Scientific American.

NEW YORK, OCTOBER, 11, 1856.

The New Theory of Heat.

Under the above caption our esteemed cotemporary, the London *Engineer*, of 12th September, quotes our article on page 405, Vol 11, entitled "Errors in Engineering," and makes a few comments thereon. It says :—

"We are of opinion that our trans-Atlantic cotemporary has not rightly understood the principles which have guided Mr. Siemens in the construction of his engine. So far from disparaging the dynamic theory of heat, which Mr. Siemens advocates as 'a mere term, out of which to raise a dust,' we look upon the same as one of the most important discoveries in physical science, and destined to lead inventive minds to great and practical results. The great difference between the old and new theory of heat is in this, that according to the old, heat and water are looked upon as the dynamic agents in producing motive force; whereas, according to the new theory, the water alone can be looked upon as the agent, whereas the heat is the material which is converted into power, and therefore gives up its very existence."

We did not disparage the dynamic theory of heat, but we stated that what was called "the dynamic theory" of heat, put forth as new by Mr. Siemens, was no discovery at all; that it was "a mere term out of which to raise a dust," and we are right, too, as we shall prove. Our cotemporary and Mr. Siemens entertain the idea that a new theory is a new discovery. This is a mistake; a new theory is simply a new way of explaining certain phenomena, but it is not a new discovery; it does not add a single new fact to the domain of science. Our cotemporary's explanation of the difference between the old and new theory of steam makes both *dynamic*, and the new one only a wrong explanation of the old theory; our cotemporary is our witness. The old theory is stated to be "heat and water are dynamical agents," that is, heat is an agent, and water an agent, and these two combined produce motive power in the form of steam in the engine. The new theory is "water is an agent and heat the *material* which is converted into power, and gives up its very existence."

Here it is asserted that heat is a material; but matter has the properties of indestructability, and yet we are told that this material "gives up its very existence." Matter has also the properties of inertia and gravity, but heat has not; it is, therefore, an imponderable agent.

Bacon says: "Heat is an expansive undulatory motion in the minute particles of a body." Descartes says: "Heat consists in certain motion or agitation of the parts of a body." Robert Boyle says: "Heat consists in that mechanical property of matter called motion." These philosophers held the dynamical theory of heat—for mechanical motion is dynamics—hence the new theory of Mr. Siemens is at least 200 years old.

The absurdity in his case appears to us to be that he simply calls an old theory *new*, and builds a steam engine upon this basis, to save fuel. Such conduct appears to be as sensible as would be that of a man who asserted that combustion was a new theory in illumination, and upon this idea molded a tallow candle to last longer, or give more light than the candle of any other person. If he effects the saving —50 per cent.—in fuel in his new steam engine, as asserted by the *Engineer*, it must be by some arrangement based upon old and well known principles, not the pretended new dynamic theory of heat.

Well, how does Mr. Siemens effect this great saving? Our cotemporary says: "In Siemens' engine the Respirator occupies the position of the heaters of the feed water of common high pressure engines, with this difference only, that it returns the *whole* waste heat to the engine, whereas the ordinary heater receives only 12 per cent." What has the new pretended dynamic theory to do with such claims. The Regenerators of Stirling and Ericsson were set up as effecting the very same objects, nothing more.

Our cotemporary states that there is one of Siemens' engines in Paris which consumes only about one half the fuel of the best expansive engines, and has no more back pressure on the pistons than common high pressure engines. If it consumes less fuel, we venture to assert it does less work. More extravagant claims were set up for the hot air engine, and as little back pressure, it was asserted, was exerted on its pistons. But it is impossible for steam to be exhausted into a close hot heater from the cylinder without exerting great back pressure on the pistons, it cannot be otherwise. Cold is as necessary as heat to produce reciprocating motion in a steam engine. Without a condenser of some kind there would be no steam engine. The atmosphere is the condenser of the high pressure engine, the vacuum condenser that of the low pressure engine. Many engines waste a great deal of heat, but that is owing to their bad construction, or not working the steam expansively, not for want of correct ideas respecting the old dynamic theory of heat.

American Machines Saving Money to England.

The Birmingham (Eng.) *Journal* of Sept. 6th, contains a description of the government new manufactory of small arms at Enfield. It originated from the inability of obtaining a sufficient supply of arms during the late war from private makers.

In 1854 more than half a million of dollars were appropriated by the House of Commons to establish the new factory, and competent officers were sent to the United States to examine our government armories, purchase American superior labor-saving machines, and engage competent mechanics to superintend their operation. A great number of valuable machines were, therefore, purchased, and sent to England last year, and they are now in successful operation, under the general charge of Mr. Burton, first engineer—formerly master armorer at Harper's Ferry, Va.

About 430 men and boys are now employed at Enfield, but when the works are complete double this number will be employed, and 50,000 rifles per annum will be turned out.

All the machines for making the gun stocks were fabricated entire at the manufactory of the Ames Co., at Chicopee, Mass. They are the well-known invention of Thomas Blanchard, of Boston. This department at Enfield has twenty-seven machines, and is under the charge of Oramel Clark, of Massachusetts, another ingenious and intelligent countryman.

About 200 gun stocks are manufactured per diem, at a cost of about one shilling sterling each, for labor—about eleven-twelfths less than it cost the British government to make them previously by hand labor. The Birmingham *Journal* says :—

"In estimating the cost of making a gun stock at Enfield at one shilling, no allowance is made for the original cost of plant and tools, or their subsequent wear and tear; but at the same time there can be no doubt that the saving effected by machinery such as this, will, in a short time, repay its whole cost, if, indeed, it has not done so ere this."

This is what American machines are doing for England. Uncle John is not so blind to his interests as some have supposed. The factory at Enfield is a success; American machines and skill have made it so, and full credit is given to our country for this; Mr. Burton has got a first rate permanent engagement, and the American mechanics engaged there have received high praise and good pay.

It is stated that France, Austria, Portugal, Sweden, and Russia are about to follow in the wake of England, and have sent Commissioners to visit Enfield. The New World is now forging machines and ideas for the Old, and when we have fully brought the old nations up to the proper standard they may be allowed to annex themselves to the Confederacy.

Resignation of Commissioner Mason.

We announced two weeks ago that Judge Mason had sent in his resignation to the President, but that it had not been accepted, and we trusted he might be induced to withdraw his petition. Since that time we learn that the friends of Mr. Mason, and the inventors generally, have so importuned him to remain at his post, that he will yield to their wishes for the present. His withdrawal from the Office may therefore be considered as indefinitely postponed; probably until the Secretary of the Interior shall attempt some new interference, when all of us who have dealings with the Office will realize the loss of an efficient and just Commissioner.

Inventors, improve your time, and get your applications filed while you have a tried and capable officer to look after your interests and see that justice is done you.

Great Exhibition of the American Institute at the Crystal Palace, New York.

THIRD WEEK.

A marked change has taken place in the aspect of things at the Crystal Palace since our last report. The final day for the reception of goods for competition has passed, and the exhibition has fairly begun. It is a great exhibition. Never has there been witnessed so large and so splendid a display, so purely American in its character as that which is now inaugurated.

It is a magnificent sight to stand at some elevated position within the Palace, and gaze down upon the scene below. The broad floors of the edifice are filled with the noblest specimens of Industry, Science, and Art. The hum and clatter of a great array of novel moving machinery attracts and arrests the attention, in one direction, while, in another, the ear is entranced by sweet sounds of music, pouring forth from multitudes of instruments, of elegant forms and surpassing excellence. A constant throng of spectators circulating around and filling every nook and corner of unoccupied space, imparts a wonderful animation to the whole.

The general arrangement of the Exhibition is good. Everything seems to be in its right place, and bears a neat, cheerful, and attractive look. The arrangement of specimens and the allotment of space is under the charge of Wm. B. Leonard, Esq.; in him the Institute have a most valuable and efficient officer. Too much praise cannot be awarded him for the satisfactory manner in which he has placed the Exhibition before the public. Indeed, all the Managers of the Institute appear to have exerted themselves to render the Fair, this year, one of unwonted superiority. We rejoice to say that they have been highly successful.

Steam Fire Engines.

The only steam fire engine at present on exhibition is a large and splendid machine made by Silsby, Mynderse & Co., of the Island Works, Seneca Falls, N. Y. This engine was built for the city government of Chicago, Ill., but will not be delivered until the close of the Fair. The pumps, and the engine which drive them are of the rotary kind, made under Holly's patent. The boiler is of tubular internal construction. Weight of the whole, 9,100 lbs.; cost, $5,000. Patented in England and America 1855. We have in preparation a large and splendid engraving exhibiting the engine as it appears in the Fair, which we shall shortly publish, with further particulars. The engine is one of the most prominent and interesting objects in the Machine Arcade. Its powers are exhibited at frequent intervals during each day. At the sound of the steam whistle everybody rushes to its vicinity to witness the mighty outpouring of water which it occasions. Its capacities are so great that it is found difficult to obtain a full supply of water, and it cannot, therefore, be shown to the fullest advantage. It drinks up the supply of two hydrants with such rapidity as to collapse the hose

The same parties exhibit a large variety of rotary steam engines and pumps made under the same patent. They are chiefly remarkable for simplicity of construction, compactness, durability, and effectiveness. The pumps vary in size and price, from those costing $10, so small as almost to go in one's pocket, to larger ones costing $500, and capable of throwing 1200 gallons, 30 feet high per minute.—The engraving to which we have alluded will exhibit the interior construction.

Power Looms.

There are only four power looms on exhibition; these are for plain weaving, and were made at the Empire Works, Stockport, Columbia, N. Y.—Messrs Benjamin & Reynold's. They are made with all the latest improvements, and can be driven at the high velocity of 240 picks per minute—60 to the inch. The picker staffs have curved rockers at the foot, and a parallel motion. The shuttle is arrested at the end of each shot by a keeper spring, so set that its pressure is graduated, increasing towards the end of the stroke, and releasing the shuttle more easily as it leaves the box—a good arrangement. Connected with the stop-motion there is a compensating device, which prevents *fell* being formed in the cloth. A self-acting friction brake stops the loom at once if the shuttle should be arrested in its race, and thus breakage of the warp is prevented. The driving pulley is boxed and coupled by a very ingenious arrangement of three sector arms set on knuckle joints at the center, and actuated by centrifugal action—they are forced out to couple by friction with the interior rim of the pulley. The web or cloth is kept stretched to its proper width by two small fixed roller *temples*—one at each selvedge. What an immense amount of labor is saved by the fixed temples alone; they require no attention from the weaver; whereas the old temples had to be shifted by hand every two minutes. One girl can attend four looms (if the weft is good) as easily as she can two with the old temples attached. The price of such looms is $70 each.

Printing Presses.

A Poly-chromatic, or press for simultaneous printing with several different- colored inks, is exhibited by Messrs. A. M. & G. H. Babcock, of Westerly, R. I. The machine shown consists of a central block having four level surfaces or beds, each of which receives a sheet of paper for printing. The block revolves, bringing each of its surfaces opposite to a platten, to which a portion of the types or engraving are secured. There are as many plattens as beds. As the sheets come in front of the plattens the latter advance and leave an impression of their types upon the paper. Each platten is inked by a different set of rollers, and thus a variety of colors are stamped upon each sheet of paper. Colored engravings, having almost the richness and elegance of oil paintings can be readily produced by machines of this kind. They may be made to print as many colors as are desired. Price $800 and up, according to size. The operations of this press are regarded with much interest by spectators at the Fair.

Windmills.

Mr. A. P. Brown, of Brattleboro', Vt., exhibits one of his self-regulating windmills, which appears to be of a very substantial and serviceable character. This invention was illustrated and described on page 361, Vol X, SCIENTIFIC AMERICAN. Fowlers & Wells, agents, Broadway, N. Y. Patented July, 1855.

Dr. F. G. Johnson, of Brooklyn, N. Y., is on hand, as usual, and exhibits a fine specimen of his self-regulating windmill. For engraving and description see SCIENTIFIC AMERICAN, Vol. XI, page 236. Patented Jan. 1856.

Messrs. Chambers & Hargraves exhibit a new windmill, patented Aug. 1856. One feature of novelty is an upright tail-board, which controls the angle of the wings. When the wind exceeds a certain force, the tail-board gives before the pressure, and causes the wings to move and present their edges to the current.

Thrashing Machine.

One of Holmes' Patent Thrashers is exhibited by Bonnell & Co., 211 Center street, New York. It is of small size, to be used by hand or power, as desired. It consists of a a few wooden, bars pivoted at one end, and caused to fall upon a platform. The bars are lifted by cams arranged on a rotating shaft. The straw is carried along under the bars by an endless apron. It is alleged that this machine thrashes out the grain, but does not injure the straw, like the common machine. It is claimed that two men, with one machine will do the work of six men with common flails.

Water Heater for Locomotives.

Magoon & Co., of St. Johnsbury, Vt., exhibit one of their patent smoke stacks for locomotives, by which the heat of the exhaust steam, and all the escape caloric is made to heat the water in the tender, and an important economy in fuel is thus obtained. We have