IS PERPETUAL MOTION POSSIBLE?

THE reply to this question, says the Scientific American, depends entirely upon the limitations put upon the term "perpetual motion." If we understand these words to mean a machine that would start itself, furnish power for doing work, and continue in operation so long as required, or until worn out, without the assistance of any external agency, we may say with the utmost confidence, perpetual motion is impossible.

If, on the other hand, we define perpetual motion as a machine dependent for its action upon the variability of one or more of the forces of nature, we may say perpetual motion is possible. The thermal motor, in which expansion and contraction are produced by natural changes of temperature, is an example of a motor of this kind. In this machine, the changes in volume in a body are made to store energy to be used in continuous regular work. A perpetual clock has been made on this principle.

Sun motors of various forms have been devised, which might be used in connection with storage mechanism for furnishing power continuously. A sun motor of sufficient size with a suitable storage system, could furnish power the year round in almost any part of the world; success being a question of hours of sunshine and capacities of motor and storage system.

Of course, what is said with regard to the sun motor applies with equal force to water wheels, windmills, tide and wave motors. Without doubt, all of these prime movers will come more and more into use as time advances, and storage systems are perfected. Still they do not satisfy the seeker for the ideal perpetual motion. This should fill the conditions first mentioned; but, as we have already said, this is an impossibility.

The first and strongest reason for making this positive assertion in regard to the ideal perpetual motion is found in the fact that never in the history of man has he been able to make a single atom of matter, or create the smallest fraction of a unit of energy.

All the works of man, of whatever name or nature, have been constructed of materials already in existence, and all the work done by man and his enginery has been accomplished by using current natural forces, such as the gravitation of water, the power of the wind, and the heat energy of the sun, or the stored energy of coal and other fuels, or of chemicals.

Having the command of some of nature's forces, inventors have sought to circumvent nature's laws, so as to make water "run up hill," to cause masses of matter to act alternately in accordance with and in opposition to the law of gravitation: in short, to deprive matter of gravity while ascending, and cause it to act with the full force of gravity while descending.

Among perpetual motion devices of this class, proposed and tried, is the one having weights arranged on a wheel in such a way as to fall outwardly and increase the leverage on one side of the wheel, while they fold in and diminish the leverage on the opposite side of the wheel. This machine, it is needless to say, has never moved on its own account, although it has become classic.

In this device, the superior number of weights on the side where the leverage is least, exactly balances the weights at the ends of the extended arms. This is true of all the modifications of this type of machine.

A favorite device of the perpetual motion inventor is that of weights arranged around the periphery of a wheel and counterbalanced by springs on which gravity has no effect. Such weights being balanced are supposed to be capable of being moved upwardly in opposition to gravity without the expenditure of much power. After having been elevated, the weight, while maintaining its position relative to the wheel, descends, causing the rotation of the wheel. After it has done its work the weight must be restored to its original position before the operation can be repeated, and here comes the rub. Many very ingenious plans have been tried to accomplish this, but the result has always been a perfect balance.

In another device the attempt is made to utilize the Archimedian screw to elevate water to be used for driving itself. The inventors in this case fail to notice that although the water is running down an incline in the screw, this incline is always being elevated, so that the water must be actually carried up an inclined plane by a force as great as it would exert if allowed to descend through the same distance. In all these cases friction is left out of the question.

Capillarity has been tried as a means of elevating a liquid to be used as a motive agent, but in this case, as in all others, the defeating element is present—the surface tension of the liquid prevents detaching the liquid from the upper end of the capillary conductor.

It seems strange that in these days the proposition should be made to run an electric motor with a current from a dynamo by the power derived from the electric motor, yet, absurd as this proposition is, it has often been broached in good faith. A mere superficial examination of this subject shows that the losses incurred in transforming the current into motive power, and vice versa, are such as to defeat any attempts of this kind.

The permanent magnet appears to have suggested itself to many as a possible solution of the problem, and experimenters have searched the world over to find an insulator of magnetism to act as a cut-off for releasing the armature after it has been drawn forward toward the magnet; but no such material has been found. Nature, in this case as in all others, refuses to yield energy without its full equivalent of energy in some other form, and the law of the conservation of energy is found to hold good.

We have mentioned but a few of the multitude of devices constructed with the hope, not to say expectation, of producing a self-moving machine by utilizing nature's constant and unvarying forces.

Although the efforts of inventors in this direction have been barren of results of the kind aimed at, yet their labor has not been fruitless; many experimenters who considered actual trial better than any amount of study or calculation have learned that "knowledge comes of experience," and while discovering the fallacy of the ideal perpetual motion, they have been led to consider more practical subjects; making inventions which have proved beneficial to the world and profitable to themselves.

If the inventor of machines intended to be self-moving will not accede to Newton's statement that "action and reaction are equal and opposite," (third law of motion), and that there is a perfect and wonderful balance in the forces of nature, let him thoroughly acquaint himself with the principles of physics, and he will ere long be able to say with certainty just how the balance will occur in any and every perpetual motion machine of the ideal kind, and admit that he has not the power of creating energy.

THE HISTORY OF SAWS.

BY JOSHUA OLDHAM.

THE invention of the saw proper is attributed to the Greeks, about 1200 years B.C. Talus, a nephew of the king of Athens, has the credit of the invention. He was an architect and sculptor. He invented the saw, lathe and compass. His inventions especially the saw made him famous, and excited the jealousy of his uncle, the king, who was also an inventor, and who killed him by pushing him off a tower.

Saws have been found in Europe belonging to a remote age, the earlier ones of flint, the later ones of bronze. The natives of the West India Islands made saws from sharks' teeth and notched shells. The later history of saws, that is, in the sixteenth and seventeenth centuries, is meager. The saw mill was first run by water, in France, in the twelfth century; by the English, in New England, in 1634; by the Dutch, in New York, in 1633, and in England previous to that date. England seems to have been behind other nations in using saw mills. In London, in 1663, a native of Holland built a saw mill, but was prevented from working it by the threats of the hand sawyers, and in 1767 a sawmill operated by wind, was destroyed by a mob. In 1682, Maine built a number of mills. The first saw mill built in Canada was located near Montreal.

The circular saw was patented by Samuel Miller in 1771. He was a resident of Southampton, England, and secured his patent from the English Government. William Newberry, of London, was granted a patent in 1808 for a "machine for sawing wood, splitting and paring skins," etc. This machine contained the essential parts of our present band-saw machine. There was no haste in taking hold of these inventions. Miller's patent was issued in 1771, but it was not put into use until 1790. The band-saw, patented by Newberry, lay idle for forty years.

The first band mill erected in America, for sawing logs, was built in 1864, by James Shearer, of Montreal. The machine was constructed in the mill and the saw obtained in England. The saw soon broke, and the mill was a failure. F. Arbey, of Paris, France, manufactured the first band mill successfully used in sawing logs. The first one brought to this country is still in operation at Quebec, Canada. Sheffield, England, the birthplace of cast-steel making, has the credit of making the finest band saws. It still retains a large share of trade in saws and saw steel, though the secrets once held so dear have become public property. At one time, in fact for a number of years, only one man knew the secret of making cast-steel. It was discovered by a trick or deception and made public.

THE DESTINY OF TEAK.

IT is not alone at home but also abroad we hear of the depletion of the forests of their most valuable timbers. Mr. Stringer, the British consul at Chiengmai, in the heart of Northern Siam, in his last trade report, mentions that the teak trade on the Meinam is declining at an alarming rate. At Chainat, the customs station for the upper part of the river, 60,000 logs of teak passed in 1889, 30,000 in 1890, and only 9,500 last year. This is due to deficient rainfall and to the effect of the indiscriminate working. Teak saplings are cut down in large numbers, and the clause in the leases forbidding the felling of small trees is disregarded. The consequence is that in Chiengmai there is reason to fear that in five years the only teak left will be that which is too far from the water to be profitably worked, and in Lakhon the foresters complain that all the best trees have already been felled. The general opinion of teak merchants and foresters is that there are large quantities of teak in the valley of the Meikong, and that it could be floated down that river to Saigon, but none has yet reached that port. The merchants who work teak on the Meiyon complain of the timber stealing which goes on at the rafting station on that river. The stolen logs are often fired with kerosene to deface the Hammer marks of the owners. The present system of granting forest leases for three years only is said to be very prejudicial to the interests of foresters. In many cases the leases are renewed when they expire, but a forester who is not fortunate enough to secure a renewal of his lease may find that at the end of three years his logs are still lying in the forest, as it takes at least three years (generally much longer) from the time the teak tree is girdled, to fell it, lop off the branches and drag and float the log out of the forest, and if the wording of the lease is strictly adhered to, all logs lying in the forest, as well as girdled trees, become the property of the owner of the forest as soon as the lease expires. Previous to 1888 the leases granted to British subjects was generally for a term of six years, but in that year the time was reduced to three. The greater part of the capital with which the teak trade of Northern Siam is carried on is British. The Chiengmai forests on the Salween side are worked almost entirely with British Indian capital from Maulmain.

Teak, of latter years, has played a prominent part in all the great naval arsenals of Europe, and its consumption, unlike that of oak, has kept pace with the rapid changes in our coast defences. It is largely used for railway carriage building and other purposes for which it is especially adapted. Teak, unlike the majority of hardwoods, is easily workable, of very close grain, and from its oily nature almost imperishable. Being almost the only source of wealth of the Chiengmai country its rapid destruction as described by Mr. Stinger, becomes a matter of serious concern from the local as well as the broader point of view.

FINE WOOD-CARVING.

THE Austrian wood-carving industry will be specially represented at the World's Fair by thirty-four expert wood-carvers from Vienna, who will exhibit their work in its various branches. A thoroughly representative collection is expected.