(For the Scientific American.)

How Worlds are Sustained.

Few indeed are the principles made use of by Nature in carrying on her operations. Force and inertia govern all the movements attending matter. These two principles originate, carry on, and terminate all mechanical operations either in nature or art.

It is the force of the artizan that wields the tool, but inertia produces the effect; it is the force of gunpowder that gives motion to the ball, but it is inertia that does the execution; it is the force of steam that propels the boat through the water, but the inertia of the water enables us to direct its course; the force of steam, through piston and rod, acts on the crank of the engine, but it is the inertia of the fly-wheel that regulates the motion and renders it effective. It is the force of gravity that causes a heavy body to descend, but it is the inertia that gives the result of the fall; it was Omnipotent force that gave the planets their motion through the heavens, it is inertia that keeps up that motion; it is the force of attraction that holds them in their orbits, but inertia prevents that force from drawing them together; and, in fact, inertia appears to be the regulator of force throughout the whole system of created things.

Motion is a consequence of the action of force. The continuation of motion after a force ceases to act, is the consequence of inertia. Inertia may be termed the repository of force—for a body once put in motion, by any force, will continue to move until its motion is arrested by some other force equal that which first gave it motion; and though the length of time, or space passed over, be ever so great, between the cessation of action of the motive force, and the commencement of the retarding force; yet inertia will deliver over the whole amount of motive force to the obstacle that arrests its motion.

If a force act on a body at rest motion will result; and the body—if its motion be not obstructed—will continue to move on during all time; but if during any time of its motion a similar force should be applied in an opposite direction to the first, its motion will cease.

When the God of Nature spake the worlds into existence, he applied to them a certain force, which gave them a rapid motion; inertia has retained that force, and although it has been over six thousand years since the motive force ceased to act, yet it will take the same amount of force to stop their motion, that it took at first to give it.

When, aided by the powers of the telescope, we look out into the boundless expanse, and there view millions of suns, each attended by numerous worlds; we see the same principles carried out—we see millions of worlds all moving on harmoniously in their assigned orbits, governed by force and inertia; the motive force has ceased to act, but inertia carries them on, and will continue to do so until the Great First Cause shall, with a force equal that which gave them motion, bid their motion cease. J. B. Conger.

[We have received a number of communications, on force and inertia, which we have refused to publish, because a great deal has been said in our columns already on this subject, and we have no great liking to newspaper controversies. We are afraid that Mr. Conger has, in his comparisons, somewhat confused the real idea of what inertia is. Inertia cannot truly be said to produce an effect, as set forth, for it is the *passive* not the active quality of matter. There was just as much *inertia* in the tool before the artisan struck the blow, as afterwards. Inertia is simply that quality of matter by which it is incapable of spontaneous change, a body at rest cannot commence moving by any inherent power of itself, and when in motion it cannot stop, change its direction, or its velocity by any inherent power: this is inertia. The language often used to explain the property of inertia is calculated to mislead. Inertia implies absolute passiveness, a perfect indifference to rest or motion. It implies as strongly the absence of all resistance to the reception of motion, as it does to the absence of all power to move itself. There can be no doubt, however, as set forth by Mr. Conger, but *inertia* is the regulator of the material universe, the sustaining law of the rolling spheres.

Recent Foreign Inventions.

Purifying and Decolorizing Oils.—R. A. Brooman, of the firm of J. C. Robertson & Co., of the London Mechanics' Magazine, Patentee.

This invention consists of an improved method of purifying and decoloring cotton oil.

For this purpose an apparatus of the following construction is employed: it consists of a double-sided vessel, the interior chamber of which is appropriated to holding the oil to be purified, and the outer, which may be called the jacket, to the steam by which the oil is heated. There is a pipe by which steam is supplied to the jacket and steam-escape pipe. There is also a second steam-supply pipe, which leads to a steam box or chest, which fits on to the top of the oil chamber. To the bottom of this steam box are attached a number of open tubes, which serve to convey the steam to the bottom of the oil chamber, whence it forces its way up in a number of minute streams amongst the oil. Opposite the mouth of the second supply-pipe, where it opens into the steam-box, is placed a flat plate for the purpose of dispersing the inflowing steam towards the tubes. Hot air, or any other aeriform fluid containing oxygen, may be substituted for the steam. The tubes are of small diameter, and from 2 to 3 inches apart; but they may be of any form, as straight, or spiral, and disposed in any manner whatever, provided always they are in sufficient numbers to divide the inflowing steam, hot air, or other fluid, into a great many minute streams or currents. Supposing cotton oil to be that required to be purified, there is to be added to every 220 lbs. weight of oil introduced into the oil chamber about eighty-seven and a half pints of sea water (of the density of 11 lbs. of salt in every hundred and seventy-five pints of water, or thereabouts); and then the communication between the steam-supply pipe, and the steam box being opened, the mass is left to the action of the heat upon it for two hours. One and three-quarters of a pint of hydrochlorite of soda or potash is then thrown in, and after the lapse of about thirty minutes, from 2 lbs. to 4 lbs. of hydrochloric acid, and in lieu thereof, three and a half ounces of hydrofluoric acid. In from five to ten minutes more the oil is drawn off and filtered, and then transferred to a wooden vat, in order to undergo a course of mechanical agitation, but previous thereto, about one hundred and seventy-five pints of water, (which may be either warm or cold), and a lye of three and a half pints of hypochlorite of soda or potash are added. The vat turns on a vertical shaft or spindle, which is furnished with a number of radial arms, which, during its revolution, pass between a series of rods or pins, which project inwards from the sides of the vat. There are also several vertical pins which project downwards from the lowest of the radial arms (passing clear of the bottom of the oil chamber), so that the mass of oil is broken up and tossed about in all directions, by the action of the agitator. A very rapid rotation of the agitator is not necessary; but it must be kept going until the decoloration of the oil is apparent, which, if the rate amount to from seven to fifteen revolutions a minute, will be generally in about an hour, but if the quantity of oil be larger, the rotation may be more rapid.

Or, instead of the method just described, the cotton oil may be purified and decolored by the following cold process alone, combined with mechanical agitation. In this case a wooden vat fitted with an agitator similar to that last mentioned, is employed, and there is added to every 220 lbs. of oil from 4½ lbs. to 6½ lbs. of soda, or caustic potash, or bluestone dissolved in thirty-five pints of water. The agitator is kept going for about an hour, afterwards the mass is allowed to settle, and the supernatant fluid drawn off and filtered. Should the oil be slow in coming to a fluid state, the operation may be expediated by passing steam through a coil of piping or hose laid in the vat; and time will also be saved by increasing even to the extent of doubling the quantity of chemical re-agents employed.

After the oil has been treated by the methods described, there is usually added two per cent. of chlorine, more or less according to the degree of color still exhibited by the oil, and is then exposed to shallow pans to the light and air until every trace of color disappears. The employment of chlorine alone will suffice without the aid of any of the other operations before described, to effect the complete decoloration, but not so expeditiously.

Linseed and rape oils can be depurated by heat alone, provided always the temperature is not allowed to exceed 194° of Fah.

The invention also consists of certain improvements in the purificatian and decoloration of fish oils. The whole of this class of oils, with the exception of whale oil, are treated by the same cold process or processes, as have been before directed, to be used in the case of certain of the vegetable oils, after which, in order to deprive them of their offensive odor, there is added to every 220 lbs. of the oil, about 4½ lbs. of hydrochloric acid, and the mixture is subjected to the action of injected streams of steam, hot air, or other aeriform fluid, in an apparatus such as has been already described. In the case of whale oil, besides subjecting the oil to the action of injected streams of hot air, or other aeriform fluid as aforesaid, there is added, at half hour intervals, (to every 220 lbs. of the oil) one and three-quarters of a pint of the solution of nitric acid, and one and three-quarters of a pint of dilute oxalic acid; 2 lbs. of dilute hydrochloric acid (divided into two or three doses) and from 2 lbs. to 4 lbs. of chlorine.

All the before-mentioned processes, or at least with slight modifications only, may be applied effectively to the purification and decoloration of mineral oils, such as those of naphtha, shael, petroleum, &c. But it must be observed, of all oils of whatever sort which have been treated with acids, that the acids must be ultimately washed out of them (before use), by hot or boiling water.

Eel Fisheries in Oswego River.

A correspondent of the Syracuse Journal gives an account of the eel fisheries that extend from lake Ontario to Three Rivers Point, and then up the Oneida and Seneca rivers to Baldwinsville. Oswego river is lined with traps, called weirs, for catching eels, and some of the fishermen occupy, by some right established by the common law of the fraternity, the entire bed of the river.

"The wiers are constructed of stone and slabs, in shape like the two sides of a triangle, opening upward to the stream, and coverging at the bottom, or lower end. The fish are coaxed into a current, which sweeps them finally into a kind of box, when they find themselves high and dry, and unable to regain the water. When taken from the trap, the fish are first skinned and afterwards smoked and barrelled for market, finding a ready sale at eight cents per pound. An old fisherman who has four wiers at Fulton, netted $800 last year, from his fish. The average weight of these fish is a little more than a pound, some being as high as three or four pounds. a marked difference in quality is observed in the eels from different sections, those from Skaneateles having the preference. The fishing season lasts from June till November, when the fish swim down the stream. It is a popular notion among fishermen that the eel never returns to the place of breeding, wherever that may be; and there is much doubt in regard to the origin of this fish. Naturalists, however, do not agree with this opinion. The eel is not found, this writer states, in the Genesee river above the falls, nor in the upper lakes. At certain seasons they are seen in the bays of Lake Ontario, where they swim among the grass and weeds near the surface."

[We have to add to the above, that the smoked eels, sometimes, but not often are found in the New York markets; they are very fine and sell high. The approach of the eel season is known on the Oneida Lake by the eel fly, an insect with a long swallow tail, which comes in clouds, sometimes actually darkening the atmosphere at eventide. During the day they cluster on the fences, trees, and houses, which they cover as thickly as locusts do the bank of the Euphrates; they are perfectly harmless, however.

Dirt—Its Value.

"Gentlemen," said Palmerston, at the Royal Agricultural dinner, "I have heard a definition of dirt. I have heard it said that dirt is nothing but a thing in the wrong place.—(Hear, and laughter.) Now, the dirt of our towns precisely corresponds with that definition. (Hear.) The dirt of our towns ought to be upon our fields, and if there could be such a reciprocal community of interest between the country and towns—that the country should purify the towns, and the towns should fertilize the country—(laughter)—I am much disposed to think the British farmer would care less than he does, though he still might care something, about Peruvian guano."

Effect of the Earth's Rotation on Locomotion.

Mr. Uriah Clarke, of Leicester, has called our attention to an article in the Mechanics' Magazine, written by himself, on the influence of the earth's rotation on locomotion. It is well known that, as the earth revolves on its axis once in twenty-four hours from west to east, the velocity in any point on its surface is greater nearer the equator, and less farther from it in the ratio of the cosine of latitude. Mr. Clarke says:—Some rather important conclusions in relation to railway travelling arise out of the view now taken. The difference between the rotative velocity of the earth in its surface motion at London and at Liverpool is about 28 miles per hour; and this amount of lateral movement has been gained or lost, as respects the locomotive in each journey, according to the direction we are travelling in from the one place to the other; and in proportion to the speed will be the pressure against the side of the rails, which, at a high velocity, will give the engine a tendency to climb the right hand rail in each direction. Could the journey be performed in two hours between London and Liverpool, this lateral movement or rotative velocity of the locomotive would have to be increased or diminished at the rate of one-quarter of a mile per minute, and that entirely by side pressure on the rail, which, if not sufficient to cause the engine to leave the line, would be quite sufficient to produce violent and dangerous oscillation. It may be observed, in conclusion, that as the cause above alluded to will be inoperative while we travel along the parallels of latitude, it clearly follows that a higher degree of speed may be attained with safety on a railroad running east and west than on one which runs north and south. There is no doubt of the tendency Mr. Clarke speaks of on the right hand rail, but we do not think it will be found to be so dangerous as he says. It will be greatest on the Great Northern and Berwick lines, and least on the Great Western.—Herapath's Railroad Journal.

[The effect of the earth's rotation upon a rail of the broad or narrow gauge placed a few feet apart from its fellow, must be so small as would stop any person of good sense from saying anything about the engine *climbing the right hand rail.* And speaking of the greater velocity of the earth towards the equator, we can see how a train might be affected running east and west, but not north and south as stated above.

Discoveries in the Bottom of Harlaem Lake.

It is stated in one of our English papers, that the work of draining the Lake of Harlaem, has led to the discovery of an immense mass of human remains, deeply imbedded in the mud, and placed precisely on the spot where, according to a topographic chart, laid down in 1511, and which has always been considered as perfectly accurate, the unfortunate village of Nierewenkirk was situated, and which, in 1539, was swallowed up by one of those irruptions of the North Sea, which formed the immense Lake of Harlaem.

Useful Things to Know.

To Cure Hickup—Raise one or both hands as high above your head as you can, it is a certain cure.

Anti-rat Mixture—Mix a small quantity of tar with tallow, and rats will not steal it from off water-wheel gudgeons, and other heavy bearings; also for leather harness; neither cattle, rats, nor mice will touch them.

Chlorate of Lime for Poison Ivy—I can recommend the liquor-chloride of lime as a good external remedy for poison ivy.

C. B. F