

[For the Scientific American.]

Variation of the Magnetic Needle.

The Legislature of Pennsylvania passed a law in 1850, among the provisions of which the county commissioners of each county were required to establish and mark near the Court House of each a true meridian line, and a fixed standard measure for a two pole chain. The same law requires every land surveyor to adjust and verify his compass, and to ascertain the variation of its needle from the said meridian, and enter the same whether east or west, and the day on which he made the adjustment, and subscribe his name thereto in a book to be kept for that purpose by the said commissioners. This has to be done during the month of April every year. Any surveyor who shall neglect or refuse to comply with the requirements of the law, by making a survey with an adjustable compass or chain, shall for every such neglect or refusal pay the sum of ten dollars, on complaint made by any person interested in such survey.

In accordance with the requirements of this law in the year 1852, 45 surveyors adjusted their compasses and chains, and made the necessary entries, the result of which was an average variation of four degrees, twenty minutes, and nineteen forty-fifths west of north.—In the year 1853, thirty-three entries were made, showing an average variation of four degrees, twenty minutes, and nineteen thirty-thirds west of north, being an increase of sixteen seconds. In 1854, thirty-one entries were made, the average of which is four degrees, twenty-three minutes, and one-thirtieth, being an increase of two minutes and twenty-seven seconds over the year previous. The entries made in the same month show a difference of three-quarters of a degree, thus showing the difference of compasses at the same time and on the same fixed line. There is a difference in the variation at different times of the day. One surveyor made two entries on the same day, with the same instrument, on precisely the same line, and found a difference of seven minutes between six A. M. and six P. M. The lowest variation entered during the years 1852, 1853, and 1854, is four degrees, and the highest four degrees and three-quarters west of north. This shows the amount of error in instruments, and the use thereof.

By a letter I lately received from the city engineer in St. Louis, it appears that the variation at that place is seven degrees and fifty-seven minutes east of north.

Not having seen any answer to several questions propounded in my letter published in the SCIENTIFIC AMERICAN, June 30th, 1855, page 331, I hope you or some of your numerous scientific readers will favor us with answers, or refer us to where they may be found.

GEORGE P. DAVIS.

Kennett Square, Pa., July 21, 1855.

[Our correspondent's questions were as follows: First, "where does the line of magnetic no-variation pass through the United States north of North Carolina?" A paper on the subject of magnetic variations in different States, by Dr. Lock, will be found in the Transactions of the Smithsonian Institute, which may give him all the required information. Second, "Is there more than one magnetic pole?" There are two. Third, "Do they shift?" They do.—Fourth, "Is the line of no-variation straight or crooked?" It is very irregular. Fifth, "does the line of magnetic no-variation change from east to west in a given number of years, and if so, what is the cause?" It has been so changing since 1629. The cause is unknown. There is much that is mysterious and to learn, connected with the magnet, but every year new developments are made.

Raw Hide Bearing Boxes.

MESSRS. EDITORS:—You have published several articles lately upon Wood Bearings. In the last number of your paper a writer says that wood prepared according to his plan, makes the best journal box of any known substance. I have not tried the experiment; but I have reason to believe that strips of hard and well seasoned raw hide, inserted in journal boxes, will wear longer than wood, and with less friction. It is used by machinists for "steps" instead of steel, and it is quite superior for this purpose.

SAMUEL BROWN.

Piermont, N. Y. Aug. 6, 1855.

Remarks on Reaping Machines.

MESSRS. EDITORS—I have frequently marked the inefficiency of committee reports on agricultural machinery, and was struck by the judicious observations in your paper of the 28th ult. respecting the trial of reaping machines. The absurd statement of a committee that they had not time to examine the machinery, the very soul of the whole implement, showed how unfit said committee were for the examination.—Every one using the machines know they are hard to pull; why have no accurate experiments been made on this point. I own one of Ketchum's machines, and Mr. Allen having sent one of his machines to this neighborhood, he wished me to cut some of my grass with it to exhibit it. Notice having been given, a number of farmers met, and were fully convinced of the advantage in lightness of draught and simplicity of construction of this machine over Ketchum's and on a subsequent trial over Manny's. They were worked with the same team, and my driver said it made a difference of one third in the power. All the mowers did the work equally as well, but Allen's machine has not required to be touched since I have had it, and Ketchum's has required a great deal of repairs. Ketchum's crank is out of sight, is a difficult piece to make, as short bends in a small piece of iron are seldom entirely sound, and the nuts on the crank boxes are apt to shake off. In all this, Allen's will be seen by any machinist to be very superior. All the gearing is in sight, and the simplicity of the machinery for putting it in and out of gear is no small advantage in an implement which a multitude of accidents show is not a safe one in careless hands. I cut an acre in 52 minutes with either machine; Ketchum's with three horses, Allen's with two, heavy grass, and a very hot day.

WM. H. DENNING.

Fishkill Landing, N. Y., Aug. 1855.

Coach Painting.

MESSRS. EDITORS.—The Editor of the *Coach-maker's Magazine*, on page 310 SCIENTIFIC AMERICAN, undertakes to correct a "novel error" of mine in a friendly manner. I still hold that coach and body varnish are copal varnishes; there are various qualities of copal varnish used for various purposes, made to suit by the addition of more or less oil, gum, or rosin, to increase the luster, dry harder, or quicker, or to make it tougher or to cheapen it. And so far as I know, the coach varnish is the purest and best copal varnish used. If it is not so, and the Editor wishes to correct my "novel error," he must tell of what it is made. I did not give my recipe for making varnish as the best or only way, but will venture that he cannot give a recipe more easily followed to answer better for every purpose. The filling for bodies submitted to my consideration is good, and well known, among coach and carriage painters; so with his rubbing down and finishing; and as my article was intended for such as were not themselves, and could not obtain experienced workmen, they can try both, and if they are benefitted my object is attained. I think the Editor of the *Coach-maker's Magazine* overlooked one very material feature in my plan for painting, viz., filling and varnishing; as but little cutting down and leveling with pumice-stone, will be found necessary. I would still advise the use of the coarse linen cloth, as I know it to be good, and there is not much danger of scratching the painting by rubbing the varnish.

A. W. II.

Platte City, Mo., Aug., 1855.

Double and Single Steam Engines.

MESSRS. EDITORS—Can any of the readers of the SCIENTIFIC AMERICAN furnish the results of working a pair of steam engines together, and also one of them by itself? Can one engine use steam to the same advantage as two engines of the same caliber? Upon this point there is a difference of opinion among engineers. This question ought to be settled by competent authority, as it is one of interest to many persons, as well as to the writer of this. I would like to know if one engine can use steam—theoretically and practically—as economically as two. What is your opinion, Mr. Editor? Yours, respectfully, J. E. BARBER.

New London, Ct., Aug. 8, 1855.

[We can advance no reason why a pair of steam engines should use steam more economically than one of the same capacity as the two.—Ed.]

Recent Foreign Inventions.

COATING METALS WITH TIN, NICKEL, AND ALUMINUM—Mr. Thomas, of Fulham, and Mr. Tilley, of Holborn, Eng., have recently obtained a patent for plating metals with other metals, particularly the three named above. In preparing the solutions of the metal to plate with, for tin they dissolve a sufficient quantity in nitro-muriatic acid, and then precipitate the metal by an alkali or alkaline salt; the ferrocyanide of potassium is preferred. Sulphuric or muriatic acid is then mixed with the precipitated oxyd, and a portion of water added, boiled in an iron vessel, with a small portion of ferro-cyanide of potassium, and the liquor filtered. Another process is to pass a stream of sulphuric acid gas through the filtered solution. For nickel, the metal is dissolved in nitro-muriatic acid, and the oxyd then precipitated by ferro-cyanide of potassium, washed in distilled water, cyanide of potassium added, boiled and filtered. For aluminum, they dissolve alum in water, and add ammonia until it ceases to precipitate; it is then washed, filtered, boiled with distilled water and cyanide of potassium, and filtered. Having obtained either of these solutions, the articles to be plated are suspended by copper or brass rods in a bath of the required solution, and attached to the zinc pole of a galvanic battery, to the positive pole of which is attached, in the case of tin, a piece of platinum; for nickel, a pole of tin, and a bag of oxyd of nickel; and in the case of a bath of aluminum, a bag of aluminum, a pole of aluminum, and a piece of platinum."

ORNAMENTING AND PRINTING SURFACES—Giuseppe Devincenzi, of London, patentee—The following is in substance taken from Newton's *London Journal*, and appears to be an important invention, of extensive application.

For the production of impressions suitable for printing from, and for other like purposes, sheets or surfaces of hard metals, such as steel or copper, engraved by pressure, are employed; or, for some particular purpose, softer metals, or a great number of alloys, and even other substances, such, for example, as wood, are used. When sheets of hard metal are employed, they are first rendered as soft as possible, either by annealing or other means capable of rendering them fit to receive impressions, and they are then placed on the objects from which the impression is to be obtained; whether such objects be natural, as feathers, leaves, &c., or manufactured, as lace, embroidery, paper cut out in figures, or generally any object which either possesses or can be made to possess sufficient hardness, either by desiccation or otherwise. The metal plates and the objects on them are then subjected to strong pressure, and an impress of the objects is obtained. To give the pressure, two rollers of very hard steel, which work in the manner of common flattening rollers, are employed. When it is desired to obtain a sunk impression on a cylinder or roller, the object from which the impression is to be taken is introduced between that roller and an ordinary pressing roller. When the impression of both sides of the same object is required, as for example, the two sides of a leaf, the object is pressed between two sheets or surfaces of metal, and the plates of metal are subsequently hardened in the usual way; or, as in the case of copper, become sufficiently hardened by the compression they undergo in the process of producing the impression.

By this part of the invention, figures or designs are drawn upon the surface of a softened sheet of metal, with varnish or gum, upon which hard granular matters, such as emery or other hard body, are dusted; or the granular matters are mixed with the varnish or adhesive material, previous to applying the same to the surface of the softened metal; or these matters are formed into pencils or sticks, with which the figures or designs are drawn upon the surface of the softened metal. When the figures or designs are well dried, the sheet of metal is subjected to pressure, and thus a perfect impression of the figures or design is obtained. The patentee sometimes forms the designs on surfaces of hardened steel, or on paper, or other like substances, and then applies these surfaces against other sheets or surfaces of softened metal, which, by means of pressure, are caused to receive the sunk impressions. After having obtained the sunk impressions, whether of natural or manufactured objects,

on softened metal plates or surfaces, he again hardens the plates or surfaces, if of steel or other like metal, by the means ordinarily employed for that purpose. An impression of figures or designs, produced by the method described, is sometimes obtained on soft metals, such as lead, or on other soft materials, such as gutta-percha, and galvano-plastic copies are taken therefrom. Or impressions of natural or manufactured objects, or of designs or figures on metal or other materials, may be taken in plaster of Paris, and copied by the stereotype process. When an impression in relief of a sunk design or pattern is required, the latter is used as a mold. In order to give to the impressions, whether obtained by the galvano-plastic process or by stereotyping, the necessary relief for printing from them, some material is applied to cover those parts of the plate that serve as the mold, which are not occupied by the impression to be reproduced; and sometimes the graver, or the action of acids, is employed, either on the impression which serves as the mold, or on the impression reproduced.

In order to harden objects which would not otherwise bear the pressure to which they are submitted, a solution of bi-chloride of mercury and of chloride of ammonium, is used as a bath to receive the fleshy or other substance, and it is allowed to remain there until the required effect is produced. Or the substances may be hardened by submitting them to dry heat until they are sufficiently solidified. The plates or surfaces, whether metallic or non-metallic, on which impressions have been produced by the improved modes of operating, may be employed for a large number of uses.

Western Rivers.

The Hon. Erastus Corning, of New York, and other heavy capitalists, are said to have joined the company which has in charge the improvement of Fox river and its connections in Wisconsin. It is estimated that the company will have a surplus of from one million to fifteen hundred thousand acres of the land appropriated by Congress, after completing the improvement. This it is proposed to put into a railroad between St. Paul and Green Bay. The road will be nearly five hundred miles in length, and as the lands are located in the pineries of Northern Wisconsin, they will go far toward the completion of the road.

The Plague of Grasshoppers.

Some parts of our country have suffered as severely from innumerable hosts of grasshoppers, as districts in Africa and Asia often suffer by locusts. They have actually consumed "every green thing," this season, in various parts of California, and in the Mormon settlements around Salt Lake. The *California Chronicle*, (San Francisco,) states that their ravages have been very destructive in the Valley of the Sacramento. The Pomological Gardens of Sacramento City, and the other Gardens in the neighborhood, have been completely ruined.

Anointing with Oil and Washing with Water.

C. Dowden, of Newark, N. J., has communicated to us by letter his reasons why anointing with oil, as recommended by Mr. Septimus Piesse, should not be substituted for washing with water in our country. Water containing some alkali in solution, he states, is necessary for removing the acids generated by perspiration. It is not with us as with the natives of India who anoint with oil, as they go mostly nude. Evening, he states, is the best period to perform our ablutions. His views are very good, but both customs of the Hebrews—anointing with oil and frequent washings—are not incompatible with one another.

Manufactures from Slag.

A joint stock company has been formed in London with a capital of \$600,000, for the purpose of converting the slag or refuse of iron works into various articles for which marble is now used, such as table slabs, mantel pieces, &c.

California Slate.

A large and long ledge of purple colored talcose slate has been discovered by I. W. Underwood, near the mining precinct of Washington, which lies some twenty-five miles above Nevada, on the South Yuba. The *Sacramento Union* says that this ledge, in some places crops out of the ground some five or six feet, and extends to a much greater depth below the surface of the earth; the supply is inexhaustible.