The Iron Manufacture.

New York, Nov. 20.

Gentlemen—There having appeared in an American paper a short notice of the patent Blast Furnace of Mr. Yates, at Wingerworth, near Chesterfield, Derbyshire, England, and being the appointed Agent for the introduction of that furnace to the leading iron making district, in South Wales, where I spent twenty-five years in the management of mines and iron works, I trust your readers will bear with some observations on the furnace and the iron trade generally.

My education was (as that of the "princes" of the iron trade) from the age of fourteen, under-ground, and at furnace and forge. My father and grandfather had for nearly half a century, from 1780, iron works on the Wingerworth minerals, at which I was brought up. A plate was presented to my father, as Deputy for Yorkshire and Derbyshire, to Parliament, to protest against the Bill for Taxing Iron, and he was requested to inform the iron masters that, after a second reading, the Bill was abandoned; and which, considering the enormous increase of the trade, (Government at that time, 1806, being the purchaser of two-fifths of the iron made) was perhaps the best escape John Bull ever had from taxation.

I was, at an early age, recommended by the leading iron masters of the above counties to set on collieries, &c., upon an estate containing near one hundred feet thickness of anthracite coal, at the sea side, for Sir Edward Banks, contractor for two-thirds of the Bridges over the Thames, in London, and most of the Government works of his time; and his partner, Mr. Brogden, Chairman of the Committee on Ways and Means, (a friend of Priestley and Franklin)—with whom I was for twenty years connected; and I have, also, in several places, had charge of near one thousand men.

Considering the wreck of capital in the finest field of the iron trade in the world—South Wales—where, as in the States, great part of the primitive capital has been wasted in the midst of hundreds of competent managers of departments, though perhaps not one qualified to manage. I am not surprised at the startling announcement that of sixteen works set on for railway iron, in this country, twelve are at a stand. After disposing of the patent furnace of Mr. Yates, I shall tender observations on this important subject.

Notes taken at Wingerworth, April, 1847:—Nine months ago the green corn was cut on the site of the furnace which has now, for three months, made 120 tons of foundry iron weekly.

The cost of the erection of steam power and blast apparatus, estimated at £1,200. The furnace only 26 feet high, to the spring of the dome, at which point are six doors for charging. The inside diameter at that point is 16 feet, contracting downwards to 6 feet at the tweres. In a stack at the top of the dome, 6 feet high, is a damper, horizontal. The outside diameter, at the base, being only 22 feet, allows only slight brickwork between the three openings, for six tweres, and it had no doubt been better to adopt the iron standards and ring of the Welsh cupola furnace.

The theory of Mr. Yates is taken from the known effect of reflected heat in hollow fires,—the dome being found equivalent to twenty feet height of furnace to the avoidance of *grinding* the material. The furnace is even found to work as well, in all respects, when the materials are allowed to be 10 feet down, and a furnace of only 18 feet in height is contemplated.

Although objections as to wear and tear have induced Mr. Yates to order a blast engine to replace his "Rotary," it may be interesting to your readers to hear that an iron wheel of about 4 feet diameter, the axle and two hollow arms, to admit steam of 100 lbs. per inch pressure, to escape near the rim, by two holes of 3-8 of an inch diameter; the fan on the same axle, is the blast machine for making 120 tons of iron weekly.

I leave it to your calculating readers to say what power of engine of 20 evolutions per minute, is equal to this of 40 lbs. power, having 2000 revolutions per minute. I will conclude this subject with saying, that any queries that may appear in your paper shall be answered to the best of my power.

It is known to persons acquainted with the iron trade, that Mr. Dixon, of Glasgow, many years ago, dispensed with the boshes of his furnaces on the ground that scaffolding at the top of the crucible was the real cause of the irregularity and acknowledged unmanagablity of furnaces, and which Mr. Yates followed up with width of materials and reflected heat upon them, instead of height.

Having been a neighbor of Mr. Crane during the first experiments on anthracite and hot blast, and the erection by him of two furnaces and fire blast engine, to carry out his success, I can state that he could not get the one-third coke off those furnaces until their height was reduced, and great credit was due to Mr. Thomas, of the Crane Stone Works, U. S., for the style in which he set on that work, taking the lead of any thing at that period accomplished in Great Britain.

Mr. Crane having opposed the adoption of the plan of Mr. Dixon, alluded to, in the furnace I erected for anthracite coal at Trimsavan, I divided with him by having the crucible an inverted cone, and a steadier furnace never was erected. I claim the erection of the first good anthracite furnace in Great Britain. As a fact connected with this principle I take the liberty to say that my father having the last charcoal furnace of the midland counties of England, and a contract for navy ballast he could barely fulfil, tried it on coke, and the make was the same as that of Dudley two centuries previously—7 tons weekly—although the same materials as now used by Mr. Yates, —a greater pressure of blast and furnace of the same height proving the vast improvement accruing by width of material and quality of blast.

Having also been a near witness of a great part of the insane management of a dozen of the largest concerns, to the tune of five millions sterling lost to the owners, in South Wales and Monmouthshire, on as good situations as those on which an equal sum has been made, I shall be ready to enter upon the subject, should it be considered desirable; but I shall at present conclude with saying that I undertook the management of the intended iron works in Nova Scotia, chiefly with a view to the amalgamation of the charcoal iron trade, with distillation of wood for products, now supplied to the calico printers of the States from England.

I have apparatus for the trade on a profitable scale, and a knowledge of the uses of the products and the cost and value, would, I believe, lead any party, possessing mines, to give the subject attention. The wood of America is proved to be superior for this purpose.

I shall, with your favor, shortly moot a subject of vital importance to the American public—that of pig iron being generally made at about $15 per ton, or as cheaply as in Great Britain, yet with the average quality of bar iron; that for horse shoes at near $80 per ton. The works in this country stopped and stopping, in the face of the fact that their machinery equals that of Great Britain, where similar iron is barely half the above price. By way of stimulating the proprietors of this country, I have to say, I remember £20 per ton being paid for the conversion of pig into bar, by pudling, and no fortunes making; and I have seen fortunes rapidly made when there was barely one-fifth that sum, for the conversion; and none of the established works stopped when there was no certain difference in the value of best forge pig and bar iron—a state of things worse than those in this country by about £10 per ton of iron. T.B.

Multiply the pound sterling by $4,84, and the amount in dollars will be ascertained.

Annihilation of Time and Space.

The steamship America's news was transmitted by lightning from Halifax on the 16th, along the line to New Orleans, stopping at the intermediate cities to write down its message and the announcement of its reception at New Orleans came back to Halifax within 48 hours, during which time it had travelled a distance of five thousand miles! Rather an improvement on the old post-boy system.

For the Scientific American.

Important Discovery that may Lead to Improvements of Great Value.

(Concluded from page 76.)

If we ask the first dozen men we meet what power it is that carries a ball towards the sky when thrown upwards from a gun; the majority if not all will tell us it is the force of the powder. If we reply that as the ball is continually resisted there must be some force continually acting upon it, and that cannot be the powder, because there is no connection between it and the powder after it leaves the gun; we may then be told that it is the motion which the powder gave it that carries it up. That it is, however, some power foreign to motion, is shown by the fact that it resists a change to motion to the same extent exactly that it resists a change from motion. But waiving all that, how do we know that what we call motion in a body is not a greater or nearer approach to a state of rest than the body was in before. For instance, if we fire a ball parallel with the earth's path towards the west, instead of increasing the ball's motion, we will have lessened it, because the ball was travelling with the earth eastwardly before it was fired, and was only travelling less fast in the same direction afterwards. But for aught we know, the whole solar system, or all the visible universe, may be rushing in some unknown direction, so that to say it is motion that carries the ball upward, is simply to declare one's ignorance of the whole matter. It seems to be a principle that belongs to all substances with which we are acquainted, and perhaps we can find no better name for it than inertia. At least we can use that term till we find a better.

Having said thus much on the law itself, let us now see if we cannot apply it to practical purposes of no ordinary value. Let us see if we cannot solve the following problem:—The length, breadth, and depth being given, what is the best possible form for running it easily through the water? If we were entirely unacquainted with the matter, the first inquiry would be, what is it that resists a vessel? What principle is it that prevents it from going rapidly? Many, or most people, suppose it is friction.—(See an article in the Scientific American in which it is proposed to lessen the friction by a surface of air between the vessel and the water.) It cannot, however, be friction, for water is one of the smoothest things possible. It must have even less friction than ice, and we all know how easily skates will run, notwithstanding their edges cut the ice, which must waste some power. It is not necessary, however, to examine the question of friction at all, because we know of a resistance which a vessel must meet with, sufficient to account for more than 95 per cent of all the resistance she does meet. That resistance is the power of inertia. That a vessel must overcome the inertia of the water is self-evident the moment we reflect upon it. Therefore, in building we should have reference to the laws of inertia, and so shape the vessel as to have to overcome as little inertia as possible. In order that we may reason upon it where we shall be beyond other influences, let us suppose a vessel sailing or passing endways through space, where the attraction of planets could not disturb it, and let us further suppose that there are floating here and there in those lonely regions, balls of metalic or other matter, of such size as on the earth would weigh a pound. Let the vessel be 640 feet long and 64 feet wide, and let the centre of its path lie one inch to the left of one of those balls. What we want is to apply a force to the ball that will move it from the path of the vessel so as to clear the vessel's greatest breadth, and bring it back to its original position, with the least expense of power. If the vessel is sailing at the rate of 160 feet a second, and we apply a spring ballance to the ball, and pull it towards the right, with a force equal to half a pound; in one second the ball will have moved eight feet. That would indeed be enough to clear the vessel, because the next second the ball would move 24 feet; but as it would then be going at the rate of 32 feet a second it would not be possible to arrest its motion and move it back in two seconds more, without an unnecessary expense of power. Therfore let us try the experiment over and apply to the spring ballance a force equal to a pound. Such a force would move the ball 16 feet the first second. The ball's motion would then be 32 feet a second, so that if we let it alone, by the time the vessel's beam or centre of length passed it, the ball would be sixteen feet to the right of the extreme breadth of the vessel but as part of our object is to bring the ball back to its original position, therefore at the end of the first second we reverse the position of the spring balance and draw the ball to the left with the same force of one pound, and at the end of two seconds it will just pass the greatest breadth of the vessel, and its motion to the right be arrested.

Continuing to draw to the left to the end of the third second, the ball will then be within 16 feet of its original position, and moving at the rate of 32 feet a second. We therefore again change the spring balance to the right, and at the end of the fourth second, the ball's motion will again be arrested; and that, too, so as to leave it in the identical spot from which it first was moved. A less force than one pound on the ball would not have answered, and a greater would have been useless. It is now evident that the path of that ball from the bow to the stern shows the true shape for the vessel; for if the ball had not been moved by external force, the vessel would have had to move it; and if the vessel had been shaped as ships usually are, the motion given to the ball would have been much greater; and therefore the inertia overcome greater, also to do which must of course require proportionally greater power.

But why, it may be asked, should we be at the expense of bringing the balls back? Why not let them go? That would indeed be best if we were actually sailing through space, as supposed; and in that case the stern should have the greatest breadth; but as water subject to gravity is pressed upon by surrounding water, we must permit it to come back at the same even rate of motion, or lose power by a tendency to vacuum. In the supposed case there is a vacuum fore and aft, so that a vacuum there makes no difference; but where water is subject to gravity, we must avoid a tendency to vacuum, or we will have pressure as well as inertia to contend with.

We have now arrived at that point in the progress of our enquiry, where the question arises, what is the form of the path described by that ball? Reason tells us what it should be. And the path of our globe, in its annual revolution round the sun tells us what it is. Our globe is acted upon by a steady force, and it obeys that force in the same manner exactly as that ball would obey the spring balance.

From the explanation we have now made any one acquainted with philosophy and figures can estimate the path of that ball, and the proper form for a vessel, where the length, breadth and depth are given; but to save trouble, we give the following rule:—Divide the breadth of beam at the centre of the length into 256 parts; and the following figures will give the exact breadth in those parts, at each sixteenth of the distance to the bow and stern —254, 248, 238, 224, 206, 184, 158, 128, 98, 72, 50, 32, 18, 9, 2, 0.

If the builder choose perpendicular sides for the vessel, one division will be sufficient; but if he prefer a rounding bottom, he may take the breadth at the centre of length, at as many points as he pleases, from the keel upwards, and use the same division each time; that is, divide the breadth, at each measurement, into 256 parts, and keeping on a horizontal line to the bow and stern, use the figures as before.

Wonderful Rock in Lake Superior.

A very remarkable rock, it is stated by the Detroit Free Press, (but of which we have doubts) has been discovered in the middle of Lake Superior. It rises only about four feet above the surface and extends down to an interminable depth. The discoverers relate that the rock appears to be a place of general resort for the salmon trout of those lakes, as they found them in almost incalculable numbers, having, during their short stay, caught several barrels with no other instrument than a rod of iron, on one end of which they turned a hook.