-wheel is only 70 per cent. of the power which drives it; that is, for every 100 gallons of water expended upon driving it, it would lift 70 gallons to the same height, and no more; and a pumping apparatus must be very well constructed indeed, to give an actual result equal to 70 per cent. of the power of the wheel. Here, then, is a loss of 30 per cent. of power in working the apparatus, and, consequently, all the water lifted by the pump would just be half sufficient to keep up the motion, without requiring the machinery to do any other work. So much, then, for not knowing how to observe.

The case which we have here noticed is probably absurd to every mechanic who knows anything about hydraulic machines; but the same absurdity has sometimes been scarcely less glaringly introduced into the schemes of ignorant projectors. Many of these worthies, in the plenitude of their presumption, undertake to create power by complex combinations of mechanical elements which they obviously do not understand. Within perhaps 200 yards of where we write, still stands, for aught we know to the contrary, a specimen of this sort, on which we believe not less than £1,000, were spent, and which was not patented only in consequence of the death of the projector. The money belonged to a person who, fortunately, can sustain the loss of it without serious inconvenience, and who perhaps deserved to pay the penalty of his ignorance; the merit of the contrivance belonged to one of those individuals who would rather scheme than work, and who had just that amount of mechanical knowledge which is dangerous. The machine alluded to is likewise an hydraulic one, and its pretended object was to save three-fourths of the water used, by pumping it up again to the top of the fall, and this without loss of

effective power in the machine! This person, and his employer, no doubt laughed loudly together at the absurdity of a perpetual motion.

But all the great projectors of this class are not simply water doctors. We have known them take to contrivances for "lifting great weights without loss of speed," and find their multiplicity of pulleys, wheels, and pinions, bent and straight levers, all resolvable into a value little superior to that of a single pulley. This is fact; we have seen such a combination of mechanical elements, and for such an object, on which a man—a great genius in his own and his employer's estimation—worked for upwards of two years with bolted doors, and every other precaution against the mighty secret being divulged to the wondering world.—["The Practical Mechanic and Engineer's Magazine," vol. 1, Glasgow, 1841, pp. 8-12.]

The following paper gives "An Account of Three Large Loadstones, one of which presented an unusual Line of Attraction. By John Deuchar, M.W.S., and Lecturer on Chemistry in Edinburgh. Read before the Wernerian Natural History Society, March 10, 1821."

After a few introductory remarks, he says:—"The largest of the loadstones, independent of its armature and connecting iron, weighs 125½ pounds, and it measures

In length	10¾ inches
In breadth	8½ „
In height	9½ „

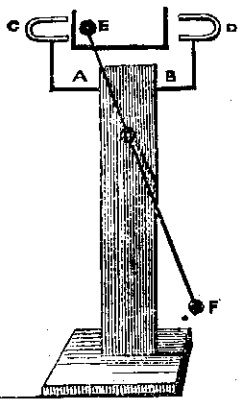
and was capable in all of bearing a weight of 205 pounds." He then proceeds to a description of the two others, and observes:—

Before concluding this paper, I may take notice of an imposition which was, about three years ago, attempted to be kept up upon the prosecutors of science in different parts of the united kingdom by a needy shoemaker, of the name of Spence,* as this disgraceful fraud was first exposed by means of the largest of the magnets just explained. This individual pre-

* See further notices of him in pages 180 and 226.

tended to have discovered a black substance which did not conduct magnetic energy through it, and he wished it to appear that when this substance was made to come between a steel beam and a magnet, the power of attraction was lessened, if not altogether stopped. He placed machinery in such a situation as not to be observed; and, with the assistance of a few falsehoods, which he found very useful in raising the curiosity and extorting the charity of credulous visitors, he tried to induce a belief that a pendulum was then moving a clock, and had continued to do so for six months, without any other exciting power than two small magnets. This is shewn in Fig. 9. A B are two supposed non-conductors of

(*Fig.* 9.)



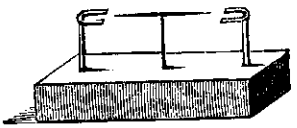
(The pretended Pendulum Motion by Magnetism.)

magnetism, affixed to the opposite ends of a beam moving on its centre; C D are the two magnets, which were said to attract alternately the end E of the pendulum E F. At the commencement of the motion of the pendulum, it was said that one of the pieces of the black substance, say A, was moved from between the magnet C and the pendulum; this enabled the attraction between C E to take place, and cut off the attraction between D E; and this is the state in which the figure on the plate is drawn. But as E approaches nearer

to C, so as to prevent the actual contact of C E, then A moves up, and entirely cuts off the effect, and at the same time B leaves the power of D in full action; therefore E moves from C towards D, and, when it has nearly arrived there, B again moves up, and A descends: and thus, it was maintained, the continued motion of the pendulum was kept up.

Another way of exhibiting this deception is shown in Fig. 10. Here, by the false account given, we are told that a very fine steel beam, about an inch in length, has been made

(*Fig.* 10.)

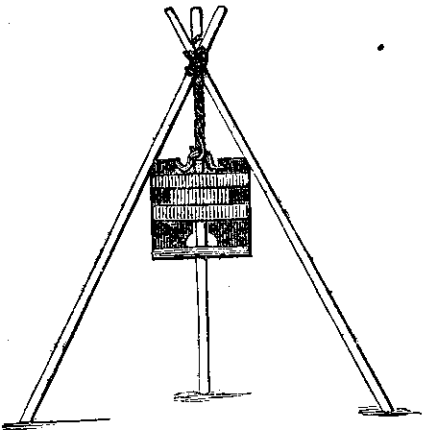


(The pretended Perpetual Magnetic Motion.)

to revolve with great rapidity for many months, and that two magnets, partially coated with the extraordinary black substance already noticed, and placed at opposite sides, are the sole cause of the motion. This motion, it is almost unnecessary to add, was also induced by secreted machinery in the box on which it rested. On one of the nights of lecture, when I was upon the subject of magnetism, this scientific juggler brought his perpetual motion, as he called it, to the class-room. As at this time I had the largest of the three magnets (Fig. 11) suspended there, for the purpose of explaining its peculiarities and powers, I thought it would be a good opportunity to try the truth of his assertion with regard to the cause of the motion. I therefore placed the revolving needle (Fig. 10) on a table under the large magnet, while the usual weight which it carried was removed, but the needle moved as rapidly as before. Here, then, a loadstone capable of lifting 205 pounds did not affect a needle said to be moved by two very small artificial horse-shoe magnets. On another occasion I placed a piece of the black substance, which was called a non-conductor, between a magnet and a magnetised sewing-needle, which I balanced on the point of my finger, and I found it to be attracted and repelled, as

the different poles were presented, in the same way as if no such black substance had intervened,—["The Glasgow Mechanics' Magazine," vol. 2, 1824-5, p. 98.

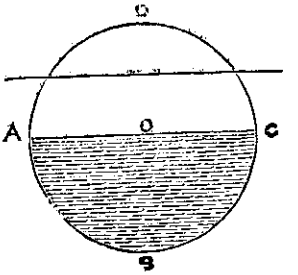
(*Fig.* 11.)



(Dr. Hope's large Magnet, as it was suspended in Mr. Deuchar's class-room.)

PERPETUAL MOTION; A PARADOX.—Let A B C D, Fig. 7,

(*Fig.* 7.)

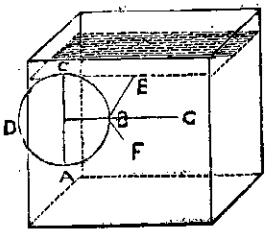


be a wheel moveable on its axis, passing through its centre O; if one half of it, A B C, be situated in a vessel filled with

water, and the other half A D C lose as much of its weight as the weight of its bulk of water, will it occasion A D C to preponderate and produce a constant motion; or does the wheel remain in equilibrium, and if so, what is the occasion of this paradox?—[Vol. 2, 1824-5, p. 42.]

EXPLANATION OF THE FOREGOING PARADOX.—The pressure of the water in every direction at any point B, Fig. 2, being equal, if E B and F B be the directions of two of these pressures equally inclined to the radius produced, O B G, then their resultant is G B O, in the direction of the centre; which can, therefore, have no tendency to put the wheel in motion. The same may be said of every two similar pressures, hence the wheel remains in equilibrium.—[Vol. 2, p. 42.]

(*Fig.* 2.)



A PERPETUAL MOTION PUMP.—A correspondent of the "Glasgow Mechanics' Magazine" thus describes his views:—

I thought I had discovered the perpetual motion. The method which appeared to me likely to answer was this:—Place a wheel in a large cistern, so that it may turn round without touching the water at the bottom, and that the water falling upon the wheel may not escape from the cistern. Attach this wheel to the end of a beam, or balance, by a crank; to the other end of this balance attach a pump, or pumps, to raise a sufficient quantity of water from the cistern to drive the wheel; raise this water into another cistern about double the height of the wheel; below this cistern place another, containing a wheel of the same size, and in the same situation as the former. The water in the highest cistern would turn this wheel, and the water in the middle cistern would drive the first-mentioned wheel (being lower than the other). You will observe, the intention of the higher wheel is to drive

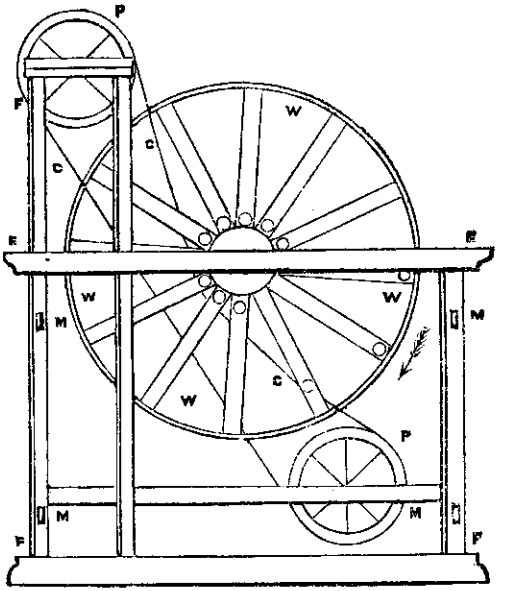
machinery, as the power of the lower one is exhausted (or, as I afterwards understood, overcome) by working the pumps.—[Vol. 2, p. 219.]

A PERPETUAL MOTION BY HOLLOW-SPOKED WHEEL AND BALLS; thus described:—

The annexed drawing shows how I have at length taken this enticing jilt (perpetual motion), though after a long and weary chase—

Through pleasant and delightful fields,
Through barren tracts and lonely wilds;
'Mongst quagmires, mosses, muirs, and marshes,
Where deil or spunkie never scarce is!
By chance I happened on her den,
And took her when she didna ken.

(*Fig.* 3.)



W W W W (Fig. 3) represents a wheel with twelve hollow spokes, in each of which there is a rolling weight or

ball. C C C C is a chain passing over two pulleys P P. There is an opening round the wheel from the nave to the circumference, so as to allow the chain to pass freely and to meet the weights. The weights are met by the chain as the wheel revolves, and are raised from the circumference till they are at last brought close to the nave, where they remain till, by the revolution of the wheel, they are allowed to roll out to the circumference. By this arrangement, the weights are, on one side of the wheel, always at the circumference, so that that side is more powerful than the other, which causes the wheel continually to revolve. F F F F is the frame of the machine; M M M M the mortices for joining the two sides of the frame by cross rails. The arrows point out the direction in which the wheel turns.—I am, yours, &c., DIXON VALLANCE. Liberton, Lanarkshire, Nov. 10, 1825. —[Vol. 4, p. 227.]

He afterwards writes to suggest employing angled spokes, which allow the rolling weights to run off above the centre. In this machine the angle between the chain and the spokes is less acute than in the other, which has spokes straight out from the centre, and of course it has more power; the wheel with 12 hollow spokes having an opening in them to allow the chain to pass freely, and to meet the weights, with the chain passing over two pulleys.

[Our friend, Mr. Vallance, is probably not aware that machines on the same principle with the above have been repeatedly tried, and as often found to fail. Indeed, until he can remove the effects of friction, he will not get this amended machine to move any time. It is not to be disputed, that the friction of the rollers or the chain, and the wheel itself, will completely compensate any power derived from the weight which the descending balls may have over the ascending.—EDS. "The Glasgow Mechanics' Magazine," vol. 5, 1826, p. 166.]

PERPETUAL MOTION: its Pursuit Censured.—In the "Saturday Magazine," for 1838, appears an article on

"Recreations in Natural Philosophy;" the fifth part is "On Perpetual Motion," from which the following is an extract:—

An amusing, but at the same time a melancholy and instructive, history might be formed of the various visionary schemes which, in all ages, have disposed some enthusiastic men to dissipate their time and fortune in seeking to obtain some object which should either confer boundless riches on its possessor, or shield him from all the ordinary accidents of life.

Our distinguished countryman, Dr. Thomas Young, says that "to seek for a source of motion in the construction of a machine betrays a gross ignorance of the principles on which all machines operate. The only interest that we can take in the projects which have been tried for procuring a perpetual motion, must arise from the opportunity afforded us to observe the weakness of human reason; to see a man spending whole years in the pursuit of an object which a week's application to sober philosophy might have convinced him was unattainable."

It will be amusing to adduce a few examples of this "gross ignorance," in some out of the numerous attempts which have been made to obtain perpetual motion.

[These consist of three plans of wheels with moving weights, and a self-filling goblet,—this last from Dr. Arnott's work,—all occurring in the present treatise.]

A few years ago, a person fond of mechanical pursuits submitted to the writer a plan for a machine whose object was to supersede the steam-engine. Water was the moving power, and the principle was somewhat similar to that of the hydrostatic press. He said his invention, being new, could not be affected by anything that had been written on the subject. He contrived many arrangements and spent much money, without the smallest prospect of a proportionate return from it.—[Vol. 13, p. 99.]

On a Plan of Perpetual Motion at Ferrara, we find the following in an Italian Journal:—

Signor Alfonzo Roito, of Ferrara, has made several experiments, by which he believes to have discovered perpetual mo-

tion. His invention does not appear to deserve to be put on one side like many others, for the Government has taken it seriously into consideration. The Cardinal Ilgolini, legate at Ferrara, has nominated a committee of competent judges—philosophers, engineers, and mechanics—for the purpose of testing its merits. The committee has already sat twice, and reports and drawings have been sent to Rome, to the Government, with the following recommendation by the committee:—

First. After having carefully examined the forces which act on the machine, and having as nearly as possible tested their power, always to the disadvantage of the machine, we find that the forces *favourable* to the motion are superior to those which are against it. The resistance of the parts which compose the machine appear to us to possess all the requisite strength; consequently, our opinion is, that it is *very likely* that the machine may be put in motion by itself, and that it will not easily be deranged.

Secondly. Your committee finds that the construction of the machine is ingenious and simple; and after having examined the machine as to the mode in which its movements are brought to act together, your committee considers it worthy of high praise.

Thirdly. The expenses of the construction will not exceed 1,500 Roman crowns, 8,070 francs,—a small outlay if the advantages gained shall be such as the inventor anticipates; among others, of setting in action four pair of stones for grinding wheat.—["The Inventors' Advocate, and Patentees' Recorder," 4to., 1839, vol. 1, p. 183.]

THE ATTEMPTS TO PRODUCE A PERPETUAL MOTION.—In a leading article of the "Inventors' Advocate," the Editor says:—

There are few objects on which so much time and money have been thrown away as in the fruitless attempts to construct a machine that will move for ever. Patent after patent has been taken out with a view to secure the exclusive right to inventions in which it was falsely imagined the desired object had been attained. A description of all the inventions for the purpose of procuring perpetual motion would, indeed, present a curious record of ignorance, fallacious reasoning, and misdirected ingenuity.

[After some general remarks he adds:—]

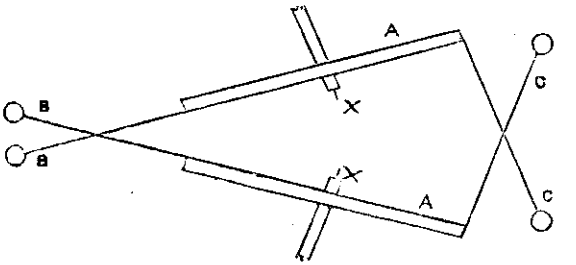
It has been frequently attempted to apply the power of gravitation for this purpose; but as that power acts equally on the whole mass of matter in the earth, its force cannot be varied, nor its direction changed, by any means within the limits of human capability.—[Vol 9, 1840, p. 264.]

ALLEGED DISCOVERY BY GEORGE WATHER.—In the "Engineer," February 8, 1856, is copy of a police report, in which is an account of the difficulties of George Wather, tailor, about 70 years of age, from Bridport, who applied for advice. About four years ago (1852) he ventured on marrying a third time, and carried on business in a small way, until he by accident discovered that which had for centuries baffled the greatest philosophers, namely, the "perpetual motion." His friends said that doubtless he would meet with distinguished patrons in London. Encouraged by their representations, he and his wife set off with just sufficient to bring them to town. His impression was that he should be possessed of thousands in a few days, but, to his utter astonishment, neither the authorities at Marlborough House, the Lord Chancellor, nor Lord Palmerston, would entertain his invaluable discovery, nor, in fact, could he find any one who would; thus he was left destitute, without means to get back to Bridport. He was relieved from the poor-box, and obtained a pass home. [Vol. 1, 1856, p. 73.]

AN AMERICAN PLAN OF PERPETUAL MOTION:—

Even the pursuit after perpetual motion, hopeless as it is,

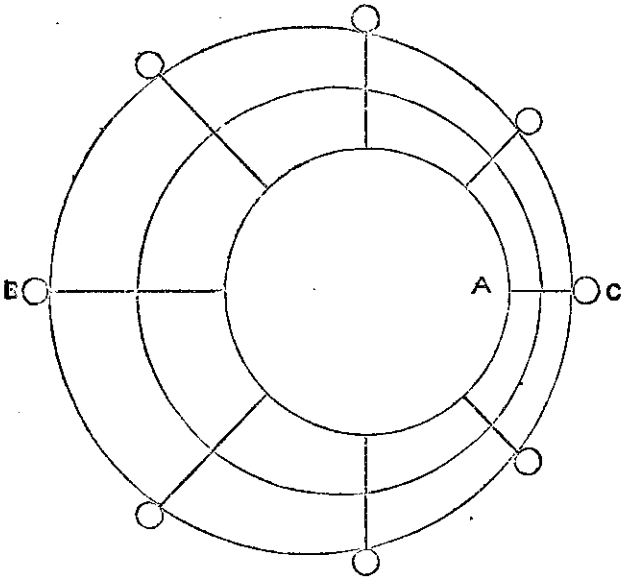
(*Fig.* 1.)



may not be considered entirely vain, in occasionally leading to useful modifications of machinery. As an instance of this, I here submit to you a plan suggested by an ingenious friend of mine, several years ago, as in the diagrams annexed, Fig. 1, a perpendicular, and Fig. 2 a horizontal view.

A A, two vertical wheels, placed diagonally, and revolving on the axes X X. The levers B B and C C are hinged at the peripheries of the wheels. By rotation the arms B B are projected from the centre of motion, while the arms C C are drawn in.

(*Fig.* 2.)



It is plain that a series of arms as shown in Fig. 2, will produce an eccentric motion, causing the weights at their ends apparently to preponderate on the side B.—Belidor.—["The Journal of the Franklin Institute." Philadelphia, 1828. Vol. 6, p. 414.]

WILLIS'S PERPETUAL MOTION.—A Public Exhibition.—The following is abridged from the "Scientific American:"—

One of the immutable laws of dynamics is, that all bodies when once set in motion will continue their movements until stopped by some opposing force. The only known opponents to continued motion are friction, gravity, and resistance of the air.

Many attempts have been made during the last three centuries to evade the dynamic law first mentioned. We could fill many pages with descriptions of pretended perpetual motion machines, some of them very curious, if it were necessary; let it suffice to refer to Austin's self-moving machine (page 209, vol. 2), and another on page 267, as specimens of what has been done.

One of the latest attempts at perpetual motion is that of Mr. E. P. Willis, first put on exhibition at New Haven, Conn., and lately at New York (1856). It is heralded to the public through advertisements and placards, as "the greatest discovery ever yet made."

[An engraving is given of the machine, as seen in a glass case, and the Editor having seen it at work, adds:—]

This machine is very beautifully constructed. The shaft bearings are fine steel points, and have but little friction. Possibly it is one of those contrivances that will run for a few hours without stopping, owing to nice adjustment and the trifling amount of friction; we are inclined to think, however, that it is driven by electro-magnetism, or some other concealed power.

The ideal water-wheel, to work a pump and lift water enough to keep the wheel always moving, is planned on the same principle.

No one is allowed to examine, and they say in their placards "Why it is not a *bona fide* 'perpetual motion' is left for the curious on the subject to determine."—[Vol. 11, 1856, p. 201.]

ANOTHER AMERICAN PERPETUAL MOTION.—In our remarks (says the Editor) relative to Willis' "perpetual motion," we referred to an ideal water-wheel intended to keep itself in constant motion.

We are in the frequent receipt of letters containing sketches of devices arranged on similar principles, and asking our advice relative to the proper steps necessary to be taken in order to secure such valuable discoveries. We have received from an inventor in Virginia a sketch of one of the before-named water-wheels, and he wants to hear from us "as soon as possible."

Another correspondent describes a plan that was "suggested by a dream," but "it stopped" after every push.—[Vol. 11, 1856, p. 232.]

In Poppe's "Taschenbuch für Urhmacher, &c.," 1822, relating to Clock and Watchwork generally, is an "Appendix, on Perpetual Motion," a large portion of which referring to the imposition practised by Geiser, applications of Galvanic agency, and some descriptions previously given in the present work, are, therefore, either omitted in consequence, or much abridged.

Meaning by perpetual motion a machine whose motion is constantly renewed by the means of its own mechanism, and uninterruptedly maintained without any fresh impulse, the discovery of such a motion is difficult but not impossible; as Kästner, Langsdorf, and other celebrated mathematicians have frequently shown.

For several hundred years some of the best mechanics have given themselves endless trouble and pains to discover this motion without success. Many have had plans they thought would solve the problem, but after a short time have ceased or required repair. Balls have been made to run uninterruptedly in channels for a certain time, smalls clocks moved by atmospheric influence have been brought forward, so was Cox's barometer, also Recorder's cleverly-constructed pocket-watch, worked by a hidden weight, and numerous other contrivances of this kind, have all failed to deserve their claimed reputation.

The wonderful and cleverly-worked pendulum clock of Geiser, of Chaux de Fond, which was recognised and admired by many of the best-informed men of the day, proved a deception as a perpetual movement. When thoroughly examined inwardly and outwardly, some time after his death, it was found that the centre props supporting its cylinders

contained cleverly-constructed, hidden clock-work, wound up by inserting a key in a small hole under the second hand.

Of all the contrivances to produce perpetual motion yet brought to light—Zamboni's pile, and Ramis's electric pendulum clocks seem most deserving of the name.*

PERPETUAL MOTION: AN ABSURD PRETENSION.—Lewis C. Buck, M.D., Professor of Chemistry in the University of the City of New York, &c., in his "Researches on Commercial Potash," after giving the specification of a patent for a most absurd mode of manufacturing potash, and which by the specious pretensions of the patentee, imposed on many, takes the opportunity to observe in a note, as follows:—

It need not excite surprise that such nonsense should gain currency among ignorant manufacturers, when intelligent and even scientific men often countenance the most absurd pretensions. I once saw the names of several respectable gentlemen, and, among the rest, that of a professor in one of our colleges, attached to a certificate in favour of a perpetual motion, which the inventor had the folly to exhibit.—["The American Journal of Science and Arts," conducted by Benjamin Silliman, M.D., LL.D., vol. 29, 1836, p. 262.

* Dr. J. H. M. Poppe Die Wand, Stand und Taschenuhren; der mechanismus, die Erhaltung, Reparatur, und Stellung derselben; Taschenbuch fur Urmacher, &c. Frankfurt am Main, 1822, 12mo., p. 176.