Arts, Manufactures and Machinery.

(*Continued from No. 37.*)

Use of Tools by the blind.—Relation of power to time.—The Earth's rotation.—The source of power.—Packing and transport of cotton, by the Chinese and Americans.

Another, although, fortunately, a less general use of Tools for human hands, is to assist the labor of those who are deprived by Nature, or by accident, of some of their limbs. Those who have examined the beautiful contrivances for the Manufacture of shoes by Machinery, which we owe to the fertile invention of Mr. Brunell, must have noticed many instances in which the operatives were enabled to execute their work with precision, although laboring under the disadvantages of the loss of an arm or a leg. A similar instance occurs at Liverpool, at the Institution for the Blind, where a Machine is used by those afflicted with blindness, for weaving sash-lines; it is said to have been the invention of a person suffering under that calamity. Other instances might be mentioned of contrivances for the use, the amusement, or the instruction of the wealthier classes, who labor under the same natural disadvantages. These triumphs of skill and ingenuity deserve a double portion of our admiration when applied to mitigate the severity of natural or accidental misfortune, when they supply the rich with occupation and knowledge, when they relieve the poor from the additional evils of poverty and want

There exists a natural, although, in point of number, a very unequal division amongst Machines; they may be classed as *those which are employed to produce power*; and as *those which are intended merely to transmit power, and execute work.*

The first of these divisions is of great importance, and is very limited in the variety of its species, athough some of those species consist of numerous individuals.

Of that class of Mechanical agents by which motion is transmitted, the lever, the pulley, the wedge, and many others, it has been demonstrated, that no power is gained by their use, however combined. *Whatever force may be applied at one part can only be exerted at some other diminished by friction and other incidental causes;* and it has been further proved that *whatever is gained in the rapidity of execution is compensated by the necessity of exerting additional force.*

These two principles, long since placed beyond the reach of doubt, cannot be too constantly borne in mind; and in limiting our attempts to things which are possible, we are still, as we hope to show, possessed of a wide field of inexhaustible research, and of advantages derived from mechanical skill, which have but just begun their influence on our Arts, and may be pursued without limit,—contributing to the improvement, the advantage, and the happiness of our race.

Of those Machines by which we produce power it may be observed, that although they are to us immense acquisitions, yet in regard to two of them, the powers of wind and water, we merely make use of bodies in a state of motion by nature; we change their directions in order to render it subservient to our purposes, but we neither add to, nor diminish the quantity of motion in existence. When we expose the sails of a windmill obliquely to the gale, we check the velocity of a small portion of the atmosphere, we convert its own rectillinear motion into one of rotation in the sails: we thus change the direction of force, but we create no power. The same may be observed with regard to the sails of a vessel; the quantity of motion given to it is precisely the same as that which is destroyed in the atmosphere.

If we avail ourselves of a descending stream to turn a water-wheel, we are appropriating a power which Nature may appear at first sight, to be uselessly and irrecoverably wasting, but which, upon examination, we shall find that she is ever repairing by other processes. The fluid which is falling from a higher to a lower level, carries with it the velocity due to its revolution with the earth at a greater distance from its centre. It will therefore, accelerate, although to an almost infinitesimal extent, the Earth's daily rotation.

The sum of all these increments of velocity, arising from the descent of all the rivers on the Earth's surface, would in time become perceptible, did not nature, by the process of evaporation, raise the waters back to their sources; and thus again, by removing matter to a greater distance from the centre, destroy the velocity generated by its previous approach

The force of vapor is another fertile source of moving power, but even in this it cannot be maintained that power is created. Water is converted into elastic vapor by the combustion of fuel. The chemical changes which take place are constantly increasing the atmosphere by large quantities of carbonic acid and other gasses noxious to animal life By what process nature decomposes or reconverts these elements into a solid form, is not sufficiently known. The absorption in large quantities of one portion of them by vegetation is to take place; but if the end could be accomplished by Mechanical force, it is probable the power necessary to produce it would at least equal that which was generated by the original combustion. Man, therefore, cannot create power, but, availing himself of his knowledge of Nature's mysteries, he applies his talents to diverting a small and limited portion of her energies to his own wants; and, whether he employs the regulated action of steam, or the more rapid and tremendous effects of gunpowder, he is only producing, in small quantity, compositions and decompositions which nature is incessantly at work in reversing, for the restoration of that equilibrium, which we cannot doubt is constantly maintained throughout even the remotest limits of our system.

When a mass of matter is moved a certain force must be expended and upon the proper economy of this the price of transport depends A country must, however, have attained a high degree of civilization before it will have approached the limit. The cotton of Java is carried in junks to the coast of China but from the circumstances of the seed not being previously separated, three quarters of the weight is not cotton. This might, perhaps, be justified by the want of Machinery to separate it in Java, or by the relative cost of the operation in the two countries, But the cotton itself, as packed by the Chinese, occupies three times the bulk of an equal quantity shipped by Americans for their own markets. Thus the freight of a given quantity of cotton costs the Chinese nearly twelve times the price to which, by a proper attention to mechanical methods, it might be reduced.

Peat and Peat Mosses.

Peat or turf, is vegetable matter in various stages of decomposition; but it is more or less mixed with earth and salts. The vegetable matter of peat consists of soluble and insoluble *geine* or *humies*, with a mixture of undecomposed vegetable matter. Its color is brown, sometimes yellowish or reddish, or a dull black. It has a loose texture; is more or less porous, and even spongy. When recently dug, it forms a viscid slimy mass, which by exposure to the air becomes dry, and more or less hard and brittle.

The upper part of peat beds is loose and fibrous, having undergone only a partial decomposition; but on descending, the vegetable fibre gradually disappears, and the peat is more compact. The composition of peat is different in different localities. According to Sir Humphrey Davy, one hundred parts of of dry peat contain from 60 to 99 parts destructible by heat, the remainder consisting of earthy matter and salts. He further adds, that the earthy matter of peat is uniformly analagous to that of the stratum of rocks or soils on which it grows. Where the earthy materials are clay the peat is more compact. The weight of a cubic foot of peat varies from forty to seventy pounds; and the denser variety yields about 40 per cent of charcoal.

Peat is mostly limited to the colder parts of the globe, for, in tropical climates, except on high lands, vegetable matter decomposes so rapidly that it is resolved into its ultimate elements too soon to admit of the formation of peat. In most temperate climates it is very abundant. In Ireland the peat bogs are said to occupy one tenth part of the surface. The great marsh of Montoire, near the mouth of the Loire, in France, is said to contain more than one hundred and fifty miles in circumference. It also exists in large quantities in South America, south of the 45th degree of latitude. In Massachusetts the amount of peat has been estimated to exceed 120 millions of cords. In the Natural History of New York, fifteen counties are noticed that contain greater or less quantities of peat; it is also known to exist in others. In some of these beds it is said to be thirty feet or more in depth.

Peat Mosses increase at the rate of 7 feet in thirty years and it is unquestionable that a considerable portion of the European peat-bogs have been formed since Julius Cæsar invaded Britain; for along the line of the great Roman road, no vestiges of the ancient forest described by that general, can be discovered, except in the ruined trunks of trees in peat. Several of the British forests, which are known to have been cut at different periods, by order of the British Parliament, because they harbored wolves or outlaws, now have their original sites covered by peat bogs.

It is believed by Geologists, that by the long continued action of water, pressure, and perhaps other agents, the geine of peat is changed into bitumen and carbon, which constitute lignite and bituminous coal. Dr. C. T. Jackson, found the process of bituminization considerably advanced in a bed of peat he discovered in Maine. This presents us an index to the formation of the older as well as newer coal beds.

Peat bogs sometimes burst from their beds and move like a wave of desolation over the country. Ireland has been often afflicted with such accidents. After a sudden thaw of snow in Janury, 1831, a peat bog or bed, in Sligo, broke away, and a hundred acres of semi-fluid peat took the direction of a small stream, and rolling on with the violence of a torrent, swept along brush, timber, soil and stones, and overwhelmed a large tract of valuable land on a lower level. On passing through some soft lands, the flood swept out a wide and deep ravine; and where it crossed the road it tore out a channel six hundred feet wide. The great earthquake in Lisbon also set some of the Scottish and Irish bogs in motion and did much damage.

Bog iron ore, or ochre, is often found at the bottom of mosses, and is composed almost entirely of a minute infusory animalcula. In the Wonders of Geology, it is stated that "the fossil animalcula of iron ochre, is only the one twenty first part of the thickness of a human hair; and one cubic inch of this ochre must contain one billion of the skeletons of living beings.

(*Conclusion next week.*)

Matthew Hale and the Poor.

It is said of the excellent Lord Chief Justice Hale, that he frequently invited his poor neighbors to dinner, and made them sit at table with himself. If any of them were sick, so they could not come, he would send them provisions warm from his own table. He did not confine his bounties to the poor of his own parish, but diffused supplies to the neighboring parishes, as occasion required. He always treated the old, the needy, and the sick, with the tenderness and familiarity that became one who considered they were of the same nature with himself, and were reduced to no other necessities but such as he himself might be brought to. Common beggars he considered in another view. If any of these met him in his walks, or came to his door, he would ask such as were capable of working, why they went about so idly If they answered because they could not get employ, he would send them to some field to gather all the stones in it, and lay them in a heap; and then paid them liberally for their trouble This being done, he used to send his carts, and caused them to be carried to such places of the highway as needed repair.

Porous Brick and Stones.

Let the brickwork become perfectly dry in summer, and give it one or two coats of boiled oil. No wet will ever go through it again.

Natural Productions of Borneo.

Borneo is productive of gold, diamonds, crystals, copper, iron, loadstone, tin, and antimony; diamonds in alluvial soil, and deposits near the base of mountains, also in sandstone, and the sand mountains of Ponteanak (a Dutch settlement) and Banjan-Massing. Gold, is found, in grains, in alluvial soil, and in the sands of the rivers; also in the mines of Salak, Sukadon, Tampazook, Matam, and many other places. Tin is said to be found at Sarawak; copper at Mandore, in Poutianak; rock crystal, called water diamond, at Sulo and Kaman; loadstone at Pulo Bongorong. But none of these mines are worked by Malays. Chinese Emigrants, from Canton, have in many instances made a fine harvest, but at great risk from their treacherous neighbors Nature has been bountiful to this indolent race, fruits of all kinds to be found within the tropics grow wild, as also sago, pepper, and tobacco, which form articles of trade; vegetables are very inferior, for want of cultivation, as is also the sugar cane. They exercise no trades, except those of boat builders, and a few blacksmiths, or armourers The women can sew; but there is no spinning wheel or other household instrument in Borneo. The seas abound in fish, which form the principal animal food. Rice is the staple, while curries of fowls, eggs, or vegetables, are much in use. The flesh of animals, or, as we call it, butcher's meat, is seldom used, excepting dried deer's flesh, which is esteemed a luxury. Sweetmeats are much in demand, made of coarse sugar from the scarcely-cultivated sugar cane, and rice fried in cocoanut oil. Fish is preferred salt, and of a high flavor. They have ducks which they keep for their eggs; and also bullocks and goats, but as Mohammedans, no pigs. Their drinks are either plain water, or sherbet, rice water, and cocoa-nut milk. Tea and spirits are neither made nor allowed amongst these orthodox Musslemen.

Hereditary Propensities in Dogs.

Roulin relates that dogs employed for hunting deer in some parts of Mexico seize the animal by the belly, and overturn it by a sudden effort, at the moment when the belly of the deer rests only upon the fore legs; the weight of the animal thus thrown over being often six times that of its antagonist. The dog of pure breed inherits this disposition, and never attacks the deer from before while running; even should the deer, not perceiving him, come directly upon him, the dog slips aside, and makes his assault on the flank; whereas, other hunting dogs, though of superior strength and general sagacity, which are brought from Europe, are destitute of this instinct. A new instinct has also become hereditary in a mongrel race of dogs employed by the inhabitants of the banks of the Magdalena in hunting the white lipped Pecari. The address of these dogs consists in restraining their ardor; attaching themselves to no animals in particular, but keeping the whole herd in check Now, among these dogs, some are found which, the very first time they are taken to the woods, are acquainted with this mode of attack; whereas, a dog of another breed starts forward at once, is surrounded by the Pecari, and whatever may be his strength, is destroyed by them almost in a moment.

Picturesque Hair-Cutting.

An English traveller in Paris, having occasion for a hair-cutter sent for one. At the appointed time, an elegantly attired person arrived, and the gentleman sat down before his dressing case to prepare for the operation. The man walked round his "client" once or twice, and finally taking a stand at some distance, attentively scrutinized the gentleman's face, with an air of a connoisseur looking at a picture,

"Well," said the Englishman, impatiently "when are you going to begin?"

"Pardon me, sir," was the polite reply, "I am not the operative, but the physiognomist. Adolphe!" he cried out, and a sleeved and aproned barber entered from a hall; "a la Vigil!"

With this laconic direction as to the model after which the gentleman's hair was to be arranged, the artist retired.