

ALGEBRA—MATHEMATICS FOR MECHANICS.

Horace Greeley, in his "Recollections of a Busy Life," says of one of the schools which he attended in early life, that "he was glad that algebra had not been introduced into it to clog the brains and occupy the time of pupils which might otherwise be better employed."

This remark, published in a medium having so large a circulation as the *New York Ledger*, will reach the eyes of thousands of young men, and may, perhaps, be the means of creating in them a distaste for this important branch of mathematics. It is a common error with men whose attention has been long fixed upon any particular field of mental effort, to disparage, and under estimate the value of any branch of science which does not immediately bear upon their favorite pursuits. We can readily appreciate Mr. Greeley's views upon the subject of algebra when we call to mind that his life has been elevated to the study of political, agricultural, historical, and statistical science, and those collateral subjects immediately connected therewith.

To advise any young man at the outset of his career, not to look to anything higher than mediocrity in his profession or occupation, would be evil counsel. To teach him that the means of distinction, approved by the experience of all the eminent men in that profession are over estimated, and are to be neglected by him, is equivalent to just that advice. Mechanics and chemistry are the main motors in the machinery of modern civilization and progress, and algebra and geometry can no more be dispensed with in the acquisition of a proper knowledge of mechanics in the present state of that science, than a knowledge of the English language could be in the acquisition of that kind of information which is Mr. Greeley's forte. In fact, the symbolic language of algebra needs first to be mastered before the student can read the standard text books which relate to mechanical subjects.

We do not intend to here attempt the demonstration of the value of algebra, as applied to the study of mechanics, or to show in what way algebraic language, on account of its simplicity and power, aids in the attainment of a true conception of the laws of nature. It is enough that the fact is sustained by universal experience.

The age in which uneducated genius could achieve distinction in engineering is past. A Trevethick or a Stevenson would, in this age, as surely remain in obscurity as they arrived at eminence in the past, and no young man who has an ambition to become anything more than a mere operative can afford to neglect study, especially the sister studies of geometry and algebra. It is true that there is "no royal road" to knowledge, and that the aid of a good instructor can remove many difficulties; yet these sciences can be, and have been mastered by young men unable to procure the aid of competent teachers, and in hours which are too often devoted by young mechanics to frivolous and unprofitable amusements. The writer has, in his own experience, to attribute as much of whatever success he has been able to reach to an early knowledge of geometry and algebra as to any other cause—a knowledge attained in spite of its exclusion from the very poor educational facilities afforded by just such a school as Mr. Greeley describes.

AMERICAN MECHANICS ABROAD—THE HAVRE EXHIBITION.

A correspondent of the *New York World* gives some of his views of the marine exhibition at Havre, France, from which it appears that but for the contributions from the United States and Great Britain, the marine portion of the show would be rather insignificant. Among the American contributions are Massey's leakage alarm gage and his boat-detaching apparatus. A description with illustrations of the first may be found on page 249, Vol. xvi, SCIENTIFIC AMERICAN, and of the other on page 260 of the same volume. Both had been thoroughly tested in actual use in this country before being exhibited in France, and with the most satisfactory results. The *World's* correspondent says:

"One of the most interesting and useful articles of its kind exhibited here is also an American invention, known as Massey's leakage alarm gage. This article is a most valuable appendage to any vessel, for it is important to know betimes that the vessel in which some hundreds of passengers are sailing is leaking, and it is very much to know that something is going wrong as early as possible then. The sooner the better, as there is the most hope of a remedy, if it is possible one can be applied. It is valuable in a small vessel as well as a large one, for though there be only a few lives on board they are precious. In this apparatus a float is actuated by the water in the hold, and its movements are indicated by a pointer on a dial face, which is graduated from one foot up to as many feet as is desirable. As the water rises from a leakage the float is elevated, and with each degree the hand moves and a bell is automatically rung. The warning is thus made audible as well as visible, and even in actual distress, when the pumps are set to work in earnest, there is a certainty in the knowledge thus afforded of whether human effort or the adverse element is gaining the victory, and which assurance cannot be otherwise than of the highest value, either as an encouragement to continue exertions or as a paramount indication of the necessity of quitting the wreck at all hazards. This is, as we said, a valuable invention, and worthy of an American brain. A French attempt to develop the same idea is a century behind it in detail.

The same parties exhibit Massey's boat-detaching apparatus, which for its simplicity and certainty of action, and the benefits derived from its use in time of peril enabled the congressional Committee to place it at the head of the list of forty-eight competitors. Forty-three were thrown out together, and of the five remaining Massey's was classed 1st."

Chlorine for Rats.

A correspondent of the *Turf, Field and Farm* gives the following: "At the commencement of this season I had a number of very choice and valuable pigeons in a large loft situated over a coach-house and stable. The flooring was very old, and numerous rat holes communicated with the space under the flooring and above the ceiling of the stabling below. Attracted by the corn, the rats came and took possession of this space. My choicest birds were eaten alive by these most carnivorous of the rodentia. I was in despair. I had tried poison, traps, etc., with only partial benefit, and I had serious thoughts of selling off my stock of Columbidae and taking to eagle owls, bull terriers, skunks, opossums, or some animals to which rats are not obnoxious. At last, after deep cogitation, I determined to try a chemical remedy—namely, chlorine, a gas so potent and destructive to animal life that I knew that, if I could apply it advantageously, it must necessarily prove effectual. Fortunately, it is much heavier than atmospheric air, so there was every probability of its flowing down the holes if it once entered into them. I therefore took a Florence oil flask, adapted a piece of glass tubing to its mouth by means of a perforated cork, and to the glass added a short length of india-rubber tubing. In the flask I put an ounce of manganese and an equal weight of common salt, poured on a wineglass of water, and then added gradually an equal quantity of strong oil of vitriol (sulphuric acid). The cork and tubes being adjusted, the apparatus was ready for action. A spirit lamp applied to the flask liberated a stream of chlorine, a gas which, if breathed, except when diluted with many thousand times its bulk of air, is absolutely irrespirable.

"All the rats' holes having been covered over, one after another was opened, the india-rubber tube introduced, and a stream of Chlorine directed down each. The space between the floor and ceiling must have been filled with a mixture of chlorine and air that no could have breathed and lived. Since that time I have seen no rats. Old and young have alike disappeared. Should a stray adventurer make his appearance I shall repeat my inexpensive remedy, and am now congratulating myself on having, for the present at least, extirpated the enemy.

"I would suggest that in those instances in which crickets, ants, cockroaches, etc., are concealed in places where they are difficult of dislodgment, the chlorine treatment might be applicable.

"I am aware that the weak odor of chlorine given out by chloride of lime has been successfully employed in driving away insects; but no animals of any kind could withstand the action of the gas liberated in quantity as I have described. I may state that chlorine is prepared with equal readiness from a mixture of manganese and hydrochloric acid (spirits of salts), salt not being required when this acid is used. It may also be liberated in large quantity without the necessity of applying heat, by pouring any acid on chloride of lime; but in this case the evolution of gas is sudden and unmanageable, so that the plan is not as well suited for the purpose as either of those in which manganese is used."

Bees in Mexico and Honduras.

The famed bees of Olancho are kept round the farms bouses in hives, which are only hollow logs of wood which the swarm has occupied in a wild state, which is cut off and suspended in the corridors of houses with a hide thong, a small hole at one end giving ingress and egress. The honey of this bee is contained in little bags or bottles, two inches in length, ranged in rows along the hive; but the cells for the young occupy the central parts. Fourteen distinct species of the apis are known in Olancho, one of which (*Ojoverritas*) makes a small nest, or hive, of capsules, with a waxy covering like isinglass, filled with a delicious fluid generally used in medicine. From Wells' Notes we judge this last species of apis is the same as that producing the fine honey of the Island of Jamaica, which never cloyes, and is of such aromatic flavor as to be in special demand for presents to Europe, and that the common domestications in the *paraisos* of Honduras appear to be the same as the Yucatan *apis* or *angelitos* mentioned by Humboldt, and nearly agree with that described at large in Beechey's California Voyage of 1824-7, known in science as *melipona beecheei*, and brought by the California Admiral from the vicinity of San Blas to England, a hive of which was presented to the great Swiss aparian, Huber, in 1828.

These bees are smaller than ours, and the hives contain a smaller number of the insects; but the Mexican insect, which is stingless, is raised with very little trouble, and all the honey can be taken out twice in the summer without disturbing the bees, as they are widely separated from the brood cells and honey sacks or bottles, and the active little workers continue on in their labors as if nothing had happened. The Mexican bee masters assert that their species have a sentinel always placed over the entrance of each hive, which is relieved every few hours, to keep a lookout for the armies of black ants, their worst enemies. Several of the hives of the Angel bees were carried to San Francisco from Mexico, in 1853, but we know not what was done with them, though bee swarms were then selling from a \$100 to \$200 a piece.

NEW METHOD OF CHARGING RETORTS IN GAS WORKS.—A machine has been invented in England by which a large system of retorts may be charged by a number of scoops operating at the same instant. The plan has been practically tried at the Alliance Gas Works in Dublin, and it is well spoken of. A new retort house has been built capable of working 300 tons of coal in a day, and containing 270 double retorts, or 540 mouth pieces, the charging and discharging of which is done by two of these machines.

MANUFACTURING, MINING, AND RAILROAD ITEMS.

BOGUS GOLD DUST.—Mr. H. M. Baynor, manufacturer and dealer in platinum, 78 Broadway, New York, has kindly submitted to us a specimen of counterfeit gold dust, made from grains of platinum, coated with gold or bronze. He has taken from Mr. H. G. Torrey (son of the Chief Assayer) at the United States office, Wall street, some 500 ounces within four months. For a year and a half past, small parcels have occasionally been offered for coinage at the office, and been examined and their character detected by the experienced assistant, Mr. Charles Gram. The grains are small and flatish, an excellent imitation, seeming to be made by crushing or stamping the cuttings or scrap platinum under heavy mill power. It is alloyed with copper and a small amount of silver. The coating when gold is not at once removed by aqua regia, requiring to be boiled for an hour or more. The analysis by Dr. John Torrey, gives 60 to 65 per cent platinum, a banker in Kansas City, was recently victimized to the amount of \$6,000 (gold) for a lot of 300 ounces, which as platinum was not worth over eight or nine hundred dollars (gold). It is surmised that this counterfeit finds its way into this country from France, via Mexican ports. Its appearance being so perfect as to deceive experts, the greatest care will be necessary to avoid imposition.

MINERAL WEALTH OF NEW HAMPSHIRE. Professor Hitchcock, of Amherst College, in a recent lecture expressed the opinion that the mineral wealth of New Hampshire was fully equal to any of the New England States. The results obtained by the use of Stevens' flux in working for gold were alluded to, and its use commended. He also alluded to the silver in Gardner's mountain, and to the soapstone, limestone, tin, lead and other minerals of the State. He stated that there was copper enough in Gardner's Mountain to supply the United States for 200 years, the vein being five miles long and 200 feet in depth.

A special train ran from Pittsburgh to Chicago, over the Pittsburgh, Fort Wayne & Chicago Railroad in twelve hours, on the 10th inst. The distance is 488 miles.

A factory 500 feet long, and estimated to need 3,000,000 bricks in its walls, is now being built at Suncook, N. H. The iron tubes employed to carry water to its wheels are one set five feet nine inches, and the other six feet and two inches in diameter.

PETROLEUM IN SWEDEN.—Shafts are sunk on the Osmund Mountain in Sweden for the working of certain petroleum springs which have been discovered. A depth has been reached of 233 feet. The materials dug out are impregnated with that species of petroleum known in America as surface oil, and which is of a deeper color than that generally used in Europe. It has been determined that the boring shall be carried to 600 feet, where the real petroleum is presumed to lie in great abundance.

An exchange suggests that the alkalis contained in the waters of the western wastes in the vicinity of Bridgers Pass, might be utilized in the manufacture of soap. These waters are so alkaline that in order to wash in them the skin has to be protected by a coating of grease which is converted into a species of soap during the operation.

Recent American and Foreign Patents.

Under this heading we have published weekly notices of some of the more prominent home and foreign patents.

TABLE FOR COMPRESSES.—Henry A. Burr, Brooklyn, N. Y.—The nature of this invention consists in constructing and arranging the table or platen of a press, that with it cotton and other goods that have been previously pressed or put up in bales, can be again compressed without removing the hoops or bands of the bales.

ROAD SCRAPER.—E. B. Driskell, Paris, Ill.—This invention is an improved road scraper which can be operated more conveniently and cheaper and more simple in construction than those in common use.

LOW WATER REPORTER.—Lorenzo Fulton, Edinburg, Ind.—The object of this invention is to furnish a simple, cheap, and accurately operating device which will indicate the fall of the water below its proper and safe level in the boiler, and which will also indicate the careening of the boat to such a degree as to improperly heat the sides of the boiler, and which, besides sounding an alarm at the time, will correctly record the fact that an alarm was given by means of a dial index and marking pencil.

SPARK ARRESTER.—James C. Rhoads, Stillwater, Minn.—This invention has for its object to furnish a neat, simple, and effective device for attachment to draft orifices of stoves, furnaces, heaters, etc. to prevent the sparks from snapping out and setting fire to the carpet or house.

WAGON BRAKE.—William B. Morgan and J. H. Terrell, Antioch, Ind.—This invention has for its object to improve the construction of wagon brakes so as to adapt them for use with different kinds of loads.

DRAIN FLOW.—Phillip Ballard, Texas, Ohio.—This invention has for its object to furnish an improved plow for opening tile drains, which shall be simple in construction and effective in operation.

TOBACCO BOXES, ETC.—George M. Bull, New Baltimore, N. Y.—This invention has for its object to improve the construction of round or oval tobacco boxes, spectacle cases, etc., in such a way that they may have no sharp corners, edges, or projections to cut or wear the pocket of the person carrying them.

ATTACHING CARRIAGE TOPS TO THE RAILS OR BODIES.—Wm. Horrocks, Poughkeepsie, N. Y.—This invention relates to the manner of securing the carriage slat irons to the rails or bodies of carriages and consists in pivoting each slat separately to a disk or knob by a separate pin or pivot.

MOWING AND REAPING MACHINE.—Wm. O. Harrison, Chittenden, Vt.—This invention relates to the manner of operating the cutter bar of a mowing or reaping machine without the use of a pitman connection, and consists chiefly in hinging the finger bar to a revolving shaft which carries at its end a crank pin, that works in a slotted projection of the cutter bar and that imparts the desired reciprocating motion to the said cutter bar, in whatever position the finger bar may stand.

COMBINED SQUARE PLUMB AND LEVEL.—A. F. Ward, Marietta, Ohio.—This invention consists, first, in providing in the main portion of the body of the frame conical sockets, and providing the swinging frame with corresponding conical projections fitted to the said sockets, and a bolt and thumb nut, whereby a more durable and reliable axial joint is formed for the same; second, in forming the metal frame in two parts and providing them with the recesses for the glasses, one on each part; and, third, in the manner of fastening the protractor.

SAW SHARPENING MACHINE.—Hymen Clendenen, Beverly, Ohio.—This invention relates to a machine for filing or sharpening saws, and it consists in a novel construction and arrangement of parts, whereby the desired work may be done with the greatest facility and accuracy.

GAME TABLE.—Wm. Keil, Haselinz, Minn.—This invention consists of a circular table having a conical center, and a raised rim around the edge between which and the base of the conical center is an annular groove divided into sections. In the center of the table a hollow stud is arranged having a concave recess in the top and a plunging rod running through it, which may be raised by a series of levers suspended from the underside of the table in radial positions, the outer ends projecting through the rim of the table sufficiently to be operated by the fingers of the players. The top of the table is provided with several circular rows of vertical pins at regularly recurring distances from the center, each row having the same number, the pins of every alternate row being set in the same radial line. In the second row of pins, each alternate pin is enlarged and provided with conical recesses.

SUPPORTING STOVE PIPES.—G. W. Bradford, Brooklyn, N. Y.—This invention relates to a means for supporting stovepipes, and is designed to supersede the pieces of wire which are now used for such purpose, and are wrapped around the pipe one or more times previous to having their ends connected to the ceiling or other fixture. Those exclusive wire supports do not have a very neat appearance and besides they are very liable to be shifted in position.