Notes & Queries

W. F. P. will find an account of the termination of the phylloxera controversy on pp. 242, 385, vol. 32.—L. C. will find a recipe for a black ink with iron in it on p. 203, vol. 29.—W. R. W. will find an answer to his engine query on p. 321, vol. 30.—C. E. W. will find a description of silver-plating on p. 405, vol. 32. For plating without a battery, see p. 299, vol. 31.

(1) K. K. C. asks: In what way is mercury used in exterminating bedbugs? A. Take corrosive sublimate 1 drachm, sal ammoniac (chloride of ammonium) 2 drachms, water 8 ozs. Sprinkle the bedding with the mixture.

(2) F. T. J. asks: How can I handle hot iron without being burned? A. The hands, when wet, can be plunged for a moment in molten iron without injury.

(3) R. W. B. says: 1. I have a quantity of vinegar made from honey. It has a pure transparent color, but has a slightly sweetish taste. What can I put in it to correct that, and give a genuine sour vinegar taste? A. See answer to H. K. G., p. 106, vol. 32. 2. How can I keep moths out of the hives? A. It is very well known that a colony of bees, under a right system of management, has no enemies that it cannot overcome. The secret of all successful management is to keep your colonies always strong, and they will always protect themselves; and the use of hives giving you the control of every comb enables you always to secure this end. When an intelligent bee-keeper possesses this power, the moth has no terror for him, since a strong stock is never injured by it.

(4) J. W. E. asks: What varnish is used to varnish saw handles? A. Shellac varnish.—J. E. E., of Pa.

(5) J. G. P. asks: How can I harden circular saws from $\frac{1}{32}$ to $\frac{1}{16}$ of an inch in thickness, and from 3 to 4 inches in diameter, without warping? The saws are used to cut steel and iron. A. There is no way known to harden any kind of a saw without its springing. They may be flattened between two heated blocks when the temper is drawn, which will make the most of them nearly flat and some of them entirely so. For a good job, they must be straightened by a saw maker.—J. E. E., of Pa.

(6) W. A. M. says: 1. I am putting in a band saw (for sawing logs 6 inches wide) of No. 16 gage to run over a 4 foot pulley. Will it be a practicable machine? A. Such a mill is perfectly practicable if properly built and worked. 2. How many lbs. strain will it bear without breaking? A. Your pulleys will be too small for a band saw mill; they ought to be 6 feet in diameter in place of 4. The strain that the saw will bear depends upon the width of the blade. About 50 lbs. to the inch in width is a fair rule to work by. 3. How fast will it do to run the pulleys? A. You can run them at a speed that will drive the saw 9,000 feet per minute.—J. E. E., of Pa.

(7) J. S. P. asks: Will an 8x10 inches engine drive a four foot burr to any advantage? A. With a sufficient pressure of steam, it would answer very well.

(8) E. K. asks: How can I remove coal oil from cotton and woolen cloth? Boiling water and soap will not do it. A. Try steeping them for a short time in bisulphide of carbon in a closed vessel, and then allowing them to remain exposed to the air until completely deodorized.

(9) F. S. C. asks: 1. What is the difference between methylated ether and simple ether, and what is the meaning of methylated? A. Methol (also called wood spirit, pyroxylic spirit, and methylic alcohol) is a product of the destructive distillation of wood. The acetic acid of the crude product being saturated with lime, impure methol is obtained by distillation, which, after rectification, constitutes the methylated spirit of commerce. Methylic ether is obtained by the same process as ordinary or vinic ether, namely, by distillation of the spirit in contact with sulphuric acid; the only difference being that, in the manufacture of vinic ether, alcohol is used, while methol is the spirit used in the manufacture of methylic ether. 2. What are spirits of wine and spirits of turpentine? A. Spirit of wine is an alcohol, usually obtained from wheat, rye, barley, corn, molasses, etc., by fermentation and distillation, and derives its name from first having been obtained by distilling wine for its yield of brandy, and then slowly abstracting the more volatile part of the brandy by a small fire and tall vessels. Oil or spirit of turpentine is obtained by distilling common turpentine, a semi-solid resin which flows from the *pinus abies*, a species of pine, when wounded. This resin yields nearly one fourth of its weight of the essential oil, which passes over as a volatile, limpid, very inflammable liquid, of a penetrating, well known balsamic odor. The residue in the retort constitutes the common rosin or colophony.

(10) H. S. J. asks: What is the best process of cooling lard in summer, so that it will stand up? A. Keep it immersed in cold water.

(11) P. S. says: 1. In your issue of April 10, I find a device for bronzing cast iron, which I do not quite understand. It requires a bath of melted chloride of copper and cryolite, to which chloride of barium is added. Does this mean that these three articles are to be mixed in a melted state, or are they to be dissolved in water? A. The recipe is to be taken as written. 2. I am about to reduce some old gold solutions, consisting of cyanide of gold dissolved in cyanide of potassium. I evaporated it to dryness; can I now melt it in a crucible with borax, to get metallic gold, or does it want to be treated in another way? A. The pure metal may be obtained, in the form of a black, finely divided powder, from its solutions, by the addition of a filtered aqueous solution of common sulphate of iron. If this be melted, a mass of the metal with its characteristic color may be obtained in its pure state.

(12) H. B. asks: I have a sign (which I believe to be zinc) which requires cleaning two or three times a week and needs a great deal of rubbing to obtain a good polish and remove stains and finger marks. How can I clean it? A. Rub the metal over with a strong aqueous solution of oxychloride of zinc; wash, and dry quickly.

(13) G. C. S. says: We are putting in two boilers, each having two 16½ inch flues. Length of boilers is 24 feet. What should be the diameter of smoke stack, in order to insure good draft? A. Make the cross section of the chimney from $\frac{1}{8}$ to $\frac{1}{5}$ the grate surface.

(14) C. E. B. says: 1. In your issue of April 10, mention is made of too much oil in engine cylinders being the cause of priming. Can this be so, except by the use of an open heater where the oil would be forced into the boiler with the feed water, causing it to foam? A. No. 2. I built an engine 1½ x 3 inches, with which I run a lathe, using a cylinder boiler, 10x18 inches. In surface blowing, I notice that the water is very dirty and oily, that blown off at bottom being much clearer. I always supposed that the oil would get into the boiler while making the connection. I exhaust into the air, and have not noticed any indication of priming; but the water appears to foam considerably. Will frequent blowing off remove all the oil from the boiler? A. Blow all the water out a few times, and cleanse with cold water.

(15) D. A. W. asks: In making an arrangement for heating the water for a bath tub, I unfortunately used second hand ¾ inch pipe, which was badly rusted. The water is badly discolored from the rust in the pipes. Is there anything that I can place in the tank, to pass through the pipes, that will cleanse them of rust and stop the discoloration of the water? A. Take the pipe down, and coat the interior with coaltar.

(16) J. C. L. says: 1. I have a small mill, driven by a 30 horse engine: and on account of dry weather, my well has partially failed. At its lowest stage the Missouri river is 35 feet below the level of the ground at the mill, and nearly 1,000 feet distant. Can I get water from the river by laying a pipe so that the highest point would not be over 25 feet above the river, and terminating in a well 50 feet deep? I know that in theory I could, but have never seen or known a siphon so long. A. Much longer siphons are in successful operation. It would probably be necessary to draw the water from subsiding basins or through filters. The siphon should be fitted with a valve at the top, to let out the air which will collect from time to time. 2. How ought I to start the water? Could it be done by means of a jet of steam from the boiler down the well end of the pipe, on the principle that a jet pump (or steam siphon) works? A. You can use the jet of steam or a small pump to start the flow.

(17) G. F. says: The wells in this vicinity average about 80 feet in depth, in clay and soapstone. One is 84 feet with no sign of water yet. We have struck a number of dry crevices that are full of wind and are continually blowing off, etc., so that you can hear them for rods around. Is this any sign of water? A. The escape of gas sometimes precedes the finding of oil, etc. You had better follow up the matter.

(18) C. W. R. asks: 1. How does the cycloid differ from the ellipse? A. The ellipse is an algebraic curve, and the cycloid a transcendental. 2. How can the circumference of a cycloid be found when the major and minor axes are known? A. The length of a cycloid formed by one revolution of the generating circle is four times the diameter of this circle. 3. Is every section of a cone an ellipse except that which is at right angles to its axis? A. No.

(19) W. M. asks: At what distance above the rail is the center of gravity of an ordinary box freight car, when empty, situated? A. We have not the data at hand for a complete calculation, but believe that the center of gravity is a little below the top of the trucks.

(20) C. J. M. asks: In running a small boat with a horizontal engine, 1⅝ inches diameter of cylinder and 4 inches stroke, what should be the size of screw? A. Use a propeller from 15 to 18 inches in diameter. 2. What sized boat would it run? A. The engine would answer for a boat from 12 to 15 feet in length. 3. Are two 13 x 16 inch engines more powerful than a 17x19 at 90 lbs. pressure? A. With the same mean pressure and piston speed, the double engine would develope about 15 per cent more indicated power than the single one.

(21) A. K. asks: Why is the fly wheel of an engine placed next to the bed plate, and the driving pulley next to the pillow block? A. This arrangement is by no means general; but where it is adopted, it is probably done for convenience in getting at the belt and pulley.

(22) J. K. W. asks: 1. What should be the size of a chimney large enough for three boilers with 38 three-inch flues in each? A. Make the chimney with a cross section of about $\frac{1}{8}$ the area of the grate surface. 2. What is the comparative value of hard and soft coal for generating steam? A. There is very little difference between good qualities of either kind.

What length of 3 ply 1 inch hose (horizontal) will a common suction pump suck through, it having also a suction of about 10 feet perpendicular? A. Through several hundred feet, if everything is well arranged.

(23) W. S. B. says: I have a boiler badly incrustated, and I am bothered also with hot water pipes coated with similar incrustation. Kerosene, applied to the lime on the pipe, will soften it so that it is easily removed. Would there be any danger if I put in the boiler 2 or 3 gallons of the oil, and apply it to the incrustation for the purpose of soaking loose the scale? A. You can use the oil with little fear of danger.

(24) E. R. J. asks: Can a knife blade be tempered without being taken from the handle? A. It might be done, but it would be bad for the handle.

(25) J. W. W. C. says. I am making a lathe of the following proportions: Pulley, 3¼ inches in diameter at end, 3½ inches at center of face. Driver, 2 feet in diameter, weighs exactly 50 lbs. Crank, 2¼ inches long, 4¼ inches stroke. What should be the relative position and distance apart of the pivot, pivot of pitman, and point of foot pressure of the treadle? A. The arrangement is in a great manner a matter of taste, so far as we know; except that, of course, the movement of that part of the treadle to which the pitman is attached must be sufficient, without making the space moved through by the foot excessive.

(26) W. G. says: I am building a boat 6 feet wide and 40 feet long, to draw 10 inches of water. How fast will an engine 3x6 inches, with a boiler containing 30 square feet of fire surface, drive this boat on slack water, with a paddle wheel? A. Probably at 3 or 4 miles an hour.

(27) A. R. R. asks: 1. How many cubic feet are contained in a tun of anthracite coal? A. The specific gravity of anthracite coal is about 1 41, and as water is 1, and weighs 62·5 per cubic foot, you can easily work out the problem. 2. What are its heating qualities compared with those of hard wood? A. It is assumed in practice that the heating effect of good coal is very nearly that of wood charcoal, and twice that of dry wood. In smelting operations, the heating effect of coal is taken by bulk to that of wood by bulk as 3:1, and by weight as 15:8. According to Karsten's researches: 100 parts by bulk of coal in the reverberatory furnace=700 parts by bulk of wood; 100 parts by weight of coal in the reverberatory furnace=250 parts by weight of wood. In boiling operations: 100 volumes of coal =400 volumes of wood; 100 parts by weight of coal =130 parts by weight of wood.

1. I am easily affected with lead poison. Would rainwater kept in an ice cooler lined with zinc be injurious? A. No. 2. I see you recommend (for use in cisterns) lead pipe lined with tin. What protects the outside of the pipe from poisoning the water? A. In this case it would be necessary that the outer surface be also protected.

(28) S. E. H. says: A flat bottomed scow is being built of No. 24 galvanized iron (weighing 1 lb. to the square foot), 11 feet long, 2½ feet wide, and 10 inches high. What number of lbs. will it sustain? A. You must calculate the weight of the boat, and the amount of water it displaces at various drafts. The difference between the weight of the boat and the weight of the displaced water is the amount of cargo it will sustain.

(29) S. C.—The boiler is large enough for average work. Stopping off the opening for the forge will probably improve the draft, and increasing the hight of the chimney will do still more, though it may be as well to exhaust into the chimney. The flue should join the chimney in a gradual upward bend, instead of an abrupt elbow.

(30) S. asks: How many cubic feet of space are required to stow a tun of 2,000 lbs. of Lackawanna chestnut coal? A. From 43 to 48.

(31) S. F. B. asks: How can I project the form and appearance of a rainbow upon a screen? A. A diaphragm or slide of metal or cardboard, having in it a small slit in the form of an arc, is placed before the condenser in the position ordinarily occupied by the transparency. The light passing through the slit, from the lantern, is caused to traverse a prism placed immediately before it. The image formed is defined or focussed by the objectglasses in the usual way.

(32) C. R. says: Please give me an explanation of the following formulæ: $\frac{144}{\text{degree Baumé}+134}$ =specific gravity, and $\frac{144}{\text{specific gravity}}-134$=degree Baumé. I see these used constantly in describing the specific gravity of petroleum, but nobody can explain them to me. A. It is merely an arithmetical ratio which represents the relation in which the numbers obtained by the purely arbitrary divisions of the Baumé scale stand to the specific gravities. The second is derived from the first in the following manner: $\frac{144}{\text{degree Baumé}+134}$ =specific gravity. 144=(specific gravity ×degree Baumé) +(134×specific gravity). 144–(specific gravity× 134)=specific gravity×degree Baumé. Dividing both terms by the specific gravity, $\frac{144}{\text{specific gravity}}-134$=degree Baumé.

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

F. W. B.—It is *Haltica striolata*, an insect very injurious to young plants. It is of a polished black color, with a broad, wavy, buff-colored stripe on each wing cover, and the knees and feet are reddish yellow. Its length is considerably less than $\frac{1}{10}$ of an inch. We think the ravages may be prevented by watering the leaves with a solution of lime, a remedy employed in England for this purpose.—G. N. K.—The sample sent is pure hydrated red oxide of iron, and might answer for making a cheap red paint. But it is without action on either tin or lead, and the explanation of the corrosion is to be found by examining the water, and not from these settlings.—J.B.W.—The wood is in the course of that slow change (under water) which would slowly bituminize and mineralize it, and result in the production of a body resembling coal.—G. A. S.—It is silicate of alumina, and is useful for all the purposes to which a fine, soft, polishing powder can be applied.—E. L. P.—It is neither lead nor silver. It is blende, sulphuret of zinc. Follow up the coal outcrop.—G. E. S.—No. 1 is silex containing clay mixed with oxide of iron. No. 2 is tourmaline. No. 3 is crystallized quartz.—R. A.—It is composed of copper pyrites, iron pyrites, and sulphide of lead.—I. J. W.—It is copper pyrites.—M. A. H.—It is galena, valuable lead ore.—F. E. P.—It is stibnite, or sulphide of antimony, and contains sulphur 28 per cent and antimony 72 per cent.—H. E. S.—It is common mica, used in large plates in stoves, etc.

COMMUNICATIONS RECEIVED.

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

On Steam Boiler Explosions. By J. W. D.
On a Preventive of Shipwreck. By J. F. J.
On a Curious Fact in Flower Growing. By W. H. M.
On a Theory of Dissolution. By W. T. D.
On Utilizing Natural Forces. By T. A.
On Extracting the Square Root. By E. C.
On Ship Railways. By J. A.

Also inquiries and answers from the following:

F. G. H.—H. W.—J. J.—J. McI.—M. W. M.—J. C. G. —E. F. N.—R. I.—N. W. T.—A. B. F.—H. R.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of inquiries analogous to the following are sent: "Who sells lathes with engine-turning attachments? Whose is the best dividing engine? Why do not makers of gas-making machines advertise in the SCIENTIFIC AMERICAN?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

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Stove, heating, L. B. Stuart 163,951
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Stove pipe lid holder, Denman & Barfoot 163,852
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Table and desk, combined, T. W. Moore 163,939
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Table, ladies' work, C. R. Snyder, (r) 6,475
Tar, treating, T. H Dunham 163,979
Telegraph, duplex, M. Gally 163,923
Telegraphs, station for submarine, R. F. Bradley 163,915
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Tide power, T. Beche 163,965
Torpedo for oil wells, J. Taylor 163,952
Toy, cartesian, A. Demuth 163,851
Track clearer, S. G. Smith 163,893
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Trunks, spring buffer for, E. N. Geer 163,863
Tubing, drawing and welding, G. Matheson 164,011
Type setting machine, A. C. Richards 164,037
Vessels, construction of, J. W. Norcross 163,941
Vessels, mast and sail for, J. W. Norcross 163,940
Vessels, steering gear for, D. Scattergood 163,890
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Walls of buildings, covering for, P. J. Hardy 163,991
Wash bench and wringer, C. F. Hornbeck 163,870
Washing machine, Addison & Yates 163,906
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Washing machine, E. J. Robinson 163,947
Washing machine, J. Seaman 163,891
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Wells, torpedo for oil, J. Taylor 163,952
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Whiffletree trace fastening, J. L. Wingate 163,956

DESIGNS PATENTED.

8,358.—SILK FABRICS.—J. Coignet, New York city.
8,359 to 8,363.—INKSTAND SUPPORTS.—C. Kitschelt, New York city.
8,364.—FAN.—N. Metz, New York city.
8,365.—MEDAL.—J. H. Schreiner, Philadelphia, Pa.
8,366.—MEDAL.—I. Townsend, Philadelphia, Pa.
8,367.—COOKING RANGE.—N. Vedder *et al.*, Troy, N. Y.
8,368.—VASE.—J. W. Fiske, New York city.
8,369.—FORK HANDLE.—J. F. Fradley, Brooklyn, N. Y.
8,370.—SPOON HANDLE.—J. F. Fradley, Brooklyn, N. Y.
8,371.—LAWYER'S BADGE.—S. L. Harmon, Batesville, Miss.
8,372.—TEA POTS, ETC.—J. D. Rice, Philadelphia, Pa.

APPLICATION FOR EXTENSION

CONVERTING MOTION.—A. J. Hathaway. August 4.

SCHEDULE OF PATENT FEES.

On each Caveat $10
On each Trade mark $25
On filing each application for a Patent (17 years) $15
On issuing each original Patent $20
On appeal to Examiners-in-Chief $10
On appeal to Commissioner of Patents $20
On application for Reissue $30
On filing a Disclaimer $10
On an application for Design (3½ years) $10
On application for Design (7 years) $15
On application for Design (14 years) $30

CANADIAN PATENTS.

LIST OF PATENTS GRANTED IN CANADA, June 5 to June 9, 1875.

4,791.—G. H. Palmer, Monmouth, Ill., U. S. Army equipments. June 5, 1875.
4,792.—N. Louerin, Montreal, P. Q. Historical centograph. June 5, 1875.
4,793.—A. J. Small, Woodstock, N. B. Barrel lifter. June 5, 1875.
4,794.—J. E. Finley, Memphis, Tenn., U. S. Churn dasher. June 5, 1875.
4,795.—J. J. Roberts *et al.* Steam packing ring. June 5, 1875.
4,796.—T. S. Dickerson, Chicago, Ill., U. S. Making gas from petroleum, etc. June 5, 1875.
4,797.—C. Hutchings, Kansas City, Miss., U. S. Rein holder. June 5, 1875.
4,798.—E. E. Gold, New York city, U. S. Hot air furnace. June 5, 1875.
4,739.—J. B. Robert, Montreal, P. Q. Lime kiln. June 5, 1875.
4,800.—A. J. B. Berger, Easton, Pa., U. S. Burglar-proof lock. June 5, 1875.
4,801.—D. B. Pond, Woonsocket, R. I., U. S., *et al.* Washing machine. June 5, 1875.
4,802.—Wm. Abercrombie, Hamilton, Iowa, U. S., *et al.* Polishing machine. June 5, 1875.
4,803.—F. E. Town, Boston, Mass., U. S. Gang saw mill. June 5, 1875.
4,804.—L. Bradford, Plymouth, Mass., U. S. Machine for making boot shank pieces. June 5, 1875.
4,805.—G. E. Dayton, New York city, U. S. Metallic skylights. June 5, 1875.
4,806.—J. B. Smith, Amable, Ont. Car coupler. June 5, 1875.
4,807.—Wm. Randall, Salem, Mass., U. S. Boiler injector. June 5, 1875.
4,808.—Wm. Hardy, Ancaster, Ont. Horse collar. June 5, 1875.
4,809.—D. Mackinnon, Stratford, Ont. Pen and ink holder or reservoir. June 5, 1875.
4,810.—Wm. Buck *et al.*, Brantford, Ont. Heating stove June 5, 1875.
4,811.—B. Atwood, Stanstead, P. Q. Mowing machine June 5, 1875.
4,812.—Wm. Challenger, Mitchell, Ont. Trace buckle June 5, 1875.
4,813.—H. N. Colby, New York city, U. S. Wire stove shelf. June 5, 1875.
4,814.—L. Maltus, Hamilton, Ont. Car fare box. June 5, 1875.
4,815.—J. Stauffer *et al.*, Toronto, Ont. Sash fastener June 5, 1875.
4,816.—V. R. Taylor, Syracuse, N. Y., U. S., *et al.* Blacksmith's tweer. June 5, 1875.
4,817.—A. Robbins, Yarmouth, N. S. Waterproof process for tanning. June 5, 1875.
4,818.—J. L. Isaacs *et al.*, St. Louis, Mo., U. S. Universal ladder. June 5, 1875.
4,819.—H. Foster, Westerly, R. I., U. S. Railroad snow plow. June 5, 1875.
4,820.—B. Ackerman, New York city, U. S. Preparation of fertilizer. June 5, 1875.
4,821.—D. E. Roe, Ayer, Mass., U. S. Fly trap. June 5, 1875.
4,822.—H. Martyn, Boston, Mass., U. S. Metal pan and mechanism for its manufacture. June 5, 1875.
4,823.—J. Scott, Jr., Hamilton, Ont. Composition stamp. June 5, 1875.
4,824.—J. Sale, Jr., Toronto, Ont. Pocket book or purse. June 5, 1875.
4,825.—W. D. Westman, Toronto, Ont. Rip and scroll saw. June 5, 1875.
4,826.—J. Z. Walling, Red Wing, Minn., U. S. Horse trot training apparatus. June 9, 1875.