Parker's Water Wheel.

Messrs. Editors,—I have read J. S.'s "Useful Information about Water Wheels," in No. 17 of the present volume, also S. L. in No. 20, and R. C. M. in No. 27, all on the subject of water wheels. The reader will perceive that the first and last writers give a very different account of the useful effect of the same kind of water wheels. L. S. shows that a fixed quantity of water, to grind a bushel of grain, will constantly vary on account of the difference in the head or fall of water, and he might have stated, with the different kind of water wheels; and even the same kind of wheels using the same quantity of water, will vary from 100 to 3 or 400 per cent., owing to the difference in grain, size, and dress of the mill stones. It is seldom you can find two millers or millwrights to agree as to how mill stones ought to be furrowed or dressed. I have satisfied myself from practical experience, that owing to the different ways in furrowing and dressing the millstones, that the same mill, with the same quantity of water on the wheel, will vary, in grinding, from five to twenty bushels an hour. How erroneous, then, will all conclusions be, if we judge of the quality or useful effect of the different kind of water wheels, from a simple statement of the number of bushels ground in a given time, while we are ignorant of other circumstances that ought to be brought into the calculation. What is here said about grinding will, with equal force, apply to many other purposes—such as sawing lumber, owing to the difference of timber and fixtures about the mill.

The best way I know of testing the useful effect that the different kind of water wheel will yield, from the absolute power applied, or water used, is to apply the friction brake, similar to that used by M. D. Prony to the turbine wheel of Fourneyron. This is a very simple, correct and useful instrument, and uniform in its answers.

Would it not, Messrs. Editors, add much to the interest of the country, to have the Commissioner of Patents, or some suitable person or persons appointed by him, or Congress, take what is considered our best kind of water wheel. and test them by actual experience, with the friction brake, or any other mode that would be more satisfactory, and show to the world the useful effect or per centage of power they yield, from the absolute power they use? Statements coming from such a respectable and disinterested source, might be relied on by all, and the beneficial results would be almost innumerable. It does seem that a little of the public money spent in this way, would benefit our country more than the way much of it is now spent.

Your correspondent, R. C. M., says, "according to the laws of hydraulics, a percussion wheel is one that moves with the water, and a re-action wheel moves in a contrary direction. If a percussion (or re-action, I suppose) wheel moves faster than the water that propels it, where, and from what source, does it derive its power? According to well known principles, action and re-action are opposite and are equal. If so, how can they be combined on the same wheel, with one current of water, upon the same surface, at the same time, to produce any effect?" R. C. M. seems to doubt J. S.'s assertion that a wheel ran seven per cent. faster than the water that propelled it. Such a statement does seem like an impossibility. But it appears J. S is not alone in his assertion, and is not the first that made such a discovery. Mr. Waring, in the third volume of the American Phil. Society's transactions, describes a machine, (on the principle of a re-action or Barker wheel) on De la Cour's construction, from his own inspection, where the fall was twenty-one feet, and the radius of the arms, from the centre point to the centre of the discharging orifice, forty-six inches,—that the wheel, when unloaded, made 115 turns in a minute, giving a velocity of 9 5-8 feet in a second, faster than the water would flow out under a 21 feet head of pressure,—which excess of velocity he attributes to the prodigious centrefugal force generated in the arms, upon which principle the wheel in a great measure depends for its useful effect. Statements coming from such a respectable source, ought not to be treated with contempt, because they don't happen to agree with our present theory. Facts are stubborn things, and when experience and theory will not agree, the theory must be wrong.

I will now try and show R. C. M. how a re-action and action, although in different directions, may be combined with the same current of water, at the same time, with a double wheel properly constructed. But whether any power will be gained by the application, I am at present unable to decide. But as I am now busy making such a wheel, as I shall now describe, and intend testing it by actual observation and experience, perhaps I may give you the result of the trial in some future communication after I have fairly tested it. I shall try its effect with the friction brake, and with all the impartiality I can bring to bear on the subject.

Let a water wheel be constructed on the principle of Whitelaw and Sterrat's re-action, (the water applied from below the wheel, as they apply it) with any number of vents, say six or eight, (and the American Turbine, illustrated in No. 3 of your present volume, with only two vents, seems to work on the same principle ;) this wheel would answer the same purpose as the fixed disc in the turbine of Fourneyron—and suppose this wheel or disc instead of being stationary, as in the turbine of Fourneyron, that it be fixed to a revolving shaft, and of course it would revolve on the principle of re-action. Then let another wheel or rim be constructed like the turbine of Fourneyron, that will fit over it, the inside diameter of the outer wheel to fit the outside diameter of the re-action or disc wheel, making due allowance for clearance; let this turbine be keyed on to a hollow shaft that will fit and turn on the shaft of the disc or re-action wheel. Both shafts will be vertical, and it is evident the wheels and shafts will revolve in different directions, for the water, as it escapes from the inside wheel, will impinge on the buckets of the turbine, and will re-act on the inside, and act on the outside wheel. Let the shaft of the re-action wheel be a foot or two longer than the hollow shaft of the turbine that fits it, and let both shafts of each water wheel have a band-wheel or pulley keyed on to them, communicating with a band wheel on a separate shaft, and one of the belts of the turbine or re-action running crossed, it is evident they will operate in the same direction, and each wheel will exert the power it is capable of yielding, although running opposite, in turning the separate shaft in one direction. The power can now be taken from this shaft and applied as other mill work. I hope R. C. M. will now perceive that the same current of water, at the same time, can be made to re-act, and act on a double wheel properly constructed. I am not aware of water ever having been so applied, and made some inquiries of you, Messrs. Editors, in a former letter to ascertain if you knew of its application. I will now try the experiment to see if any power will be gained by the application of water on this principle. Any kind of a water wheel that will yield from 70 to 90 per cent. useful effect, from the absolute power applied, is a good wheel. And that kind of water wheel that is the most uniform and easily regulated in its motions, the simplest, cheapest, most durable, not liable to get out of order, not effected by back water, and will yield the most useful effect, from the amount of water used is the best. But ask scientific and practical mechanics what form of water wheel combines and yields those results, and the answers will almost be as different as the form of the water wheels. This shows that there is much to learn and to be decided by practical observation and experience, even on water wheels—although the application of them are as old as Adam and Eve. G. B.

Little Rock, Ark., 1850.

Sugar in France.

The quantity of sugar manufactured in France is greatly on the increase. Beet root is the material. There are 288 manufactories and the number of pounds produced up to this time, this year, is almost double what it was for the corresponding season last year.

The Benefits of Coffee as an Article of food.

At a recent meeting of the Academy of Science, Paris, a communication from M. de Gasparin, a very scientific argriculturist, excited a great deal of interest. This gentleman had heard of a body of miners in the neighborhood of Chaleroi, on the Belgian frontier, who subsisted altogether on a peculiar diet essentially vegetable, and enjoyed with it excellent health, and great muscular strength. He visited the spot; and found the regime of these prime workmen, universally to be this: on rising, the miner drank half a quart of liquid coffee and chicory, mixed in equal quantity, with about a tenth part of milk; he ate, too, a stout slice of bread and butter. He carried with him to the mine some slices of bread and butter, and a tin quart bottle filled with the same coffee, as food during the day; on his return home in the evening, he made a supper of dressed potatoes and cabbage, or other green vegetables, and finished with a cup of his coffee and a slice of bread and butter. It was only on Sundays and festival days, that he ate even a small quantity of meat and drank about two quarts of beer; no fermented liquors on week-days.

Azote being the great doctrinal principal of nourishment, Mr. Gasparin calculated closely, and ascertained that the daily fare of the robust Charleroi miner did not contain half the quantity which might be supposed requisite for health and strength. There was less nutrition than in the diet or regime of the most austere religious orders, or in that of the inmates of the French central prisons. French miners had tried in vain to equal the men of Charleroi, though they fed themselves much more substantially. All the population that subsisted in the way above described, were in comparatively easy circumstances. A man with a wife and six children kept free of debt, and lived with some comfort on two francs—forty cents—a day.

The savan concluded that it must be the coffee which worked the miracle in the human frame. He knew that this berry had been eminently serviceable to the French troops in Algeria, in their arduous and fatigueing expeditions; and to the crews of exploring vessels in the artic regions. All the nations that use it considerably are of sober habits. It accounts for the prodigious abstinence of the Arabian caravans. Hence, not being nutritive, it must possess other properties, does it assist or consummate digestion? or does it retard the mutation of the organs which then require a less consumption of renovating material? M. de Gasparin would not decide, but he was sure that the subject was of much consequence.—To be able to subsist so cheaply with such bodily advantage, would prove a signal gain for the laboring classes, particularly in seasons of scarcity.

M. Majendie, threw out immediately, some sensible comments on this communication.—"It was true, he said, in general, that the alimentary substances that contain little or no azote, are not nutritious; he had, himself, established this fact many years ago; but it must not be inferred from any of the experiments made on this point of physiology, that the proportion of azote contained in an aliment expressed strictly its nutrive power. A number of very highly azoted substances were not nutritious. Majendie specified various instances. The disproportion of azote in substances equally alimentary is sometimes enormous even in the same substance of equal weight, differently modified.

"Let me suggest," he added, "that all that relates to the theory of nutrition is yet covered with an impenetrable veil. We know almost nothing on this important and fundamental phenomenon. We begin to understand the different acts or processes of digestion,—thanks to the recent labors of physologists, and particularly of M. Bernard, but all that happens in the formation and absorption of the chyle, all that passes in the blood and the intimity of the organic tissues and of the fluids, is still enveloped in utter obscurity. Thus you see, that we are far from being authorized to infer the nutrive qualtities of an article of food from the proportion of azote which enters among its chemical elements."

Another academician indicated as important considerations overlooked by M. de Gasparin, the race or species of men in question, the mean duration of their lives, the special influence of localities, &c.

He might, methinks. have ascribed some share of virtue to the chicory. This ingredient is employed in vast quantity in France.—It struck me with some surprise that so much of it is consumed in Great Britain in the same away. The annual consumption of coffee proper is, there, thirty-seven millions of pounds; of chicory, as mixture, twenty-two millions; four pence per pound duty is levied on colonial coffee. The best associate for coffee known to me, is burnt acorns or chesnuts, ground—what the French call glands doux d'Espagne, of which a great quantity is manufactured in the South of France. It has proved effectual in cholera, and often cures chronic diarrhœa. It best counteracts the operation of coffee on the nerves.

Handling Molten Lead and Iron.

The Boston Traveller says experiments, similar to those recently made in France, by which molten lead and iron are handled with entire impunity, the hands and arms being boldly immersed in the boiling liquids, have been tried with equal success at the scientific school, Cambridge. A fortuitous circumstance discovered that the apparently wonderful results were nothing but the simple effect of what is called the spheroidal forms, which prevent the immediate contact of the iron with the skin. The experiments are to be repeated before the Natural History Society of Boston soon. If so, they will be duly reported.

[It is very singular to see how long some things take to get into some of our daily papers, after they have been published in the Scientific American. It is a long time since we first noticed the experiments made by Boutigny in France. It is now 4 or 5 years since they were given to the world. In a paper lately submitted to the Academy of science by M. Corne, he says:

"Having determined on investigation the question whether the employment of liquid sulphurous acid for moistening the hands would produce a sensation of coldness when they are immersed in the melted metal. I immersed my hands, previously moistened with sulphuric acid, in the melted lead, and experienced a sensation of decided cold.

I repeated the experiment of immersing the hand in melted lead and infused cast iron.—Before experimenting with the melted iron, I placed a stick previously moistened with water, in the stream of liquid metal, and on withdrawing it found it to be almost as wet as before; scarcely any of the moisture was evaporated. The moment a dry piece of wood was placed in contact with the heated metal, combustion took place. M. Covlet and I then dipped our hands into vessels of the liquid metal, and passed our fingers several times backwards and forwards through a stream of metal flowing from the furnace and the heat from the radiation of the fused metal being at the same time almost unbearable."

There is one thing about this which is very remarkable, viz., the sensation of cold when the hand is moistened with sulphuric acid and dipped into the metal. If the hand is quite dry and dipped into sulphuric acid, no pain will be felt for some time, but if the hand be wet with cold water and dipped into the acid, it will commence to burn in a moment.

The Mechanical Labor on a Newspaper.

Few persons have any idea of the vast amount of mechanical labor, independent of the mental exertion, which is required in the production of a newspaper. The London Times with its mammoth supplement has 72 closely printed columns, which contain 17,500 lines, made up of more than a million pieces of type. Thirty-four thousand copies of this paper and supplement have been printed in about four hours. The greatest number ever printed in one day was 54,000, and the paper used weighed seven tons, the usual weight being four and a half tons. The surface printed every night (with a single supplement) is thirty acres, the weight of type in constant use is seven tons, and 110 compositors and 25 pressmen are constantly employed.