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Young Mechanics---The Way to Rise.

We stated last week that few of our mechanics rose direct from the workshop to important places of trust in the Republic, and we also stated that but a few of the great many were qualified to fill important situations even in connection with the trades they learned Why is this? Is it not possible formen to be as well educated in the workshop as anywhere else? Do mechanics not possess the same abilities as those who follow the professions? Yes. Well then, why is it they are not in general fit to march out from the workshop to fill the highest and most honorable offices in our country?

The answer is, they do not in general try to qualify themselves to fulfill their proper duties, as citizens of this great Republic. We suppose that our mechanics themselves would be planet-struck, if it was proposed to run one of their number for President, but it is not our object, except in an angular direction, to point to political situations—we hope the point however, will not be lost.

We have alluded to the absence of a taste for sound and solid reading among our mechanics, and we have now to complain of the absence of a pure and lofty conversation. The majority of our young men belong to fire or military companies, and during their spare moments, their conversation consists more in what this and that engine can do, &c., and not about how it can be done. Idle, vain and frivolous conversation has a very injurious tendency, like reading bad books. A pure conversation and gentlemanly discussion of useful questions, has a very elevating tendency. Young mechanics, we speak to you, in all earnestness; if you wish to rise, you must be enthusiastic about your business, and in the pursuit of knowledge connected with it. In your spare moments, endeavor to seek enjoyment in talking about the principles of your trades, seek to know the why and the wherefore of everything connected with them, and whatever your hand findeth to do, do it well and with all your might. Do not be eye servants, do not use profane language, and give yourselves the best education you possibly can. Every machinist should learn to draw, so should every carpenter, and do not be content until you fully understand, and can construct every machine, apparatus, or whatever it may be, and can take charge of and superintend every branch of business connected with your trades. Men possessing such qualifications are sure to rise. And what is to hinder you from possessing such qualities, along with a character for honesty, fidelity, and ability? Let every one put this question to his own heart.

New Theory of the Central Heat of the Earth and the Cause of Volcanoes.

Mr. Stevenson Macadam, of Edinburgh, Scotland, has advanced a new theory, as indicated by the caption of this article, which puts an entire new face on the subject, and is distinguished by the firm, clear, unmistakeable logic of the Scottish School. It is well known that as we descend towards the centre of the earth (for all the small depth yet penetrated), the temperature increases at the rate of about one degree every 45 feet. Proceeding to reason upon this as a basis, many suppose the centre of the earth to be a red hot fluid mass, and they account for volcanoes and hot boiling springs upon this theory. Sir Humphrey Davy once held this opinion, but discarded it. The favorers of it believe that the solid crust of this earth lies on the fluid mass as a lump of ice on water; but not so Mr. Macadam: he has adopted the *spheroid* theory, which is thus explained:—If we throw some water on a red hot piece of iron it rolls up into little globules and evaporates very slowly, each drop orspheroid keeping at a far lower temperature than boiling water. A quantity of water, by ordinary boiling, will evaporate fifty times faster than water in this spheroidal state. It is found that there is no real contact between these spheroids of water and the red hot metal, but a kind of reflecting atmosphere of heat. Mr. Macadam believes the crust of our globe to be lying upon the interior red hot round sea at the centre of our planet, in the same way that the spheroid lies on a red-hot plate. The internal crust he likens to a concave mirror, and the hot fluid mass to a sphere, with an atmosphere between the two of vaporized metal. He believes this heat is constant, and that the crust of the globe is influenced by two great forces—gravitation and spheroidal repulsion.

As it regards volcanoes, he believes they are caused by basins of metal at a high temperature, to which water finds admission, thus generating steam, which causes volcanic explosions in some cases, and hot springs in others. The volcanic theory is thus set down as caused by chemical action, the central heat theory has nothing to do with chemical action.

These are the principal features of his theory, and it may be true and it may not. Among the many new and useful discoveries which are continually being developed, there is much that is speculative and of no real earthly benefit—speculations which can never be settled, consequently any person has the perfect right to be as wild and extravagant, or plausible, as he chooses, there being no risk to run, while there may be considerable notoriety gained. This theory of Macadam, however, is the most plausible on the subject which has yet been advanced, we think; and as he allows us 25 miles of solid crust, after which all is red hot fire, we may consider ourselves on solid floating ground until some better theory is advanced.

Electro-Magnetism as a Prime Mover.

Although much has been recently said and written about the application of electro-magnetism as a prime mover, it is not a new subject by any means. After the discovery of Electro-Magnetism, by Oersted, in 1819, it at once became apparent that a new mechanical power was given to man, and many were enthusiastic about its superior advantages over steam, as a propelling power. Our own Professor Henry, now of the Smithsonian Institute, first demonstrated the method of developing great magnetic power in soft iron by a small battery, and as a natural result he applied it to propel machinery. In 1831 he described, in Silliman's Journal, a machine for producing a reciprocating motion, " by a power never before applied in mechanics—by magnetic attraction and repulsion." He stated, however, that it was no more than a philosophical toy, but deemed it not impossible that a modification of it might be applied to some useful purpose. In 1833, Dr. Schultless, of Zurich, Switzerland, exhibited a machine propelled by this power, and so did Dr. Ritchie, of London. In 1834, Prof. Jacobi, of St. Petersburg, described to the Academy of Sciences, in Paris, a method of propelling machinery by electro-magnetism; and, about the same time, Mr. Davenport, of Vermont, who has corresponded with the Scientific American, contrived a machine upon the same principle. In 1836 Mr. Davenport propelled a turning lathe with his electric engine, and at the same time Mr. Davidson, in Scotland, had a turning lathe and a small locomotive in operation by the same power. In 1838 Prof. Jacobi applied his electro-magneticengine to propel a boat at St. Petersburg; and the effort was apparently a very successful one, for the boat had paddles, was 28 feet long, 7½ wide, drew 2½ feet of water, and with only a battery of 64 platina plates, and but a small engine, he propelled the boat with 12 persons in it at the rate of 3 miles per hour, against the current. In 1840 Mr. Davenport, we believe, printed for a short period, in this city, a paper named the "Electro Magnet," the press which printed it being moved by his electro-magnetic engine. Capt. Taylor obtained an American patent in 1838, and in 1839 he patented it in England, and exhibited a working model in London, which moved a lathe used in turning articles of wood, ivory, and metal.

These were great experiments, and aroused public attention to this "beautiful, cheap, and simple power," as it was termed. In New York, about 1841, electro-magnetic engines became a kind of mania, and hundreds were manufactured to meet the market demand. It did not last very long, however: it was found that they were expensive, weak of power, inefficient, and troublesome. In 1842, Mr. Robert Davidson, of Aberdeen, Scotland, (a mechanic like our Mr. Davenport), built a locomotive weighing five tons, and experimented with it on the Edinburgh and Glasgow Railway. He had 6 batteries, in all containing 60 zinc plates, with iron ones intervening. Th carriage ran at the rate of 4 miles per hour—a failure, to be sure, as we stated last week. The experiments of Jacobi, Davenport, and Davidson, caused disappointment; still, many attributed their failures to mechanical and other defects, and not to the inherent nature of electro-magnetism. This is the right spirit, for, until all the depths and shoals of this science are discovered, it is folly to despair. Among the many successful investigators and experimenters in Electro Magnetic science, the name of Prof. Page stands high; and his recent experiment with an electro magnetic locomotive at Washington, is the greatest effort of the kind ever made. It makes no matter how much mechanical power may be developed by electro-magnetism, if that power is derived at too great an expense to compete with steam, and it is our opinion that the economy of steam power is not so well understood as it should be by many who are sincerely laboring to perfect electro-magnetism. Hunt, in his experiments, says he proved that the greatest amount of magnetic power is produced when the chemical action is most rapid. Hence, in all magnetic machines, it is more economical to employ a battery under an intense action, than one in which the chemical action is slow. It has been proved by Mr. Joule that one horse-power is obtainable in an electro-magnetic engine, the most favorably constructed to prevent loss of power, at the cost of forty-five pounds of zinc, in a Grove's battery, in 24 hours; while seventy-five pounds are consumed in the same time to produce the same power in a battery of Daniell's construction.

A voltaic current, produced by the chemical disturbance of the elements of any battery, no matter what its form may be, is capable of producing, by induction, a magnetic force, this magnetic force being always in an exact ratio to the amount of matter, (zinc, iron, or otherwise) consumed in the battery.

What amount of magnetic power can be obtained from an equivalent of any material consumed? The following were regarded as the most satisfactory results yet obtained:

1. The force of voltaic current being equal to 678, the number of grains of zinc destroyed per hour was 151, which raised 9,000 pounds one foot high in that time.

2. The force of current being, relatively, 1300, the zinc destroyed in an hour was 291 grains, which raised 10,030 pounds through the space of one foot.

3. The force being 1,000, the zinc consumed was 223 grains; the weight lifted one foot 12,672 lbs.

We have no data of the battery expense of the locomotive of Prof. Page, but the experiments of Mr. Hunt and others have proved that one grain of coal consumed in the furnace of a Cornish engine lifted 143 pounds one foot high; whereas one grain of zinc consumed in the battery, lifted only 60 lbs.

The difference of expense between steam and electro-magnetism is obvious, the latter is fifty times more expensive, and some new discovery in its chemical developement must be made before it can hope to enter the field as a competitor to propel machinery. We have heard many objections against the huge engines, boilers, &c., required on board of steamships, and have been told how electro-magnetism would do away with "all unnecessary encumbrances," but we have no hopes that Prof. Page's Rotary Electro Magnetic Engine —for he has fallen back on this idea of Davidson and Avery—nor any other propelled by the same power, can be placed in any less space than a steam engine; we are sure, at least, they will have to be built just as strong, and all those we have seen, exhibited, according to their size, had far less power than the common steam engine.

We consider the locomotive the prince of prime motors, and we have no hopes of ever seeing it superseded by an electro-magnetic engine. We may be mistaken, but when 400 tons can be drawn 58 miles at the expense of only 1½ cents per ton for coal, as has been done by a locomotive, we may begin to talk of the importance of Electro Magnetism as a prime mover.

Astronomical Observations at Washington.

The second volume of "Astronomical Observations," made under the direction of Lieut. Maury, at the National Observatory, Washington, containing the Appendix, has just been published. It is a work which does honor to our country, and Lieut. Maury has our thanks, and will have that of all our readers, for the information we are permitted to glean from its pages in relation to the Electric Clock of Dr. Locke, &c. Capt. Wilkes, of the Navy, it is stated, was the first to apply the magnetic telegraph to the determination of longitude. This was done five or six years ago, for determining the difference of longitude between Washington and Baltimore, and he reduced the results down to the accuracy with which the time, between the ticks of the second-hand could be measured by the eye and the ear; this was the first time the magnetic telegraph was reduced to a valuable astronomical instrument. In 1848, Dr. Locke, of Cincinnati, informed Lieut. Maury that he had invented a Telegraphic Register Clock for Longitude. This clock has been erected in the "National Observatory," by Dr. Locke, and the principle of its operation is the breaking and closing of the circuit, so as to make regular marks on a fillet of paper of a certain length, to indicate the 100ths of a second, unless the circuit is broken by the operator, who is observing the heavens, noting the transit of stars. He then lays his finger on the key, breaks the circuit, and, during the time the circuit is open, there is left a blank on the paper, which can be measured by compasses, and will tell whether the blank was 100th or ½ a second—time of transit.

Pay Your Postage.

When any person sends a letter to another upon matters of business, to gain information, he, as a gentleman, should pay the postage. Mr. O. Child, of Illinois, whose Saw Mill was illustrated in No. 26, who was made to reside in Ohio, by mistake, has received a number of letters for which he has had to pay double postage. We believe that but few realize the extent of our circulation; when any machine is illustrated in our columns, if it has any merit, it is sure to meet with great attention, and hundreds of letters are sent to the proprietor; in such cases it is no more than just and fair for correspondents to pay their own letters. Those who wish to write to Mr. Child will be pleased to direct letters to Granville, Illinois, —not Ohio.

Cotton Crop Prospects.

In South-Western Georgia and all that region of country beyond Macon, as well as in the north-eastern counties lying on the Savannah river, the plant is small and unhealthy. The same is true of Burke and Jefferson, two of the most productive counties in the State. The cold weather has kept the plant from coming up, and consequently the stand is a poor one. In no particular, is the prospect so good as it was at this time last year. It will require favorable seasons and a late fall to make so large a crop as the last.

The Seventeen Year Locusts.

We perceive by some of our cotemporaries that the seventeen year locusts have been plowed up in many places in Maryland and Pennsylvania. All those who desire to obtain the most correct description of the appearance and habits of this insect will find the same in an article by Dr. Smith, in number 27, this Vol. Sci. Am.

The Patent Office.

We have been informed that four Assistant Examiners have been appointed in the Patent Office; their names are F. Southgate Smith, of Ohio; Wm. C. Langdon, of Kentucky; Timothy Fitch, of New York, and Henry Baldwin, of Tennessee, at a salary of $1,500 each.