IV. Description of a new implement called a cultivator

Mr. William Lester

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months ago, to C. Vauquelin a flask containing a liquor obtained by the distillation of vinegar on a large scale. As C. Pontier was not ignorant that the first product of the distillation of the acetous acid is aqueous, he separated it from that which followed. After uniting several phlegms of the same kind, he was much astonished to find that these phlegms had a very agreeable aromatic odour: having discovered, by preliminary trials, the properties which gave this product a similarity to ethereal liquors, he rectified all the supposed phlegms, and by these means obtained a peculiar ether, which Vauquelin found to be acetic ether completely rectified.

From an identity so striking in the experiments above described, it is evident that there exists no difference between the constituent parts of the acetic and acetous acids; that the water, and mucilaginous or extractive matter, are the only two apparent differences observed in these two acids; and, consequently, that there exists only one acid of vinegar, which being at its maximum of oxygenation, ought, according to the chemical nomenclature, to be distinguished by the name of *acetic acid*. In future, therefore, there will not exist two different kinds of salts, either by the combination of distilled vinegar or of radical vinegar; they will hereafter be so many products, the names of which must be the same; and hence *acetates* will exist, and not *acetites*.

IV. *Description of a new Implement called a Cultivator.* By
MR. WILLIAM LESTER, of Northampton*.

SIR,

AS the health and luxuriance of corn depend, in a great measure, on the pulverization of the soil previous to the seed being sown, the Society of Arts will, I am persuaded, give every encouragement in their power to the introduction of any implement that promises an abridgement of labour; and as all tenacious soils are pulverized in the best manner in dry weather, when their particles are the most disjointed, and their contact broken, the propriety of taking the advantage of working them in that state will be obvious: and at the same time it follows, that an improved implement for the abridgement of labour would be a desirable thing in a climate like England, where the seasons are so uncertain.

* From the *Transactions of the Society for the Encouragement of Arts*, &c. vol. xix.—The Society's silver medal was awarded to Mr. Lester for this invention.

In working on a rough fallow, my cultivator should be set at its greatest expansion, and contracted in proportion as the clods are reduced. I am confident that one man, a boy, and six horses, will move as much land in a day, and as effectually, as six ploughs; I mean land in a fallow state, that has been previously ploughed.

It will be requisite in some states of the soil to alter the breadth of the shares; but of this, I presume, the farmer will always be a proper judge. By the expansion and contraction of the cultivator, the points of the shares are, in a small degree, moved out of the direct line; but this is so trifling, that it is no impediment to its working. I am, Sir,

Your most obedient servant,

Northampton, Feb. 10, 1801.

WILLIAM LESTER.

Mr. C. Taylor.

A certificate from Mr. William Shaw, of Cotton End, near Northampton, accompanied this letter; in which he states, that he had used Mr. Lester's cultivator upon a turnip fallow last summer, and that he believes it to be a very useful implement for cultivating the land in a fallow state, by its working or scuffling off seven acres per day, with six horses. He adds, that, from its property of contracting and expanding, it is calculated to work the same land in a rough or fine state, by which mean it unites the principles of two implements in one; and, by the index on the axis, it may be worked at any given depth required.

Description of Mr. Lester's Cultivator. (Plate I. fig. 1.)

A, the beam.

BB, the handles.

CC, a cross bar of a semicircular form, containing a number of holes, which allow the two bars DD, to be placed nearer or further from each other.

DD, are two strong bars, moveable at one end upon a pivot E, and extending from thence, in a triangular form, to the cross bar C. In these bars are square holes, which allow the shares F, placed therein, to be fixed to any height required.

The seven shares marked F, are shaped at their lower extremities like small trowels: the upper parts of them are square iron bars.

GG } are three iron wheels, on which the machine is

G, } moved; they may be raised or lowered at pleasure.

H, the iron hook to which the swingle-tree and horses are to be fixed.

Lowry sculp.

When the machine is first employed on the land, the bars DD are expanded as much as possible. As the soil is more loosened, they are brought nearer to the centre: the shares then occupy a less space, and the soil will consequently be better pulverized.

V. *Description of a newly invented Undershot Water-wheel.*
By Mr. J. BESANT, of Brompton*.

SIR,
I BEG leave to lay before the Society some observations respecting the common undershot water-wheel, and to point out the superiority of that of my invention.

1st, In common water-wheels more than half the water passes from the gate through the wheel, without giving it any assistance.

2dly, The floats coming out of the tail-water are resisted with almost the whole weight of the atmosphere at the instant they leave the surface of the water.

3dly, The same quantity of water which passed between the floats at the head, must of course pass between them at the tail, and consequently impede the motion of the wheel.

In the water-wheel of my invention,

1st, No water can pass but what acts, with all its force, on the extremity of the wheel.

2dly, The floats coming out of the water in an oblique direction, prevent the weight of the atmosphere from taking any effect.

3dly, Although the new water-wheel is heavier than that on the old construction, yet it runs lighter on its axis, the water having a tendency to float it.

4thly, By experiments made with the models, proofs have been shown that the new wheel has many advantages over the common wheel; and that, when it works in deep tail-water, it will carry weights in proportion of three to one, so that it will be particularly serviceable for tide-mills.

I hope on trial, before the Society, my invention will prove successful; and am, Sir,

Your obedient servant,

J. BESANT.

No. 26, Brompton.

To the Secretary of the Society of Arts, &c.

* From the *Transactions of the Society for the Encouragement of Arts*, &c. vol. xix. — Ten guineas were voted to Mr. Besant's widow for this invention.

Repeated