

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-Miltimore 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. Feuchtwangner, 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. Feuchtwangner, 55 Cedar St., New York.

Nickel Salts, double Sulph. and Ammonia, especially manufactured for Nickel Plating, by L. & J. W. Feuchtwangner, 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 Extinction. 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 Coal-yard 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 & Bliss, 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.

G. L. H.—What will be the best practical method to decompose water into oxygen and hydrogen, filling separate vessels respectively? Answer: The most convenient method of decomposing water is by means of the galvanic battery. Place the ends of the two wires in water, near each other, and over each wire a collecting jar or tube. The two gases will then rise, hydrogen in one, oxygen in the other.

R. H. D. says: You might add to your article on paper hanging: Cover your table with newspapers and renew when soiled, instead of cleaning the table so often, and use sizing of vinegar and water before pasting the walls.

A Subscriber asks if tea made of burdock root will purify the blood without thinning it too much? Answer: This root is considered excellent for disorders of the blood, but we advise you to consult a physician in respect to its use.

W. C. Van N. says: I am troubled with rheumatism in my feet. Will some one state a remedy? I have heard that lemons are good. How many must I eat a day, and at what hours? Answer: Fifteen lemons a day, eating one every hour, will probably quiet your rheumatism, and all other troubles, in a short time. But if you wish to live for a while longer, let the lemons alone and consult a first-rate physician.

W. D., of N. C., sends us a mineral specimen, asks what it is, and says he has leased for ten years the land where it is found. Answer: The mineral is quartz rock, colored red by oxide of iron. The silvery particles in it are mica, and of no value.

F. D. H. asks: Can iron be plated with copper by the means employed to plate metals with silver, using a solution of sulphate of copper instead of the silver solution? Answer: Yes.

F. D. H. asks: How can I remove mercury from the surface of brass, which has become coated by accident, without injury to the same? Answer: By heating the article. Look out that you do not inhale the mercurial fumes.

E. H. asks in what way galvanized iron can be treated to resist the action of salt. Answer: You can protect the iron by means of varnish. You do not state, however, the circumstances under which the iron is used.

F. H. N. requests us to inform him whether the report of one gun can be heard as far as the report of two, fired simultaneously, the guns to be of the same size, charged the same, etc. The question arose thus: A. claimed that the solos sung at the Boston Jubilee could be heard just as far as the choruses, provided the voices were all of the same power. Certainly the report of two guns will make a louder noise, then it consequently would transmit the sound farther. Answer: Your conclusion is correct. The report of two guns will be louder than one, and will consequently be heard further. A. is wrong about the Jubilee singers. One voice could not be heard at so great a distance as several voices of the same power.

Professor Ott writes as follows: In your issue of November 9, I find it stated among the answers to correspondents that the process of Mallet for manufacturing oxygen has not as yet come into practical use. Permit me to inform you that the same has been in use in Frankfort-on-Main for about two years, the oxygen being employed for Phillips' new system of illumination, which has also been patented in the United States. The experiments made with the first apparatus of Mallet yielded a gas consisting of 97.3 volumes of oxygen and 2.7 of nitrogen, an amount which for all technical purposes is of no consequence whatever.

In answer to A. F. S., asking how to clean stove pipes of soot, I would recommend the following: Place a piece of newspaper with a spoonful of gunpowder enclosed, beneath the entrance to the stove pipe, removing the tops on the back near the pipe. Let the paper have a long end; light it and then retire after replacing the tops. The explosion of the powder will bring the soot down.—H. B.

W. K. L., query 2, page 281, will find that silicate of soda is soluble in water after becoming hard. The trouble is that people generally do not understand the difference between silicate of soda and water glass. The makers of this useful article decline to sell it at retail; where can it be procured in small quantities?—T. E. L.

In a recent issue you suggest to artists and draftsmen the use of "ordinary collodion, sold by all dealers in photographic materials" as a protection to pencil and crayon drawings. Would it not be best to use plain or unsensitized collodion, as the free iodine in ordinary collodion, for photographic use, would seriously stain or tint a delicate drawing? The solution should contain less cotton than for ordinary use. The following is a good formula; Sulphuric ether, 1 oz., alcohol (95 per cent), 1 oz., soluble gun cotton, 4 grains. I have used it with excellent results.—G. G. R., of N. Y.

To A. T. M., query 6, page 314. Dissolve about 60 grains of carbonate of ammonia in the water used for mixing with 1 pound of flour. Knead well, and bake immediately; all the ammonia will volatilize. Or mix dry, with each pound of flour, about 36 grains tartaric acid and 42 grains carbonate of soda, add water, etc. Knead quickly, place in tins and bake. Bread also used to be made by using carbonate of soda and muriatic acid; but the introduction of the large quantity of common salt so formed was considered injurious to the health.—E. H. H., of Mass.

To O. S., query 11, page 314. Ozone papers are made by dipping unsized paper into a solution of 1 part iodide of potassium, 10 parts wheat starch and 100 parts distilled water. Dry rapidly, cut into slips, and keep in a well stoppered bottle in the dark. To use: moisten a slip and hang in a cage of wire gauze, when the effect of any ozone will be indicated by the depth of color produced.—E. H. H., of Mass.

To D. R. W., query 12, page 314. There is nothing dangerous about the processes named for silvering glass.—E. H. H., of Mass.

To O. S., query 21, page 314. Saturate the outside of your vats—especially the bottoms—with a solution of corrosive sublimate, and, when dry, coat well with paint. You need not fear any ill effect from the sublimate on the contents. It will be also well for you to see that there is some ventilation underneath. The corrosive sublimate is about the best preservative of wood against decay known.—E. H. H., of Mass.

To T. J. S., query 26, page 314. Steep, for a while, in a dilute solution of permanganate of potash; the broom corn will become brown. Place then in a hot dilute mixture of muriatic acid, and it will be quite white.—E. H. H., of Mass.

To O. S., query 11, page 314. Boil common starch into a weak solution of iodide of potassium, to make a solution of any convenient consistency. Brush this evenly over any good paper; druggists' white wrapping is good. Dry and preserve. To use it, moisten the slips and expose. Free ozone will, if present, decompose the iodide of potassium, coloring the starch a deep blue, forming iodide of starch.—S., of N. Y.

To E. E., of R., India, query 5, page 314. Such a machine as an ordinary hay cutter answers very well for cutting leaves. Have four or more blades, instead of two, and so cut the leaves to the width you want.—E. H. H., of Mass.

To E. E., of R., India, query 9, page 314. The senna leaves after drying on sieves by currents of air or in a stove, are prepared for the market by picking out the leaflets, stalks, pods, and the leaves of weeds or other herbs, etc., thus being sure that it is free from argel leaves, with which it frequently is largely adulterated.—E. H. H., of Mass.

W. B. N., query 5, page 298, will want 40 horse power to drive sixteen 30 inch 12 gauge circular saws through 6 inch to 10 inch stocks, and he will require two rubber belts, 12 inches wide, 5 ply thick.—J. H. M., of P. Q.

To J. H. L., page 314. A very good way to imitate ground glass is to take a ball of fresh putty, as large as a small apple, and press it to the inside of the glass, repeating the operation until the whole is sufficiently coated. It will require a practical eye to distinguish the result from ground glass.—A. B., of U. S.

To A. P. C., query 23, page 314. All parts of the circumference of a locomotive wheel travel around the axle at the same rate. But one point rests upon the rail, not moving forward for the time being. All the other points are moving forward with varying rates, the top point moving most rapidly. Thus every point of the wheel describes a cycloid but, being in different parts of the cycloid at the same time, advance accordingly.—Le R. F. G., of Mass.

To E. E., of R., India, query 28, page 314. There is no plan so reliable as the tasting of an infusion made of definite strength, by weighing the quantity of tea and measuring the quantity of water. An extract of tea can be made, but the result would be useless, as the fine aroma would be dissipated during the necessary evaporation. Tea contains the principle called theine, similar to caffeine in coffee, and possessed of the same therapeutic properties. Heat, if too great, will volatilize it, as is done daily in the roasting of coffee. Tea can be analyzed and its constituents separated.—E. H. H., of Mass.

J. F. S., query 29, page 314, can prepare litmus paper by taking druggists' white wrapping paper and brushing over one side with a solution of 1 part litmus to 4 parts water. This will make blue paper, to detect acids. For red paper, redden the above solution, carefully, with an acid and use as above. I prefer to take blue litmus paper and hold it over the fumes of nitric or acetic acids, and thus redden it. This avoids all excess of acid, and the paper is more delicate. Any vegetable blue will answer in place of litmus, if you can get a color deep enough.—S., of N. Y.

To J. F. S., query 29, page 314. Make an infusion of litmus in water and a very little alcohol. Use unsized paper. Put the infusion in a flat dish or saucer, and draw slips of the paper through it. If common blotting paper is used, it probably will be an advantage to add a few drops of ammonia to the litmus solution. This will make the blue papers. For red: proceed as before, but add a drop or two of acetic, or dilute sulphuric acid.—E. H. H., of Mass.

#### COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On the Dangers of Car Couplings.—By J. E. S.
- On the Force of Steam and the Theory of Heat.—By J. C.
- On the August Meteors.—By W. L. D.
- On Methods of Ascertaining the Dew Point.—By R. H. A.
- Experiments and Suggestions Concerning Automatic Fire Alarm Devices.—By H. M. S.
- On the Prognostication of the Weather by Animals.—By J. P. H.
- On Sheet Lightning.—By J. H. P.
- On a Recent Boiler Explosion.—By J. A. W.
- On the Rotation of Movable Wheels.—By J. H. P.
- On the Properties of the Concentrated Solar Rays.—By G. R.
- On Milk Sickness.—By A. G. P.
- On Canal Boat Propulsion.—By L. M. H.
- On Car Couplings.—By T. E. B.
- On Cylindrical Steam Boilers.—By L. C. S.
- On Thunder and Lightning.—By A. E. D.
- On Scientific and Mechanical Possibilities.—By J. E. E.

#### Recent American and Foreign Patents.

Under this heading we shall publish weekly notes of some of the more prominent home and foreign patents.

ROTARY STEAM ENGINE.—Andrew Philp, New York city.—In this invention the cylinder has two long circular recesses in the inner periphery, at opposite sides of the axis, with inclined abutments, said recesses being as wide as the length of the cylinder, and as deep as it is designed that the piston plates, that the steam acts upon, shall project from the disk, which fits in the cylinder as close as it can and revolve freely, and carries the said piston plates in radial slots. The said plates are fitted therein so as to slide out and in and yet not allow steam to escape by passing around them in the slots. The said disk is provided with steam way grooves on one side, and on the other in the corners between the plates, by which live steam is admitted to the recesses behind the plates for propelling the disks. The steam is admitted to these steam ways by the ports on one side and on the other, from the annular steam chests in the disks, attached to the plates which inclose the cylinder at the ends, and to which said chests the steam is admitted by a cock which can be shifted to admit it to either, as required. Steam is also admitted from these steam chambers through the small ports on one side and on the other to the radial slots behind the plates for throwing them out against the walls of recesses. The arrangement of the ports, relative to the recesses, is reversed for the different sides of the engine, the object being to run the engine in opposite directions thereby. There is an exhaust port at each end of the recesses, with a cock for opening and closing them, as required. All discharge into an annular space. The steam, admitted to the radial notches for forcing the plates out into recesses for taking steam therein, exhausts through the small ports, which are arranged equidistant between the ends of recesses, so that they exhaust the said notches, whether the engine runs one way or the other. The inner ends of the plates have little grooves to admit the steam, although the said ends rest on the bottom of the notches. The ports are arranged so that the steam will always enter the notches and recesses when they come to the ports, which are always open and will be cut off when they pass beyond said ports. The steam ways are so arranged, relatively to said recesses, that steam is admitted behind the plates as soon as the said rear corners have arrived at the bottoms of said inclines; and the steam ways will be made any length short of the exhausts, according to the extent it may be desired to work the steam expansively. The exhausts will be alternately opened and closed, according to the direction in which the engine is required to run.

CARPENTER'S WORK BENCH.—Edward Andre and William H. Andre, of Tiffin, Ohio.—The object of this invention is to construct a work bench for joiners, house finishers, and others, which can be much more easily moved and transported from place to place than work benches of ordinary construction; and it consists in a bench that folds up.

FIRE KINDLING COMPOUND.—John S. Carroll, of Covington, Ga., assignor to himself and J. W. Rogers, of same place.—This invention relates to a new composition which is to be applied to wood, coal, or other devices to be ignited, and which can also be used for illuminating purposes on torches or similar articles. The invention consists in combining the following ingredients: plaster of Paris, lard or swine oil, kerosene oil, and Spanish brown or other coloring matter.

CHURN.—Roger Williams, of Yonkers, N. Y.—The invention consists in operating two open frame dashers in the same direction in an oval churn. The two dashers stand with their faces at right angles and always remain so during operation, as they revolve in the same direction with equal velocity. They thereby prevent a continuous current of the cream along the walls of the churn. A faucet for the discharge of milk is applied to the lower part of the churn.

FLYING APPARATUS.—Watson F. Quinby, Wilmington, Del.—This invention relates to a new apparatus for enabling men to fly with the use of side and dorsal wings, which are connected with the extremities for operation. The chief object of the present invention is to support the flying apparatus entirely on the body of the operator, and remove all weight from the arms and legs, so that they will be free to give their entire strength to the operation. The invention consists in a new arrangement of belt and rigid braces for supporting the apparatus on the body; in a new system of stay cords in the several wings; novel method of uniting the wings in front and making them adjustable, and in a new arrangement of cords for connecting the wings with the extremities or exposing them to the action of the same. By grasping certain cords with the hands, and pushing forward and upward, the wings are raised, not fully at once, but gradually, the forward part first, and thence backward, the same as can be observed in the movement of winged animals. By means of the feet, the operator can draw the wings exactly in a reverse to the effect on the same by the hands. The system of upper and lower cords on each side wing is divided into two parts, whence branched cords extend to the uniting rings, thus forming two points of attachment whereby the canting or rolling of the wings will be prevented and a steady motion insured. The rods and branches are principally strained in the direction of their lengths, and can, therefore, be comparatively light. The apparatus is easy to put on, and can, when not in use, be folded together into a comparatively small compass. The weight of the whole machine need not exceed fifteen pounds. The points are the same as those of the bat's wing, except that in the bat the three rods projecting backward are not branched. The rods are then secured in position and the stay cords and covering attached to them. The waistring may be composed of felines, like a light wheel, or of thin metal curved so as to combine strength with lightness. The main rods may be composed of bamboo, branches of reeds, or wood, not exceeding an inch and a half in the thickest part, and tapering to a half inch. The small rods are in proportion. The covering (which may be composed of oiled silk or gummed cloth) is secured to the cord which extends all around and connects the points of the rods and stay cords. It is intended to start from the ground. In order to make a beginning, one foot is disengaged from the stirrup, when, by raising the other foot and pushing the hands upward and forward, as in swimming, the wings are raised. Then, by suddenly depressing the wings, by means of the elevated leg, the former are intended to elevate the body by their action on the air. This alternate elevation and depression of the wings is continued as long as flight is desired. After rising from the ground, the other foot may be inserted in its stirrup and both legs used. The actions are intended to be natural, resembling those of swimming in water.

COMBINED WARDROBE AND BEDSTEAD.—Robert M. Austin, of Philadelphia, Pa.—This invention has for its object to improve the construction of the combined wardrobe and bedstead patented June 4, 1872. Suitable appliances hold the side boards from rocking or turning when extended, and at the same time, allow the said side boards to be turned up into a vertical position. To the outer side of the inner end of each of the side boards is pivoted a grooved pulley, which rolls up and down in a groove formed for that purpose upon the inner surface of the sides of the case, the said groove being made dovetailed to keep the said pulley in place while moving up and down. To the inner end of each side board is attached the end of a rope or cord which passes up and is attached to a drum, attached to a shaft, which is pivoted to the upper part of the case. One of the drums is made double, and to its other part is attached a cord, which is weighted, and passes over a guide pulley or pulleys, to bring it into such a position that it may be conveniently reached and operated to raise the side boards. To the inner ends of the side boards are attached the ends of another pair of ropes, which pass over guide pulleys to bring them into such a position as to be easily reached and operated to draw the side boards downward, and thus extend the bedstead. When it is desired to close the bedstead the spring slats are pushed along into grooves, and when the bedstead is opened the said spring slats are drawn out of one set of grooves and into others.

ICE CUTTER.—Louis Townsend, of Terre Haute, Ind.—This invention has for its object to furnish an improved machine for cutting ice for packing and for opening a passage for vessels. The frame work which carries the saws is made in T form. A set of circular saws, attached to a shaft, is intended to take the place of ice plows in crossmarking the ice, but they are not intended to cut through the ice. The ends of the shaft revolve in bearings in bars and may be raised out of contact with the ice, or lowered to cut the ice to any required depth, by moving the rear ends of the bars up or down upon screws. The saws for cutting the ice are held forward against the ice by weights connected with the upper parts of the saw by cords. To the under side of the bars of the frame, that run in the direction in which the cutter moves, are attached runners, some of which may be grooved longitudinally to enable them to take a firm hold upon the ice and prevent lateral slip. The cutter frame may be connected with either end of the frame to enable the return cuts to be made without turning the power. To the under side of the longitudinal bars of the frame are attached runners upon which the power moves. Cross runners are pivoted eccentrically to the side bars of the frame so that, when turned in one direction, the said runners may be held free from the ice, and when turned in another direction their faces may project below the runners to support the frame and enable it to be moved laterally to adjust it to make a return trip. The construction enables the power to be placed at a considerable distance from the edge of the ice, and at any desired distance in front of the cutters, so that there may be no danger of breaking through.

MACHINE FOR CROZING AND DRESSING THE INSIDES OF PAILS, ETC.—Richard W. How and Clarence E. Patterson, Brooklyn, N. Y.—This invention has for its object to furnish an improved turning out slide of pail and keg lath, which shall be easily adjusted for different sized pails and kegs. By turning a shaft in one direction, the crozing heads will both be moved forward into a working position; and by turning the said shaft in the other direction, the said crozing heads will both be drawn back to allow the slide to be withdrawn from the pail or keg. A stop arm projects into such a position that the ends of the staves of the pail or keg, when the slides moved forward into the said pail or keg, will strike against it and stop the said slide in the proper position for the crozing knives to operate upon the staves, the adjustable crozing heads having been previously adjusted in proper position.

TUB WASHER FRAME.—Butler R. Platt, Plainwell, Mich.—The invention consists in the tub washer frames, which rest upon the top of the tub, to allow of which the tub is grooved to admit the crank shaft. Pins in the bottom of the frame, four inches, more or less, in length, are so arranged that they bear against the outside of the tub to hold it in place. The side and end pieces of the frame are returned, to allow the water to drain off from the frame, and give the same a finished and workmanlike appearance. By means of the pins arranged to inclose the tub, the machine is kept steady and in its proper position when in operation.

PNEUMATIC FIRE ENGINE AND LAWN SPRINKLER.—Henry C. Neer, Park Ridge, N. J.—This invention consists of a stationary or portable tank of sheet metal, adapted to bear great internal pressure, with two pumps arranged within it, and adapted for compressing air, also for injecting water in some cases; the pumps being worked by a foot treadle connection, which is also adapted for the application of a hand crank. The tank is also provided with a funnel with a stop cock for being filled by pouring water in when the air pressure is off, in case it is not convenient to introduce the water by the pumps. The object is to provide a machine which may be kept charged with water and compressed air for use in shops, factories, etc., ready for instantaneous use for extinguishing fires in their early stages, when a small quantity of water will suffice if quickly applied. It is also designed to afford a apparatus, to be moved about on wheels, much better and more convenient for sprinkling lawns than those in which the water is expelled by a pump.

CHAIR, ROCKER, AND LOUNGE, COMBINED.—Henry Haidt, New York city.—This invention consists of a chair in which the back and seat are arranged on a stand or frame so as to rock, or be made fast for either a rocker or easy chair, and the back turns down and unfolds by a joint at the top to form the body of a lounge while the seat turns up to form the head, constituting an easy chair, rocker, and lounge.

COFFIN HANDLE.—Nehemiah Hayden, Essex, Conn.—This invention has for its object to furnish an improved coffin handle, neat, tasteful, and beautiful in appearance, that can be manufactured at small expense; and it consists in the joint formed by the combination of the tube and tips with the ear and end of the arm that supports the hand piece.