

SCIENTIFIC AND PRACTICAL INFORMATION.

INOCULATION WITH DEAD BLOOD.

It is well known that surgeons are often seriously injured by accidentally cutting themselves with instruments that have been recently used for dissecting purposes. The wounded part swells, and mortification often ensues, necessitating amputation and sometimes causing death. In order to determine the poisonous properties of this putrid blood, M. Davaine communicates to *Les Mondes* the result of several experiments made upon rabbits. The liquid used was the blood of an ox that had been ten days slaughtered. This, by subcutaneous injection, he administered to his subjects in varying quantities, obtaining by successive dilutions with water the most infinitesimal attenuations. Killing one animal, he would take its infected blood and force the same into the veins of another, and so on until he reached what he terms the twenty-fifth generation. On this last experiment he says: "Four rabbits received respectively one trillionth, one ten-trillionth, one hundred-trillionth, and one quadrillionth of a drop of blood from a rabbit belonging to the preceding generation that had died from the effects of a one trillionth dose. Of the four, but one animal died—that which received the one ten-trillionth. It appears, then, that the limit of the transmissibility of the poison in the rabbit reaches the one trillionth part of a drop of decayed (*septicque*) blood."

INDEPENDENT CAR WHEELS.

In the Polytechnic Exhibition of Moscow is now exhibited a new method of arranging the axletrees of railroad cars or other vehicles, in order to facilitate the passage around curves of very short radius. The axle is cut in the middle and the two portions are reunited by means of a long metallic sleeve. The extremities of the axle consist of a pivot and socket, so that their only point of contact is directly in the center of their junction. Shoulders or flanges are arranged which retain the halves within the sleeve. The two portions of the axle are thus allowed to work at different velocities, by which it is believed that the successive shocks occasioned by the sliding of the wheels on the rails in rounding short curves will be avoided. This system is being applied to a tramway between Petrofsky Park and the gardens of the exposition, on which there are curves of from 30 to 50 meters radius.

The invention is very old and has long been known in this country. One of the most approved examples is the "Doty-Milmore Compound Car-axle," which is now used on several of our railroads. It is stated that 104 patents have already been granted in this country upon car axles and wheels having the above idea in view, to wit, making car wheels to run independently.

COLORING THE EYE.

Dr. R. J. Levis, of the Pennsylvania Hospital, has devised a means of coloring opacities in the cornea of the eye. He says: "The disfigurement of the glaring white opaque spaces of the cornea can be cured by indelibly tinting, so that if central, they shall show the blackness of the natural pupil, or if peripheral in location, the color of the underlying iris may be most deceptively imitated. Should even the entire cornea be opaque, a very natural imitation of the appearance of the whole circle of the iris and the pupil can be accomplished." The instrument used is a bundle of from three to six very fine sewing needles inserted into a handle. For coloring matter, ordinary water pigments are used, rubbed to a pasty consistence and mixed with a little glycerin. For the black of the pupil, Indian ink is employed. The surface of the opaque spot being wiped clear from moisture, the paint is applied thickly over it with a small pencil. The needle points are made to penetrate repeatedly and rapidly in varying directions, until much of the opaque surface is gone over with the pigment. Two or more repetitions of the process are required. The operation is said to be painless, and as the coloring matter is regularly tattooed into the tissues, it cannot be washed out by tears.

THE OSCILLATIONS OF SHIPS MADE USEFUL.

M. Guzman, of France, has lately published in the *Annales du Génie Civil* an elaborate essay, proposing to utilize the inertia of a suitably suspended and freely oscillating body, such, for instance, as a heavy pendulum so placed on a vessel as to be swayed by the action of pitching and rolling, and, by suitable mechanism connected with the pendulum, to apply the power to working pumps, etc. This is a very old idea, and is, we believe, an American invention. At any rate it is the basis of several different patents in which the idea is embodied. One would almost suppose that Mr. Guzman must have had before him, in preparing his essay, a copy of United States patent No 18,192, of September 15, 1857.

This invention consists simply in a heavy weight attached to a swinging shaft. As the former sways to and fro, by the movement of the vessel, it actuates gearing which communicates motion to a shaft which operates a pump and keeps the ship dry. In the back numbers of the *SCIENTIFIC AMERICAN* will be found several other forms of the same idea illustrated and explained.

The essay of Mr. Guzman is only one of hundreds of examples in which Europeans, having hit upon some old American invention, have put it out in a new dress and passed it around through the press as a novelty.

NEW BOOKS AND PUBLICATIONS.

HOW TO PAINT: A complete Compendium of the Art. Designed for the Use of the Tradesman, Mechanic, Merchant and Farmer. By F. B. Gardner, Author of "The Carriage Painter's Manual." Price \$1.00. New York: Samuel R. Wells, No. 389 Broadway.

A neatly printed, convenient little book, thoroughly practical in all its instruction. Many excellent recipes are contained in it.

Facts for the Ladies.—Mrs. O. Pierce, Boston, Mass., has used her Wheeler & Wilson Lock-Stitch Machine since 1859, without repairs, earning from \$12 to \$15 a week, making men's clothing. See the new improvements and Woods' Lock-Stitch Ripper.

Business and Personal.

The Charge for Insertion under this head is One Dollar a Line. If the Notice exceed Four Lines, One Dollar and a Half per Line will be charged.

Diamond Carbon, of all sizes and shapes, furnished for drilling rock, sawing stone, and turning emery wheels or other hard substances; also Glazier's Diamonds, by John Dickinson, 64 Nassau St., New York.

Wanted—To purchase good Second Hand Wood and Iron Lathes. Address Loudon Mfg Works, Fairfield, Iowa.

Wanted—A position in a Cement Factory; or in an Artificial Stone Works. Address, Owner, 378 Gold Street, Brooklyn, N. Y.

Permanent Photograph Printing, just what is wanted by Manufacturers. Send for Circular to Amer. Photo Relief Printing Co., 1002 Arch St. Philadelphia, Pa. John Carbutt, Sup't.

Winans' Boiler Powder, 11 Wall St., New York. Certain cure for Incrustations—17 years best in the market.

Valuable Patent Right for Sale. The amusing Toy Attachment for Pianos, illustrated in *SCIENTIFIC AMERICAN*, October 28th, 1871. Address G. L. Wild & Bro., 420 11th St., Washington, D. C.

Boston Fire! Goodnow & Wightman, 23 Cornhill, were not burned out, and are ready to fill all orders for Tools and Materials. Catalogues were all burned, but will have more in about two weeks.

For Sale—An interest in an established business. Capital required, seven thousand dollars. Enquire of Messrs. Fine & Gallaher, Counselors at Law, No. 7 Murray St., New York.

First Class Steam and Vacuum Gauges, Engine Registers, Davis' Recording Gauges. New York Steam Gauge Co., 46 Cortlandt St., N. Y.

Water Front for Factories, Rope-walks, Lumber-yards, &c.—Lots for Sale or Lease. Blocks of lots on Newtown Creek, near East River, adjoining New York and Brooklyn Cities; prices \$300 to \$1,000; terms easy. Apply to S. R. Schieffelin, No. 15 East 26th St., New York.

A thorough machinist, who is an experienced foreman, and first class mechanical Draftsman, desires employment. Address A. G. Edwards, Oshkosh, Wisconsin.

A first class Improved Water Power for Sale, in Hawley, Pa., on Erie R. R. & D. & H. Canal. Address Northrup Bros., Hawley, Pa.

Water Wheel Regulators—warranted, or no sale. Address F. B. Bowen, Pawtucket, R. I.

Soluble Glass, Water Glass, Liquid Quartz, Silicates of Soda and Potash for Concrete Cements, Fire and Waterproofing, manufactured by L. & J. W. Feuchtwangler, Chemists, 55 Cedar St., New York.

Oxide of Manganese, highest test, from our own mines, for Steel manufacturing, Patent Dryer, Paints and Glass, at lowest prices, by L. & J. W. Feuchtwangler, 55 Cedar St., New York.

Nickel Salts, double Sulph. and Ammonia, especially manufactured for Nickel Plating, by L. & J. W. Feuchtwangler, Chemists, 55 Cedar St., New York.

Four Brick Machines, Combined with Steam Power (Winn's patent), makes 40 M. per day, for sale at a bargain. Address the manufacturers, John Cooper and Co., Mount Vernon, Ohio.

Engine and Speed Lathes of superior quality, with hardened Steel bearings, just finished at the Washburn Shop, connected with the Technical Institute, Worcester, Mass.

Hand Lathes. C. F. Richardson, Athol Depot, Mass.

I will Remove and prevent Scale in any Steam Boiler or make no charge. Engineer's Supplies. Geo. W. Lord, Philadelphia, Pa.

Absolutely the best protection against Fire—Babcock Extinguisher. F. W. Farwell, Secretary, 407 Broadway, New York.

Hydraulic Jacks and Presses—Second Hand Plug Tobacco Machinery. Address E. Lyon, 470 Grand St., New York.

Steel Castings "To Pattern," from ten pounds upward, can be forged and tempered. Address Collins & Co., No. 212 Water St., N. Y.

Ashcroft's Original Steam Gauge, best and cheapest in the market. Address E. H. Ashcroft, Sudbury St., Boston, Mass.

Heydrick's Traction Engine and Steam Plow, capable of ascending grades of 1 foot in 8 with perfect ease. The Patent Right for the Southern States for sale. Address W. H. Heydrick, Chestnut Hill, Phila.

The Berryman Steam Trap excels all others. The best is always the cheapest. Address I. B. Davis & Co., Hartford, Conn.

Wanted—Copper, Brass, Tea Lead, and Turnings from all parts of the United States and Canada. Duplaine & Reeves, 760 South Broad Street, Philadelphia, Pa.

The Berryman Heater and Regulator for Steam Boilers—No one using Steam Boilers can afford to be without them. I. B. Davis & Co. T. R. Bailey & Vail, Lockport, N. Y., Manf. Gauge Lathes.

Brown's Pipe Tongs—Manufactured exclusively by Ashcroft, Sudbury St., Boston, Mass.

Windmills: Get the best. A. P. Brown & Co., 61 Park Place, N. Y.

Ashcroft's Self-Testing Steam Gauge can be tested without removing it from its position.

The Berryman Manuf. Co. make a specialty of the economy and safety in working Steam Boilers. I. B. Davis & Co., Hartford, Conn.

Williamson's Road Steamer and Steam Plow, with Rubber Tires. Address D. D. Williamson, 82 Broadway, N. Y., or Box 1809.

Belting as is Belting—Best Philadelphia Oak Tanned. C. W. Army, 301 and 303 Cherry Street, Philadelphia, Pa.

Boynton's Lightning Saws. The genuine \$500 challenge. Will cut five times as fast as an ax. A six foot cross cut and buck saw, \$6. E. M. Boynton, 80 Beekman Street, New York, Sole Proprietor.

For Steam Fire Engines, address R. G. Gould, Newark, N. J.

Brown's Coalyard Quarry & Contractors' Apparatus for hoisting and conveying material by iron cable. W. D. Andrews & Bro. 414 Water St. N. Y.

For Solid Wrought-iron Beams, etc., see advertisement. Address Union Iron Mills, Pittsburgh, Pa., for lithograph, etc.

All kinds of Presses and Dies. Bliss & Williams, successors to Mays & Biles, 118 to 122 Plymouth St., Brooklyn. Send for Catalogue.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or rent. See advertisement, Andrew's Patent, inside page.

Presses, Dies & all can tools. Ferracute Mch. Wks., Bridgeton, N. J. Also 2-Spindle Drills, for Castors, Screw and Trunk Pulleys, &c. Kahnweiler's Cotton Seed Huller, \$175. Is warranted perfect in its operation. Send stamp for circular to R. H. Allen & Co., New York, manufacturers and dealers in Agricultural Machinery of every kind.

A party intending to engage extensively in the hose knitting business wishes to obtain full information as to the best machines, prices etc. Address H. Hutzler, 383 Central Avenue, Cincinnati, Ohio.

Gear Wheels for Models. Illustrated Price List free. Also Materials of all kinds. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Agricultural Implements and Machines for Fall and Winter use. R. H. Allen & Co., 189 & 191 Water Street, New York. For 2, 4, 6 & 8 H. P. Engines, address Twiss Bro., New Haven, Ct.

Wanted—A reliable and intelligent man of good address, to engage in a desirable and lucrative business producing from \$1,500 to \$5,000 per year. Address J. B. Ford & Co. New York Boston; Chicago or San Francisco.

Steam Boiler and Pipe Covering—Economy, Safety, and Durability. Saves from ten to twenty per cent. Chalmers Spence Company; foot East 9th Street, New York—1202 N. 2d Street, St. Louis.

Peck's Patent Drop Press. Milo Peck & Co., New Haven, Ct.

Machinists; Illustrated Catalogue of all kinds of small Tools and Materials sent free. Goodnow & Wightman, 23 Cornhill, Boston, Mass.

Complete Water Gauge for \$4. Holland & Cody, 8 Gold St., N. Y.

Gatling guns, that fire 400 shots per minute, with a range of over 1,000 yards, and which weigh only 125 pounds, are now being made at Colt's Armory, Hartford, Conn.

Perfection—Patent Ears for Elliptic Spring Heads. Address George P. Cleaves, Concord, N. H.

For hand fire engines, address Rumsey & Co., Seneca Falls, N. Y.

A New Machine for boring Pulleys, Gears, Spiders, etc. etc. No limit to capacity. T. R. Bailey & Vail, Lockport, N. Y.

Notes & Queries

[We herewith present a series of inquiries embracing a variety of topics of greater or less general interest. The questions are simple, it is true, but we prefer to elicit practical answers from our readers.]

- 1.—How can I best stop small leaks in a rubber gas bag?—B. S. P.
- 2.—Will some one please inform me whether black ink writing, faded by age, can be restored so as to be read; and if it can be what is the process?—H. E. C.
- 3.—How can I best prepare lime cylinders for use in producing the oxyhydrogen or calcium light? Can air-slaked lime be utilized for the purpose?—B. S. P.
- 4.—Can any one of the readers of the *SCIENTIFIC AMERICAN* give me a recipe for making a cheap and permanent silver plating for brass ware? I have tried several patent preparations, but the coating does not last long.—J. W. C.
- 5.—What is the best and cheapest way to remove old paint or varnish from carriages, preparatory to repainting and varnishing?—M. M. H.
- 6.—How can I galvanize cast iron? I wish to have your way of doing it, as all the recipes from your paper I have tried came nearer the mark than any others.—C. I.
- 7.—I am experimenting in photozincography and collogtypy; can any of your numerous readers inform me what kind of a press I should use, whether platen or roller, and whether an ordinary copper plate could be successfully printed with from the same press? What is the composition of the ink to be used?—A. G. Jr.
- 8.—Can any one give me information concerning the manufacture of flour starch? Would it pay a farmer to make it on a small scale? How many pounds of starch can be extracted from a bushel of ground wheat?—J. S.
- 9.—I am using a copper and tin composition for a sliding box, and find it wears out rapidly. I have thought of using *Uignum vite*, or some other hard wood, instead of metal. Will some one inform me whether any kind of wood would wear longer than the above named metal for such a place? I have noticed that some manufacturers of steam fire engines use *Uignum vite*, but do not know the reason why they use it. Can any one inform me?—J. M.



SPECIAL NOTE.—This column is designed for the general interest and instruction of our readers, not for gratuitous replies to questions of purely business or personal nature. We will publish such inquiries however, when paid for as advertisements at \$1.50 a line, under the head of "Business and Personal."

ALL references to back numbers must be by volume and page.

P. H. A. enquired in our paper of November 16 whether there was any danger of bursting the barrel of a rifle in case the ball is not rammed down to the powder. The answer was that the fact that the ball was not rammed down does not increase the liability of bursting the barrel. It should have read "does increase" the liability of bursting. The theory of gun men is that, when there is any considerable space between the powder and ball, the gas engendered by the charge strikes the ball a more sudden blow than when the ball is rammed home to the powder. Accidents from bursting, due to insufficient ramming, or placing two charges or balls in the gun, with air space between, or placing wads or other plugs in the barrel, not in proximity to the powder, are of frequent occurrence. Shot guns, which have light, thin barrels, especially near the muzzle, have been known to burst on firing if the muzzle was simply plugged with snow.

C. M. B. says: I am about to have a particular kind of muzzle loading rifle made, and there are some points that I wish to be informed upon before giving the order. The following are the points: How thick ought a steel rifle barrel be to carry a two ounce conical bullet with perfect safety, allowing as much powder as would burn in the chamber? What would be the proper charge of powder to use for such a bullet in order to shoot it with all the force that the barrel would stand? What would the weight of such a barrel be, allowing it to be as light as possible and perfectly safe, that is, as safe as the ordinary rifle? I have tried hard to find this matter out here, but with poor success. I have consulted some gunsmiths, but they could give me no definite answer, and guess work won't do in this case. You may be sure I shall anxiously look through your column of answers to correspondents for the time to come. Answer: In thickness the barrel should be twice the diameter of the bore at the breech, and one and three fourths the diameter of the bore at the muzzle, and the barrel should not be less than thirty inches long in order to burn all the powder. The barrel should be made of decarbonized steel of good quality. The weight of the barrel will depend upon its length, which is not stated by you. But you can easily settle the weight. The quantity of the powder should be equal in weight to about one sixth the weight of the bullet.