## Business and Lersonal.

The Charge for Insertion under this head is \$1 a Line.

Iron Planers, Lathes, Drills, and other Tools, new and second hand. Tully & Wilde, 20 Platt St., N.Y. second hand. Tully & The finest Machinery Oils, combined from perm, Tallow and Lard, suitable for all machinery, are now being furnished to consumers at from 40 to 75 cents per gallon, by Wm. F. Nye, New Bedford, Mass. His famous Sperm Sewing Machine Oil received the highest

award at the Vienna Exposition. Amateur Astronomers can be furnished with cood instruments at reasonable prices. Address L. W. Sutton, Box 218, Jersey City, N. J.

Microscopes, Spy Glasses, Lenses. Let Free. McAllister, Optician, 49 Nassau St., N.

For Sale—Several Screw Machines of dif-erent Sizes, cheap; also, a second hand Press. Write, for particulars, to A. Davis, Lowell, Mass.

Removal—L. & J. W. Feuchtwanger, of 55 Cedar St., have removed to 190 Fulton St., two doors above Church St., New York.

Chemicals, Drugs, and Minerals imported by L. & J. W. Feuchtwanger, No.180 Fulton St., removed from 55 Cedar St., New York.

Steam Whistles, Valves, and Cocks. Send to Bailey, Farrell & Co., Pittsburgh, Pa., for Catalogue.

For Surface Planers, small size, and for ox Corner Grooving Machines, send to A. Davis, Lowell. Mass.

The "Scientific American" Office, New York, is fitted with the Miniature Electric Telegraph. By touching little buttons on the desks of the managers. signals are sent to persons in the various departments of the establishment. Cheap and effective. Splendid for shops, offices, dwellings. Works for any distance. Price \$5. F. C. Beach & Co., 268 Broadway, New York, Makers. Send for free illustrated Catalogue.

For best Presses, Dies and Fruit Can Tools. All Fruit-can Tools, Ferracute, Bridgeton, N.J.

Brown's Coalyard Quarry & Contractor's Apparatus for hoisting and conveying materials by iron cable. W. D. Andrews & Bro., 414 Water St., New York.

For Solid Emery Wheels and Machinery and to the Union Stone Co., Boston, Mass., for circular

Lathes, Planers, Drills, Milling and Index Geo. S. Lincoln & Co., Hartford, Com

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

Temples & Oilcans. Draper, Hopedale, Mass. Hydraulic Presses and Jacks, new and sec-

Peck's Patent Drop Press. For circulars, address Milo, Peck & Co., New Haven, Conn.
Small Tools and Gear Wheels for Models.
List free. Goodnow & Wightman, & Cornbill, Boston, Ms.

The French Files of Limet & Co. are pronounced superior to all other brands by all who use them. Decided excellence and moderate coathave made these goods popular. Homer Foot & Co., Sole Agents for America, 20 Platt Street, New York.

Mining, Wrecking, Pumping, Drainage, or Irrigating Machinery, for sale or reat. See advertise-ment. Andrew's Patent, inside page.

Two 50 H. P. Tubular Boilers for Sale (Miller's patent) very low, if applied for soon. Will be so separately or together. Complete connections and pump Holske Machine Co., 279 Cherry Street, New York

Lovell's Family Washing Machine, Price 85. A perfect success. Warranted for five years. Agents wanted. Address M. N. Lovell, Erie, Pa.

Buy Boult's Paneling, Moulding, and Dove-siling Machine. Send for circular and sample of work. B. C. Mach'y Co., Battle Creek, Mich. Box 227.

Price only three dollars—T e Tom Thumb Electric Telegraph. A compact working Telegraph ap-paratus, for sending messages, making magnets, the electric light, giving alarms, and various other purposes Can be put in operation by any lad. Includes battery key and wires. Neatly packed and sent to all parts of the world on receipt of price, F. C. Beach & Co., 263

Engines, Boilers, Pumps, Portable Engines Machinists Tools. I. H. Shearman, 45 Cortlandt St., N.Y. Automatic Wire Rope R. R. conveys Coal re. &c., without Trestle Work. No. 61 Broadway, N. Y.

A. F. Havens Lights Towns, Factories, Hotels, and Dwellings with Gas. 61 Broadway, New York.

Best Philadelphia Oak Belting and Monitor Stitched. C. W. Arny, Manufacturer, 301 & 303 Cherry St., Philadelphia, Pa. Send for circular.

Rue's "Little Giant" Injectors, Cheapest and Best Boller Feeder in the market. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

A Superior Printing Telegraph Instrument (the Selden Patent), for private and short lines—awarded the First Premium (a Silver Medal) at Cincinnati Exposition, 1871, for "Best Telegraph Instrument for private use"-is offered for sale by the Mercht's M'f'g and Construction Co., 50 Broad St., New York, P. O. Box 496.

Dean's Steam Pumps, for all purposes; En gines, Boilers, Iron and Wood Working Machinery of all descriptions. W. L. Chase & Co., 93, 95, 97 Liberty Street, New York.

Steam Fire Engines—Philadelphia Hydrau-lic Works, Philadelphia, Pa.

Bone Mills and Portable Grist Mills.—Send for Catalogue to Tully & Wilde, 20 Platt St., New York.

For descriptive circulars, and terms to Agents of new and saleable mechanical novelties, address James H. White, Newark, N. J., Manufacturer of Sheet and Cast Metal Small Wares.

Emerson's Patent Inserted Toothed Saws See occasional advertisement on out side page. Send Postal Card for Circular and Price List Emerson, Ford & Co., Beaver Falls, Pa.

Hand Fire Engines, Life and Force Pumps for fire and all other purposes. Address Rumsey & Co., Seneca Falls, N. Y., U.S. A.

The best Horse Power for the Workshop or Farm—Machines for Threshing, Cleaning Grain, and Sawing Wood. Descriptive circular, price, &c., free. A. W. Gray & Sons, Middletown, Vt.

Protect your Buildings—Fire and Water proof! One coat of Glines' slate roofing paint is equal to four of any other; it fills up all holes in shingle, felt, tin or iron roofs-never cracks nor scales off; stops all leaks, and is only 80c. a gallon ready for use. Roofs examined, painted and warranted. Local Agents wanted. Sead for testimonials. N. Y. Slate Roofing Co., No. 6 Cedar St., N. Y.

Millstone Dressing Diamond Machines— Simple, effective, economical and durable, giving uni-versal satisfaction. J. Dickinson, 64 Nassau St., N.Y.

Teleg. Inst's and Elect'l Mach'y—Cheap Outfits for Learners. The best and cheapest Electric Ho-tel Annunciator—Inst's for Private Lines—Gas Lighting Apparatus, &c. G. W. Stockly, Scy., Cleveland, Ohio.

Hoisting Engines, without brakes or clutches; one lever operates the engine, to hoist, lower, or hold its load; simple, cheap, durable, effective. Two hundred of these Engines now in use, from the little Ash Hoister." on steamships, raising 300 lbs., up to the Quarry and Mine Hoister, raising from 6,000 to 60,000 lbs. Send, for references and circular, to the Lidgerwood Man'i'g Company, Office 165 Pearl St., New York city.

For Peabody's improved Cotton Seed Hul-lers, address G.H. Peabody, P.O. Box 5434, N.Y. Pr. \$50.

Perpetual Motion Water Wheels; self sup-lying and does work. X State interests for sale. A. T. Peck, Danbury, Conn.

Iron Roofing-Scott & Co., Cincinnati, Ohio.

Waterproof enameled papers—all colors—for packing Lard and other oily aubstances, Chloride of Lime and similar chemicals, Cartridges, Shoe Linings, mailing Plants, wrapping Soaps, Smoked or Dried Meats and Desiccated Vegetables, Wall Papers, Shelf Papers, and all applications where absorption is to be resisted. Also, waterproof Tin Substitute for out door Show Cards. Samples on application. Crump's Label Press, 75 Fulton Street, New York.

L. L. Gibson, Colorado Springs, Colorado, wishes to purchase a lot of sea shells, for picture frame work.

Keuffel & Esser, largest Importors of Drawing Materials, have removed to 111 Fulton St., N. Y.

Ice Machine Wanted, that can make from 100 to 200 lbs. per hour, at a cost of not more than one or two cents per lb. Price of Machine to be less than \$2,000. (We have steam power.) Address Wm. C. Brown, Box

Wanted—A Situation as Draughtsman underinstructions. No objections as to locality. Address B. Adriance, 88 John Street, New York.

For sale cheap—Patent Right. Lamp Bracket for Sewing Machine. Address Ludwig M. N. Wolf, Col-

Rights for Sale—Of the most Simple, Durable, and Cheap Tbill Coupling. Large Profits. Also, Patent forvaluable Iron Bender for Sale, or on Royalty. Address Sam'l Pennock, Kennett Square, Pa

Portable Engines 2d hand, thoroughly over-auled, at 1/2 Cost. I.H. Shearman, 45 Cortlandt St., N.Y Vertical Tubular Boilers, all sizes. Send for reduced price list to Lovegrove & Co., Phila., Pa.

To Manufacturers —Parties wishing a small article in iron to make, can secure the sole right to an article of real merit, for a small amount, cash. Patent ecently granted. Address Lewis Geisler, 410 East 19th Street, New York.

Wanted, by a young man well acquainted with steam engines, a situation where he can get the practice he needs to be an engineer. Address A. M., 142 Nassau St., cigar store, New York.

Partner wanted, with 3 to \$5,000, in an old established, paying business, and to build and introduce a newly patented machine for cutting hoops, chair splints, fruit and band box material, &c. Address Goulding & Powers, 123 Main St., Louisville, Ky.



W. B. C. will find directions for painting outdoor work on p. 227, vol. 26.-H. W. C. Jr. cancement wood to glass by following the directions for aquarium cement on p. 90, vol. 30.—A. R. is informed that polishing shirtbosoms is described on p. 27, vol. 30.—Q. V. will find directions for making gold ink on pp. 43, 58, vol. 30.—J. R. will find instructions for repairing rubtergarments on p. 203, vol. 30.—W. B. F. will find the process of japanning castings described on p. 123, vol. 29.—R. E. should apply to a pump manufacturer.—A. F. F. will find simple tests for sirup detailed on p. 171, vol.30. There is little or no foundation for many of the sensational stories about the manufacture of this article.-A. B. D. will find a recipe foraquarium cement on p. 90, vol. 30. As to blowpipe manipulation, see p. 156, vol. 25.—A. H. M. willfinddirections for finishing walnut furniture on p. 218, vol. 26.-P. J. H. can tin small castings byfollowing the directions on p. 91, vol. 26. J. S. P. will find a description of making lamp black (carbon) on p. 21, vol. 28.—M. can use hard tallow for lubricating his paper cutting knives.

J. K. asks: What is coffee, chemically?
Are there not chemicals that could be substituted for coffee, that would have the same taste and be cheaper? A. Raw coffee has been analyzed with the following result, in 100 parts: Woody fiber 34, fat and volatile oil 10 to 18, glucose, dextrin, and vegetable acid 15'5, free caf-fein 0'8, ash 6'7. The caffeic acid, modified by roasting, is supposed by chemists to afford the greater portion of the flavor and peculiar properties of coffee. There are manyso-called substitutes for coffee, but nothing like the genuine article.

J. K. asks: 1. Is there a stone that will draw the poison from the bite of a mad dog, and thus cure or preventhy drophobia? A. No. 2. What is the medicinal virtue of the so-called bloodstone (lapis hamattis)? A. An unfoundedsuperstition. 3. What are the principal differences between the austral and borea poles of a compass needle, and how can the peculiar properties of each pole be made manifest? A. The principal difference is that they are attracted by the poles of the earth which have the opposite polarities.

C. D. F. asks: Why is it that, to a magnet which has become weakened, weights may be added un tilits full power is reached? A. It is probably due to themolecules becoming more highly polarized under the influence of the directive force.

E. G. A. asks: 1. What is the color of gold dust, as discovered in the sand of a river? A. Yellow. 2. What is the color of platinum when discovered in sand? A. Sliver white. 3. What is the most simple and effectual way of separating gold from sand? A. By washing away the sand and earth in a pau. The fine particles of gold settle at the bottom. 4. Is the valley of the Allegheny river considered as a part of the coal regions of Pennsylvania? A. It is considered as belonging to thelowercoal series.

C. R. asks: 1. Can the alkali of the great beds of Nevada and California be used as a fertilizer to advantage? A. Some of these deposits might be experimented on with advantage. 2. How can I get a small quantity forwarded to New York? A. Apply to Agricultaral Bureau, Washington, D. C.

E. C. T. asks: 1. How can I construct a bat-tery (Smee's pattern) of zinc and carbon? A. Smee's battery consists of a thin plate of platinised silver, suspended between two plates, or one plate bent double, of amalgamated zinc, and the whole immersed in dilute sulphuric acid. Bunsen's battery consists of a cylinder of compact coke immersed in strong nitric acid, contained in a porous vessel, and another cylinder of amalgamated zinc immersed in dilute sulphuric acid, ex agamated the interest in three stripturities active to the porous vessel, and the whole contained in a strong glass vessel. 2. Will a 2 inch object glass of 36 inches focus show the colors on the planet Mars? A. It probably would, but you could not use the full aperture unless the glass were achromatic. 3. What are the distances between object glasses and eye pieces from twenty-four inches focus up to eighty inches? A. The distance of the eye piece from the object glass is equal to the sum of the focal distances of the two. 4. What is the value of a pound in English money compared with currency of the United States? A. About \$5.58. What are the duties on scientific instruments, such as microscopes, etc.? A. It depends upon the materials of which they are constructed.

F. G. N. asks: What is the best kind of varnish for covering the inside of a silver plating vat? A. Use copal varnish dissolved in turpentine

J. W. asks: 1. How are porous cells made?
A. Porous cells are made of unglazed carthenware. 2. How is the thing that you pull out of an electric machine for giving shocks, to regulate it, constructed? A. By two rods running to a point at one end and terminated by balls at the other. They slide through holes in brass caps, which are fastened on the tops of insulating columns the caps being provided with clamping screws to fix the rods at any desired distance.

W. H. S. asks: What acids are said to mix with water and linseed oil, so that they will not separate? A. Probably muriatic and nitric acids. We cannot tell the quantities unless we know for what this mixture is used.

M. S. J. asks: How is carmine made? What is the meaning of the numbers No. 12, No. 20, No. 40. by which the quality is known? Is there any better than No. 40, or poorer than No. 12? Where are they made? A. Carmine is a beautiful red pigment prepared from the cochineal insect. The insects are found upon the eactuses of Mexico and Africa, and when matured are brushed off the plants and dried by artificial heat. There are many processes for the preparation of carmine, but success principally depends upon the use of the purest materials and the exercise of care, skill. and patience. The following is an English process: Cochineal 1 lb. and carbonate of potash 1/2, oz. are boiled in 7 gallons of water for 15 minutes. The vessel is then removed from the fire and 1 oz. powdered alum added. The liquoris then well agitated and allowed to settle for 15 minutes. The clear liquoris then decanted into a ciean vessel and isinglass % oz. dissolved in water 1 pint (and strained) added. As soon as a coagulum forms on the surface the heat is removed, the liquorstrongly agitated with a bone or silver spatula, and then allowed to repose for 20 or 30 minutes. The deposited carmine must be drained and dried. Carmine is made in Europe. The numbers refer to the different qualities, from the best or that of the richest and brightest hue to those of inferior shades.

J. E. G. asks: How can I separate very fine floatgoidfrom quicksliver without using a retort? A. You can remove the mercury after amalgamation by digesting it in an excess of colddilutenitric acid. The goldwill remain unaffected. The mercury, however, will be lost.

N. N. asks: 1. What kinds of wood are used in the manufacture of paper? Can pine, spruce hemlock, oak, chestnut, and white wood be used? A Allsoft woods are used for paper making, such as the trembling poplar, linden, aspen, fir, etc.; the pine is of too resinous a nature to be of much value. 2. What is the process of reducing the wood to pulp? A. See p. 272, vol. 20. 3. Cin it be made into whitepaper? A The finest woods are used for writing paper. 4. If so, what is the process of bleaching? A. A jet of chic. rine water under pressure.

S. H. B. asks: How can a polish be given to Iceland spar or selenite, perfect enough for spring purposes? A. With oxide of tin used wet, on a bed ci white wax.

C. R. A. says: Is the bismuth of commerce a metal much used? A. It is largely used for type and sterestype metal. Newton's fusible alloy, which is used as a soft solder by pewterers, consists of bismuth parts, lead 1 part, and tin 1 part.

R. J. H. asks: 1. Does electricity occupy space? A. It does not occupy space. 2. Is lightning fire produced by electricity, or is it electricity itself. A. It is the particles of the air rendered luminous by the passage of the electric fluid. 3. Does it take a smaller charge of electricity to send a dispatch across the Atlantic cable than it would to send one 25 miles on land? A. No. 4. Would a battery of six guns send the noise any farther than one gun? A. There would be a greater probability of the noise being unquenched by obstacles and disturbing causes in the case of six guns 5. Does the noise travel any faster from the six guns than it does from one? A. No. 6. Will not a too heavy harge of electricity going through the cable generate agas and cause it to burst? A. No. 7. Is electricity a gas, or do vibrations of the wire send the message? A. It is a motion transmitted from particle to particle of the wire.

H. C. H. asks: Can you give me a rule for finding the velocity with which water will flow through a hole in a vessel submerged to any given depth? A. See article on "Friction of Water in Pipes," p 48, vol. 29. The effective head will be the difference between the hight of water above the orifice, within and with out the discharging vessel.

P. D. R. asks: 1. What are three or four of the best conductors and non-conductors of heat? Wha metal will transmit heat and cold the quickest? A Silver will conduct most readily, and then gold, copper zinc. iron, and tin, in the order mentioned. Feathers powdered charcoal, sawdust, woolen goods, sulphur are among the best non-conductors. 2. Why is it that a spoon in a glass jar or tumbler prevents its being cracked or broken when hot water is poured therein? A. Any effect it might exert is due to the rapid absort ing and conducting power for heat, which would di minish the amount of heat which could operate upon the containing vessel.

F. asks: How can I clean very hot brass? I have some brass pipes (with live steam in them) that have to be polished. What is the best way to clean brass, warm or cold, so that it will keep its polish for sometime? A. It will be difficult to clean the brass workin such a manner that it will continue bright for any length of time, unless it is covered with a lacker.

E. E. M. asks: Can you give me a recipe for making a wash that will kill sheep ticks in lambs and not be injurious to the lambs? A. Try powdered sulphur.

S. L. SRYS: I have a few gallons of lubricating oil. What can I mix with it to make axle grease? A. Try adding tallow or lard to it, until it thickens sufficiently foruse.

E. T. H. asks: What alkali and acid (used inflate the bags for raising wrecks) is spoken of in "Scientific and Practical Information," in No.16? A. Carbonate of soda and muriatic acid. 2. What is glass etching, and how is it done? A. By mixing powdered fluor spar and strong oil of vitriol to a thick paste in a leaden vessel, and allowing the vapor arising from the mixture to come in contact with the glass where it is leftunprotected by a thin coating of bees wax.

C. B. L. asks: 1. What causes the report of agun? One friend says that it is the air rushing back into the gun barrel after the discharge, and another save that, when the gun is fired off, the force of the now der cleaves the air, and, coming together with the great force which it possesses, causes the report. A. Sound being propagated by waves, any cause which puts the airin vibration gives rise to a sound, more or less loud according to the intensity of the disturbing force. The report of a gun is due to concussion, a sudden striking of the air, as it were, and the propagation of sound waves. 2. What causes thunder? A. Thunder is the report from a fiash of lightning, and is accounted for in specimen seems to be a thin film of oxydized oil or gelatin colored with Prussian blue.

C. K. asks: Is not a carwheel by which the difficulty of running on curves may be obviated a desideratum? A. If you mean a wheel so constructed that the train will experience no greater resistance on a curve than on a straight track, we answer: Yes.

W. J. E. asks: 1. What is the best method kecping steam boilers clean and preventing scale within the boiler? A. See p. 116, vol. 30. 2. Will the cut-off valve, cutting off thesteam at  $\frac{1}{2}$  stroke, afford the same power as the flat valve engine, the dimensions of both engines being the same? A. For that point of cut-off, it is hardly necessary to have a separate cut-off

H.C. asks: 1. What should be the diameter, width of blade, and pitch of a three bladed propel ler for a boat 25 feet long and of 6 feet beam, to get a speed of 6 miles an hour? The engine is of 2 horse power. A. The engine is not large enough for that speed. 2. Can a propeller be made of boiler iron? A. Yes.

R. C. M. says: I have a 2 horse power vertical boller, of which I want to take out the flues and cleanout the shell; how can I do it without damaging them? A. If you mean without anniling them for use in the same boiler, we do not think that it can be done.

N. L. asks: 1. Does wood shrink endwise? A friend says that boards on a fence, if put on green, would shrink endwise so as to draw them off the posts.

A. The shrinkage, if any, is exceedingly slight.

2. How should a pulley be turned to keep the belt straight, with an angular or a curved face? A. Make the axes of the two pulleys parallel. 3. I lately had occasion to repair a cupola fan with four half diamond paddles. After it was done, we tried it, closed up the holesso that no air could pass out of the fan, gave it the regular speed, and opened the pipes ot hat the fan threw out the wind. To our surprise, the speed decreased nearly one half. Why was it? A. It had more work to do in the latter case.

I. asks: 1.Please give a brief description of the Gunther's scale (2 feet long), and tell the significa-tion of the legends "Lea," "Rum," "Cho," "Sin." "Tan," "etc. A. On one side is a scale of 24 inches, divided into tenths of an inch. Below this, on the left, is a scale of inches and half inches, divided into hun-dredths. On the right are scales for laying out a vessel'strack by departure and distance. They are used with small quadrants, which can be drawn by the navigator, with a radius of two or three inches. The ccales for these quadrants are in the middle. On the left is the scale for the 2 inch quadrant, which has the rhumbs (or chords for the compass divided into parts of 11%° each), chords, sines, tangents, and semi tangents. On the right is a scale for the 3 inch quadrant, with leagues (20 to an inch) rhumbs, middle latitudes, and chords. On the other side are logarithmic scales for the sines and tangents of rhumbs; numbers, sines, versed sines, and tangents of degrees: and lastly, scales of meridional and even parts, for a chart on Mercator's projection. The even parts, for a chart on mercators projection. The use of the scale is described very fully in Bowditch's "Navigation." 2. In a globe or sphere revolving on its axis, is there not a line of particles, however minute, that is in itself immovable, while all the other particles revolve around it? A. Yes, if you can conceive the line of particles to have a single dimension. 3. Would a railroad bridge across the Atlantic be possible and practicable? A. It has been proposed by some engi neers. Past experience would not justify a positive opinion for or against the project.

W. F. McD. asks: Should the bed of a ver-tical drill stand perfectly level? If the drill stands at an angle of 15°, will it make as true a hole as if it were level? Doestherule applying to the vertical drill also apply to the horizontal drill, lathe, and planer? A. If all the moving parts are truly fitted, the tools may stand in any position.

L. D. B. asks: With what sort of tools are crews made on the softer woods? I have no trouble chasing a screw hy cothed chaser does not do for soft woods. A. Try an ordinary tool and use with high speed.

L. D. H. says: 1. I have heard that salt water will not freeze, and thatice in salt water is perfectly fresh. A. It will freeze if the water is motionless and the cold is sufficiently intense. 2. How does the salt separate? A. In freezing, water crystallizes; and the crystals of ice, in forming, reject the particles of dirtand impurities. As to transmission of power by belts, see p. 389, vol. 28.

D. H. W. asks: 1. Is there any process by which I can plate steel springs without removing the blue coloring? A, Try rubbing with weak muriatic acid, and then wiping clean with water and drying. 2. What is the best way of taking the coloring off? Is there any way of covering them with copper (without a battery), so that I can plate them with silver? A. Immerse the steel springs, after being freshly cleaned as bove, in a bath of solution of blue vitriol.

D. P. W. asks: Does ice sink in the spring? Pilots on the Mississippi say that it does not break up and float away, but that it sinks out of sight. I think that water forms or fails on the surface of the ice, thus making it appear to sink. A. Your explanation is coc

- P. H. C. says: It is a popular belief among ne mass of farmers that the influence of the moon has an important bearing upon variousyoung plants as the happen to come forth either in her light, as full moon etc., or in her wane. This idea is ridiculed and entirely disbelieved by what are called the most intelligent and scientific farmers. Is it not a fact that the light of the full moon on a young plant just come forth would have some effect on it, different from the darkness which prevails in the moon's absence, and do not these tender plants require extra sleep, as an infant does? And in the absence of it, does it not essentially change their character and production? A. When the moon is shining, the clouds are wholly or in great part absent, and the effect of the absence of clouds becomes very evident when a thermometer is placed in the focus of a silvered mirror and turned towards the unclouded sky. The thermometer falls with great rapidity, its heat being radisted out into the abysses of space, which are estima ted to have a temperature vastly below the zero of our thermometric scale. When a cloud passes between the mirror and the sky, the thermometer rises rapidly, the loss of heat being interrupted. The clond acts like a woolen blanket, preventing the escape of heat. Now what the thermometer is in this experiment, so in nature is the plant. On a moonlight (cloudless or partly clouded) night, it may radiate so much heat that injury may arise to its tender organization. The Earl of Rosse's great telescope has detected the heat radiated by the moon, but it is an incredibly minute quantity, and can have no eff ect onvegetation.
- E. L. S. asks: How can I construct a blow pipe? Illuminating gas is not to be used, and the atmo spheric air is to be supplied by some arrangement worked with the foot. A. A small blacksmith's bellows may be used, and fastened between the legs of a table, with weights on the upper chamber, and a treadle play ingagainst the lower chamber, so as to give the requis ite pressure. A pipe leading from the nozzle of the bellows, through the table top, is made to end in a tapered jet. so mounted that its direction may be altered at pressure. The jet plays a short distance above the wick of an ordinarylardlamp.
- Y. M. C.A. asks: What are the chemical in gredients and proportions of the same in what is know as slag, thekind that runs from a wrought iron puddling or, heating furnace? A. Composition in 10) parts of samples from puddling furnace: Iron 54:83.oxygen 16:87, silica 8.32, phosphoric acid 7.29, sulphuret of iron 7.07 lime 4.70, oxide of manganese 0.78, magnesia 0.26. Total
- $W,\ H,\ N,\ asks:\ 1,\ What is type\ metal\ composed\ of, and what are the proportions?\ A.\ Type\ metal\ is\ composed\ of\ lead\ with\ <math display="inline">\frac{1}{16}$  or  $\frac{1}{16}$  of its weight of antimony, or: lead 2 parts, tin 1 part, antimony 1 part, or lead 15 parts, tin 1 part, antimony 4 parts. 2. Can you give me a recipe for an ink that shows plainly when written with, but fades entirely away a short time afterward? A. A solution of chloride of cobalt.
- B. & J. say: In trying to make a zinc casting in a plaster mold, on pouring in the zinc it spluttered so that it would not stay in the mold. Then we tried a wooden mold, but found it to be full of air holes. Next we tried a sand mold, but this also was full of air holes; and lastly we tried another plastermold and, after standing over the stove allday, we found that the zinc spluttered same as before. We thought all the dampness had been dried out, but there was something wrong. In looking at some zinc castings, we found they l very smooth. We melted scrap zinc. Will you inform me what was the matter, and how to cast zinc? A. The difficulty has been that the plaster molds have given off moisture, even the warmth of the stove has not prevented it. The wooden molds of course formed gases in contact with the molten metal. The sand has not been dry enough. We have never experienced any difficulty. Molders' sand, just moist enough to work is used. Castings, as bright as silver, may be obtained in this way, even with common scrap zinc. To be more sure, ventholes may be punched with a wire, and the mold may be still further dried, but these precautions are hardly necessary.
- J, A. W. says: In running printing power presses on highly calendered, dry paper, we are at times very much troubled by the paper becoming charged with electricity in its passage through the press. Can we get rid of it, or prevent said paper from becoming so charged? A. In the *Times* newspaper office in this city they obviate similar trouble from electricity by attach inglightning rods to the printing press. The rods ex tend down into the earth.
- H. B. S. asks: Why does ice form upon the bottoms of rivers, where the water passes at three or four miles per hour? The ice seems to form in clear cold weather, and can be seen to rise during the day, bringing with it gravel stones of considerable size A. It will be found, we think, that in these cases the temperature of the water is below the freezing point, and that if the motion of the water were arrested it would speedly become covered with a thick sheet of ice. Nowice is formed by the union of innumerable small detached crystals, which unite together, and, be ing lighter than water, float upon the surface and are carried off, while those crystals, which in the process of formation freeze fast to the stones at the bottom, and form points of attachment for still other crystals eventually carries them up to the surface.
- W. T. R. asks: 1. What are the acids used in Daniell's battery, and what is the proportion of acid and water? A. Saturate as much water as will fill the cells with powdered blue vitriol, and add one eighth, of the bulk of this liquid, of oil of vitriol. 3. How many cells should I use for plating small articles, such as spoons, etc.? A. Two are amply sufficient. 3. How can I tell when the current is passing? Should it be strong enough to be felt by holding the wire? A. By the fact that metal is being deposited upon the mold to be electroplated. 4. Is there a liquid blue vitriol, or must it be made by dissolving the crystals in water? A. By dissolving the crystals.
- T. A. says: 1. I read of a new material called Parkesine (from the inventor, Mr. Parkes), composed chiefly of collodion, castor oil, and chloride of sulphur. Was this material patented? A. Yes. 2. How is the chloride of sulphur prepared? A. By passing chlorine gas, properly dried, over sulphur heated in a retort, and condensing the volatlie chloride of sulphur thus formed.
- E.R. asks: 1. How is the double sulphate of nickel and ammonia used for a bath? A. See p. 91, vol. 29. 2. Are the two salts mixed with distilled Will the nickel dissolve in the bath? A. The double sulphate of nickel and ammonia is one salt, not two. Useenough to make a strong solution in the distilled water. The nickel plates will dissolve. 3. How long after mixing is it till it is ready for plating? A At once.

- J. D. M. says: Professor Silliman, in his "Principles of Philosophy," p. 392, gives Faraday's third law of electrolysis as follows: "The oxidation of an atom of zinc in the battery generates exactly so much electricity as is required to resolve an atom of water into its elements. Thus 8'45 grains of zinc dis-solved in the battery occasions the electrolysis of 2'85 grains of water. But these numbers are in the ratio of 32°5:9, the equivalents of zinc and of water." 1. Now does this mean that the dissolution of 8°45 grains of zinc in each cell or couple of the battery is required to occasion the electrolysis of 2.35 grains of water, or does itmean the sum of the several amounts of zinc dis olved in each cell or couple of the battery (making in all 8.45 grains) causes the electrolysis of 2.35 grains of water? A. For every 8.45 grains of zinc dissolved in the battery, whatever the number of cells, 2 35 grains of water are electrolyzed; so that the amount of water decomposed is found by adding the amount of zinc consumed in all the cells together and dividing by  $\frac{8\cdot 45}{2\cdot 35}$ . 2.
- In the electrolysis of water with a Grove's oxygen and hydrogen gasbattery,of 10 cells, are the quantities of ox ygen and hydrogen liberated by the current equal to the respective amounts absorbed by the act of combination in each cell of the battery, or are they equal to the whole amount absorbed in the 10 cells collectively? A. The quantity of oxygen and hydrogen liberated by the electrolysis of water is proportional to the whole amount of zinc consumed in the battery, whatever the number
- W. D. S. asks: Will ripe fruit keep in a vacuum or partial vacuum, such as can be obtained with an air pump, without preparation of the fruit or putting anything in to preserve it? If it will keep, what is the reason that fruit is not put up in this manner? A. Fruit contains germs of decay, which must first be de stroyed, otherwise the formation of a vacuum about them will not suffice to preserve the fruit.
- S. G. N. asks: 1. Will it be cheaper for me to make myown pure silver anodes for silver plating from coin silver, or to buy them from a silversmith?

  A. It will probably be cheaper to purchase it. 2. How is the quantity of electricity measured, and how the interesting. A. They are determined by the galvanometer. The intensity of a current is directly preportional to the tangent of the angle of deflection, provided the dimensions of the needle are sufficiently small as compared with the diameter of the circuit. The relation between the intensity and the quantity is thatthe formeris the quantity of electricity which in any unit of time flows through a section of the circuit. S. How iarge must a copper wire be for a | Bunsen battery, consisting of two 1 gallon cells? A. A wire the 1-10th of an inch diameter is sufficiently large. 4. Are Daniell's batteries suitable for silver plating? A. They can be employed. 5. Should melted zinc be stirred while on the fire? A. There is no advantage in so doing
- J. F. W. asks: What will remove champagne stains and grease spots from a black velveteer coat? A. Rub the stains first with ammonia and after wards with benzine.
- J. H. P. says: My hydrogen lamp does not quite meet my expectation. The gas has no effect upon the sponge till I blow upon it with my mouth, when in a second or two the sponge turns red and ignites the gas A. The platinum sponge causes the union of the hydrogen with the oxygen of the air by what is known as 'contact action," or the power which a clean surface of platinum has of condensing gases upon its surface and thus bringing them within the range of their mutual attraction, and causing combination or combustion. By exposure to the sir the surfaces become dirty. Heating for a moment with the tip of a flame is the best mode of restoring the activity.
- A. S. B. says: Please give me the process of calcining gypsum, and state the required heat. A. Gypsum is calcined in an oven or kiln. It is built of walls of strong masonry, spanned by a flatarch. In this room is placed the gypsum only, the fire being lighted in a series of small chambers in the lower part of the oom; brushwood is the best fuel. Or the kiln may be divided unequally by an arch about one foot from the floor, the gypsum being introduced into the upper part. The underpartis in connection with the flue of a furnace, the flames from which, driven by a draft, are carried to play upon the lower part of the arch, the hot air and gases passing into the upper rooms. The aqueous vapor escapes through the roof of the kiln.
- S. T. W. says, in reply to correspondents who ask how to season wood and to prevent its warping: Strip off bark, and bury about one foot deep in the spring, leaving in the ground for six months, and you will find no difficulty. This was the only way by which ve could season the sapadillo or mountain mahogany in the Sierra Nevada, it being one of the hardestand most brittle kinds of wood known. I have two canes now of tiilswood, nearly asheavyas fron. Hn company with three others I cut them on July 4, 1873. The tree was cut at an elevation of 10,000 feet; it grows very slowly and seldom to over four inches diameter and 10 or 12 feet hight. It flowers in June, usually, in favorable lo calities, having a small, pale pink and fragrant flower.
- W. R. A. R. says, in reply to W. W., who asked for a recipe for gilding without a battery: Dissolve 20 grains chloride of gold in a solution of cyanide of potassium, 1 oz. to 1 pint pure water. Put the solution of cyanide of gold in a glass or porcelain jar; place in it the articles to be gilded in contact with a piece of bright zinc, in the solution near them; the process will be hastened by a gentle warmth. If the gold is depositchloride of gold may be prepared by dissolving gold in the head of "Business and Personal," which is special aqua regia in the proportions of 16 grains gold to 1 oz. acids.
- D. M. says, in reply to C. L. C.'s enquiry for a cheap instrument to foretel a storm by pressure: The baroscope of Babinet will answer your needs; it may be constructed thus: Take any bottle; pour colored water into it, about one fourth of the quantity the bottle will hold: insert in it a glass tube, from three to four feet long andpassing sirtight through the stopper, which mustalso be airtight. Let a paper index, divided ac cording to any scale of division, say into inches and fractions of an inch, be glued to the glass tube. Blow into the glass tube, so as to cause the water to ascend the tube a few inches, say 10 inches, and the instrument is constructed. The bottle must be placed in another veesel, and protected by sawdust, or some other mate rial, from the influence of changes in the temperature of the atmosphere. This very sensible instrument records faithfully any change in the density of the externalair, and the approach of a storm will infallibly be indicated by a sudden rise of the water in the glass
- G. L. W. says, in answer to M. B. A., who asked how to remove tallow and white lead from machinery: Use turpentine, and rubit in well.

- heat an iron rod or bar to red heat, immerse it in the oil; the unequal expansion will check the jarall round at the surface of the oil, and you can lift off the top
- J. A. O. says: Allow me to add to the list of railway bridges across the Mississippi river, given by you on p. 252 in reply to J. M., the following: Louisiana Mo., St. Paul, St. Cioud, and Brainard, Minn., making s total of fifteen.
- C. B. L. says, in reply to several correspondents who asked how to remove tattoo marks from the skin: Blister the part with a plaster a little larger than the mark; then keep the place open for a week with an ointment; finally dressit to get well. As the new skin grows, the tattoo marks will disappear.
- S. P. N. says, in explanation of the excres cence on the plank, and the means by which it was pro duced: "I am a farmer, and sometimes have occasion for a tight trough. In making it, I joint up the plant and then, with a wide punch, set down a groove about 1-16 inch deep the whole length; then take off two or three shavings more, and put the trough together When the wet gets into that joint the groove swells ou again just the thickness it was at first, and of course two or three shavings thicker than the plank, and so closesall up tight. Wood can also be ornamented by punching down carefully in patterns, planing off a lit-tie, and then wetting; the parts punched down show in relicf above the planed surface and make quite a
- M. S. T. says, in answer to M. B. A., who applied to polished parts of machinery to prevent rust Try a concentrated solution of caustic potash, scrub bingwith an old scrubbing brush. It answered in a case omewhat similar to yours.

MINERALS, ETC.—Specimens have been re ceived from the following correspondents, and examined with the results stated:

- Y.N.—It is yellow hematite, and contains about 8 per cent of oxide of iron.
- E. G. A .- The grains ar 6 mica, and therock is granite J. E .- Both are pyrites, and are not valuable.
- C. S .- A very beautiful specimen of galena, or sul
- W. F. H.-Your specimen is impure crystallized lime stone. It may be used in making caustic lime
- J. W. H .- The mineral is sulphide of from. If a small percentage of nickel is present, it will require a more extended examination than could be given in a prelimi naryanalysis, to determine it.
- A. L. asks: Can you give me a recipe for making artificial honey?—J. T. asks: What kind o paint should I apply to terra cotta window caps, etc., to protect them from the weather ?—W. D. M. asks: Hov can I harden the brains and other organs of animals, s that I can take plaster casts of them?-A. J. F. asks Is it possible to make an alloy by fusing glass and metal together ?—A. F. asks: What can I put on pape muslin to prevent the paint spreading?-J. H.ssks: Hov can I make chewing gum and stencil paste?—D. H. S Jr. proposes to put bolting cloth on a reelin strips, tack ing the upper edge to the outside face of a rib, and th lower edge to the inside face of the next rib below; s that the flour shall not slide against the rib and be car ried up thereby, but shall slide off the edge of one piec of cloth and on to the next, falling the thickness of rib only. Will this plan work well?—J. W. T. S. asks What will cure chickens affected, with a disease called the chicken cholera, and what will prevent them from catching the disorder?—C. H. R. says: You credi James Bogardus with the invention of the "ring flyer. Can you inform me when and where the invention wa , and give me any details of when the first rin spinning frame was put in operation, and if it is in ex istence now?—E. T. C. says: Some wagon makers bo their hubs till soft and drive the spokes while the but are hot; others boil the spokes; others have both s

## COMMUNICATIONS RECEIVED. The Editor of the SCIENTIFIC AMERICAN

acknowledges, with much pleasure, the re ceipt of original papers and contribution upon the following subjects:

On a Column for Boys. By D. W. H. On the Mississippi Overflow. By H. S.

Also enquiries and answers from the follow

ing: P. H. B.-M.J. T.-S. M.

Correspondents whose inquiries fail to appear should epeat them. If not then published, they may conclu that, for good reasons, the Editor declines them. Th address of the writershould always be given.

Several correspondents request us to publish repii to their enquiries about the patentability of their i ventions, etc. Such enquiries will only be letter, and the parties should give their addresses.

Correspondents who write to ask the address of certa manufacturers, or where specified articles are to be hat also those having goods for sale, or who want to fin partners, should send with their communications a devoted to such enquiries.

[OFFICIAL.]

## **Index of Inventions**

FOR WHICH

Letters Patent of the United State WERE GRANTED IN THE WEEK ENDING April 21, 1874,

AND EACH BEARING THAT DATE. [Those marked (r) are reissued patents.] Acid, making sulphuric, H. Sprengel...... 150,0

Air in cotton factories, moistening, H. Bone ..... 149,5 Alarm, burglar, G. A. Beaver...... 149. Alarm, electric fire, etc., G. S. Sbute.............. 150, Alarm, electric steam boiler, W. C. Baker...... 149, Annealing box, C. A. McNish...... 149, Auger bits, twisting, W. Tueker...... 150, Augers, earth, W. W. Jlz. 150,051, 150,052 Lantern, W. Burns 149,916
Auger, hollow, M. C. Buffington 149,985 Lantern, signal, J. O. Belknap 149,826

	Bale tie, cotton, A. J. Nellis	150,096
	Bath, vapor, Miller & Cole	149.978 1 <b>4</b> 9,882
t	Binder, temporary, A. A. Goldsmith	150,108
<u> </u>	Boat, life, A. G. and A. T. Sterling	149,891 149,913
-	Boiler, agricultural, H. G. Bulkley Boiler attachment, wash, J. Haskins Boiler cleaner. G. Hicks	149,858 150,0 <b>3</b> 8
	Boilers, deflector for flue, Harwood et al Bolt, V. Labham Boot and shoe burnisher, S. W. Chamberlin	150,035 150,0{0
	Boot heels, burnishing, O. G. Critchet Boot last, J. H. Livingston	149,922 149,871
-  -	Boot lasts, head block for, H. Rose	149,825
n k t	Brick machine, A. H. Keay Brick machine, H. Martin	149,866 150,065
r	Brick mold, tile, J. Shreffler	149,965
t   e	Brush, whitewash, E. D. Van Horn	150.110 149.992
y ;- n	Buckle, L. Messer	159,084
8.	Butter, curb for packing, S. F. Spaulding Can and box, fruit, etc., E. Teyssonneau	149,890 149,893
0 n	Can, oii, G. Dryden	149,831
: e	Car coupling, W. H. Hammond	149,934
. !	Car coupling, J. McMurtry	150,069 150,080
1	Car, freight, R. Eaton	150,026
5	Car spring. J. C. Pickles Car starter, E. G. Goddard	150,077 150.023
е.	Car starter, E. Günther	149,894
1-	Cars, flexible pipe for, W. S. Deeds	149,842 149,956
e-	Carriage axie, Noyes & Stratton	149,838
ll e	Carriages, lighting and heating, 3. Edwards Carriage running gear, Seeley & Brownlow	150.010 150,089
1-	Casting metal, J. L. Jackson	150.014 149,919
r of o	Chair, folding, A. W. Stewart	150,000
w	Clothes pounder, Bailey & Dean	149,970 150.041
a a	Clutch, friction, T. Symonds	149,874
w S.	Coke from ovens, drawing, J. H. Connelly Combing machine, Mirfield & Scott	149,836 150,078
k ie io	Compass, solar, H. O. Cook	150,082
r- e 8	Copy holder, J. B. Harper	150,028 149.923
ed	Corkscrew, J.A. Bragaw Cow milker, C. W. Thompson Cultivator, S. Luney	150,106
it ."	Currycomb, C. B. Bristol (r)	5,840 149,861
8.8 1 g	Cut-off, rain water, G. Straszer  Dentist's gold foll, R. S. Williams (r)  Doll heads, etc., hollow, W. E. Brock	5,846 149,831
x- 11 bs	Door hanger, J. Collins	149,946
<b>a</b> 6	Orill chuck, W. Knight	149,935 150,113
.N	Earth boring machine, Blair & Paul	149,825
e- 18	Equalizer, draft, Terry et al	150,105 149,947
10	Fence, Iron, W. C. Groff	150,083
	Fertilizer distributor, M. Gockman.  Fire arm, magazine, Swingle et al.  Fire arm, revolving, B. H. Williams.	149,860 150,102
₩-	Fire extinguisher, H. L. McAvoy Fire kindler, W. Laramy	150,066 150,061
ld	I Fluwer stand. U. Achtey	5,841
de he	Flue cap, R. N. Harlan	150,032 149.931
es n.	Gas, illuminating, L. Bois, fils	150,045 149,978
bу	Gas into ovegen atmospheric C. M. T. Du Motor	149,895
in d, ad	Gate, sutomatic, G. R. Mease	. 150,070 . 150,054
er	Grain dryer, W. J. Demuth	. 150,002
ll <b>y</b>	Grates, blower for fire, W. D. Guseman Grinding wheel, J. T. Henry	. 14),854 . 149,929
	Hammer, C. Bilharz	. 149,878
	Heating drum, E. R. Weston.  Hide for belting. H. Royer.  Hinge, butt, R. Hoadley (r).	. 149,903 . 149,954
e	Hoe, B. D. Sanders	. 149,889 . 149,97
	Horses, hoof boot for, J. B. Wiggins	. 149,930 . 149,998
	Insect bellows, E. Cookiron, refining, W. W. Hubbell	. 149,995 . 150,042
096	1	. 150,0°
91( 09(	Knitting machine, A. Angst Ladder, folding, J. B. Johnson	. 149,968 . 150,058
90 87: 10	Lamp trimmer and extinguisher, W. Walton	. 149,96
05 98	Lantern, W. Burns	. 149.91