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A. A. can separate aluminum by the process described on pp. 99, 116, vol. 32.-T. H. Y. can make garden walks by the method described on p. 50, vol. 32.-E. L. S. can silver plate his iron knobs by using the preparation described on p. 187, vol. 30. It would be better to copper them first, see p. 90, vol. 31.-M. J. G. will find directions for bronzing on iron on p. 283, vol. 31, and on brass on the same page.-J. D. C. can raise water by the device described on p. 259, vol. 31.-H. E. L. will find a repipe for a dip for gilding brass on p. 332, vol. 30.-H. D. G. can solder iron to iron by the method described on p. 123, vol.30.-E. B. can construct a continuous battery by following the directions on pp. 315, 362, vol. 31.-E. C. B., H. M., and others can ce ment brass lamp fittings to glass by using the preparation described on p. 27, vol. 30.-M. A. G. can make condensed milk by the method described on p. 343, vol. 30.—F. E. W. can remove mildew from cotton cloth by washing with soap. A recipe for acid dip for castings is given on p. 107, vol. 31.

(1) C. J. M. asks: In burglar alarms, how the gas lighted when an alarm is given? A. By a friction match, in many kinds of alarms

(2) C. H.A. asks: 1. What is the meaning of the word ohm, in electrical science? A. A unit of resistance. 2. I am making the positive element of a Smee's battery (the silver plate) by depositing the silver on tin foil. How can I get the foil off the plate? I cannot remove it successfully by melting. What acid will dissolve it without affecting the silver? A. Cover the foil with plumbago before depositing the silver. 3. I have made several Leyden jars lately, but they do not work properly. The foil was attached to the inside and the outside of the jars with ordinary flour paste. The machine (plate 16 inches, 4 rubbers) works admirably, giving a spark of from 3 to 4 inches, but I cannot accumulate a particle of electricity on the jars. A. Connect all the outer coatings together for one side and all the inner coatings for the other. 4. How can I manage to deposit a film of silver on polished copper, so that it can be removed without solution of continuity? A. Cover with plumbago.

I have a coarse-grained grindstone which, with considerable labor, I had fitted to my lathe. Owing to the swelling of some wooden wedges near the center, the stone split into two pieces. What cement can I use to repair the damage? A. Try a mixture of black japan varnish and white lead.

(3) J. B. C. asks: How are steel magnets, to retain a large quantity of magnetism, made? What kind of steel is used, and how is it tempered? A. Steel magnets designed to possess strong magnetic power should be made in sections and fastened together. In order to retain their power the poles should be connected together by an iron keeper.

(4) W. E. D. asks: 1. Is the Smee battery a good and desirable one for running a short telegraph line? A. Yes. 2. What is the best solution to use with the above battery, the zinc plates being amalgamated? A. 1 part sulphuric acid to 20 water. 3. How often would a battery of 5 one quart jars of the Smee pattern require cleaning and fresh solutions, in running a line one mile long in close circuit? A. If you use magnets of 200 ohms resistance, probably the battery would run six months. 4. Would the above battery be sufficiently strong for nickel plating? A. Yes. 5 We have a telegraph line nearly one mile in length with eight offices; would it, not be best to have all the batteries of the line divided and half of them placed at each end rather than have three or four at each office on the line, it being a close circuit? A. It makes no difference where you put the batteries in the line. 6. I had occasion to repair a small sounder ; and on taking off the paper covering of one of the spools, I found the spool was wound with No. 26 wire, not insulated; but be tween each layer of the wire was a piece of paper to insulate the layers from each other. Please explain the modus operandi of this. A. The wire is wound in such a manner as to keep the different turns from touching. Many regard this method as better than insulating the wires with silk or cot ton.

give me the formula for making this ingredient for magnets. Put armature within sixteenth of an for this purpose. I have made the sulphate of indigo as follows: 8 ozs. sulphuric acid (commercial), and 1 oz. indigo in powder, carefully mixed. With what shall I neutralize the acid? I have tried carbonate potassa, powdered chalk, and marble dust; either will neutralize the acid, but on filtering out (after mixing with water) the chalk or marble dust preparations, the coloring matter combines with the lime, and the liquor passes off clear, leaving the coloring matter in the filter. If I use the carbonate of potassa to neutralize the sulphuric acid, the soluble sulphate of potassa goes into the ink: and in using a steel pen, the sulphate attacks the pen and leaves an annoying crust upon it. Can you help me out of my difficulty? A. Add small quantities of indigo until the solution is neutral, or nearly so.

(6) W. B. H. says: I wish to bring a stream of water from a reservoir, in 3 inch pipe, down a hill, and across a wide ravine, and up an inclined plane on the other side. The fall from the reservoir to the bottom of the ravine is 150 feet, and from the bottom of the ravine, up the hill on the other side, to the discharge is 50 feet rise. 1. What would be the pressure to the square inch at the bottom of the ravine? A. About 65 lbs. when the flow of water is stopped at the outlet, and 22 lbs., plus the friction, or say 25 lbs., when the water has free discharge. 2. Would the pressure be greater in consequence of the rise of the pipe on the other side? A. Yes, when running free; no, when stopped. 3. Would material that would make a pipe one inch in diameter, that would sustain a pressure of 150 feet fall, make a three inch pipe that would sustain the same pressure, or must the strength of the pipe beincreased in the proportion that the size is increased, to enable it to sustain the pressure of the same fall? A. No; the strength must be increased in proportion to the diameter of the pipe. 4. How high would it throw water from a common hydrant through an ordinary hose pipe? A. From 40 to 75 feet, according to the material of which the pipe is made and the number and abruptuess of the bends in it. 5. Would 50 feet rise on the one side be exactly equaled by 50 feet fall on the other, lcaving, at the discharge, the full force of the remaining 100 feet fall, or would the force of the remaining 100 feet fall be made less by the effect of 50 feet rise? If so, how much? A. The force would be less in consequence of the friction in the extra length of pipe. How much less will depend upon the velocity of discharge, the material of the pipe, and the care with which it is laid.

(7) T. H. R. asks: Has electricity ever been used as a motive power for running light machinery, such as printing presses, sewing machines, etc.? A. Not with any practical success.

(8) B. J. A. savs: I have seen attached to the guards in front of show cases a class of electric machines for giving shocks, constructed in the following manner: The guard (generally of wood) is covered with metal or some other conductor, and, as far as I could see, one pole of a cell of bat tery was connected with one end of the guard, and the other pole with the other end. A person putting both hands on the metal would instantly receive a shock. I have constructed one on the above principle, and it will not work. Can you inform mewhere the trouble lies? A. The circuit must be so arranged that the current shall pass through the person.

How much nitrate of silver can be made from one ounce of pure silver? A. One ounce of nitric acid will dissolve one ounce of silver.

(9) W. L. R. asks: What size of insulated wire is the best to make electro-magnets for at-tracting weights? A. No. 16. 2. Will cotton-covered answer as well as silk-covered? A. Yes.

(10) A. B. asks: 1. How shall I proceed to set up a Callaud battery? A. To set up the battery, place the coppers in the bottom of the jars, fill with blue vitriol to a level with the tops of the copper; suspend the zincs in position so that the bottom of each shall be about two inches from the top of the copper. Connect the copper of each cell to the zinc of the next, fill the cells with pure soft water to cover the tops of the zincs; then put the battery on short circuit for twentyfour hours, or until the solution immediately under the zinc appears clear and white, when the battery will be ready for use. No acid or quicksilver is used. The zince must not be amalgamated. After the battery has been in use a few days the zincs may be lowered half an inch to an inch, care being taken not to allow them to touch the blue solution. Lowering the zincs decreases the number of wires are worked from one battery. About two pounds of sulphate of copper per cup | out molds. The mortar contained one measure of is required to charge the smaller cells, and four pounds the larger. A little oil poured upon the surface of the solution in the cells prevents evaporation and creeping over of the zinc solution on the edge of the jars. When oil is not used, it is better to charge the battery with a smaller quantity of blue vitriol, a little being added from time to time, as the supply is exhausted. 2. Please explain the meaning of the word ohm, as applied to telegraphy. A. The ohm is a unit of resistance. 3. I have a sounder marked 6 ohms. Will this work on a metallic circuit of 1,700 feet with 3 cells of a Callaud (local) without a relay? A. Not very well. You will require about 10 cells. You will achieve success if you persevere. Reading by sound requires a great deal of practice. (11) A. N. W. says: I am making an elecrial alarm clock to be operated from the front door of the house. The circuit is about 60 or 70 feet, with No. 20 copper wire supported on wooden brackets with one Callaud's cell. The magnet consists of 2 pieces of softiron % inch diameter, 3 inches long, screwed into one piece (21/2x1/2x8/ inches). I have about 1/4 lb. very fine insulated silk wire coiled on magnet; but it will not work. which should be neutral, or nearly so. Please Can you tell me the reason? A. Use No. 20 wire

inch of poles, and use ten cups of battery arranged in two series

(12) G. asks: How many cubic feet of gas will one gallon of gasoline make at ordinaryburning gas pressure? A. The quality of gasoline variesgreatly; but 200 cubic feet would be a fair average.

(13) X. Y. Z. savs: I have a block of buildings, 28 feet deep, with a roof of slate of 7 feet pitch. During the winter I have been extremely annoved by the snow and ice crowding over the eaves. It seems as if the sun softened the snow and partially melted it, and saturated that in the gutter with water. At night it would freeze into ice, and again melt upon the roof next day. The snow would slide cff, and crowd this gutter ice until it would project a foot or more over the eaves, and produce a very unpleasant drip, besides being absolutely dangerous in case of falling. What is the best and at the same time cconomical remedy? A. Take a plank 12 inches wide, set it up vertically about 6 inches back of the gutter block it up about 3 inches, and brace it with iron braces from the top back to the roof; this will hold the snow and let the water run through. But the snow will cause some of the water to remain on the slate, to make its way through the joints thereof by capillary attraction. It will therefore be ssary for you to take off the lower corners of slate for about 4 feetin hight, and relay this portion with tin only.

Can anything be put into white lead paintto prevent its turning yellow? A. Enough blue paint sometimes put into white lead, at the time of mixing, to give it a slightly bluish cast, and to counteract its tendency to turn yellow.

(14) T. B. asks: 1. What is the best paint or other substance, to put on a smoke stack the heat has heretofore burned off everything we have tried? A. Coal tar, commonly called black varnish. 2. Would tubes put into a boiler, parallel with the central flue, be likely to make it generate steam more quickly? A. Yes, if put in by a good boiler maker.

(15) C. M. A. asks: I propose to put in a cistern, the water of which is to be used for drinking purposes. What is the best kind of filter to use? It strikes me that a wall across the cistern, of porous brick, would be the cheapest. How would it answer? How thick should it be? A. Brick is frequently used for this purpose; the wall may be built across one side of the cistern, and. as the water will be always of nearly the same hight on both sides of it, 4 inches thick will be sufficient. 2. If I put the cistern in my cellar, would any ill effects arise from dampness, etc., in the horse? A. Not if properly covered in and ventilated from the outside.

(16) M. A. says: I have an underground cistern, walled with brick laid in cement, and plastered in the usual way, Rosendale cement being used. Atabout 18 inches from the bottom there is a leak, the water rising in the cistern to about the hight of 1 foot. I have tried several plans, but have not succeeded in keeping the water out. In one instance I dug a hole, six inches in diameter, four feet below bottom of cistern, into which the water drained: into this I put a pump, and kept the water level below the bottom of the cistern. I now put another coat of cement on, keeping the water pumpe d out till the cement was well hardened, took out the pump, tamped the hole with clay to within 3 or 4 inches of top, and filled with cement; but it would not hold. The pressure of water broke thecement, which did not adhere to the old cement. What is the remedy? A. The best Portland cement is very much superior to the Rosendale for the purpose you refer to, but it should have a chance to set before it is immersed in the water. To do this, build the bottom and about 2 feet in hight of the sides of the cistern above ground; supply it with as much water as it will absorb easily in setting; let it stand until it gets as hard as stone; then lower it into the excavation and build the remainder of the cistern upon it. This bottom tub may be built of brick, well grouted in the cement, or with cement concrete, composed of broken stones, bricks, gravel, sand, and cement. The proportion of the ingredients may be as follows: 1 measure of cement powder. 3 measures of clean sharp sand, and 3 measures of broken stone and gravel. To resist pressure, the bottom may be built of a concave or arching form, like a dome reversed. The following is an instance of the capabilities of concrete to resist the action of water: At the harbor of Cherbourg, France, the blocks, of 12 feet by 9 feet by (1/2 feet, containbattery resistance, and is only necessary where a ing 712 cubic feet, and weighing 52 tuns, were built up of mortar and stone, like rubble masonry, with-

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(5) C. J. H. says: You give a recipe for making a blue black ink which calls for sulphate of indigo in the form of a thinnish paste, and

Portland cement powder to three of sand, and occupied from 1/4 to 1/4 of the entire mass. Blocks of this kind, 9 months old, showed a compressive strength of 113 tuns per square foot, which is but little inferior to that of Portland stone. Their cohesive force was about 200 lbs. per square inch. After becoming hard, they were slung to pontoons and thrown loosely into the sca. Some of the 52 tun blocks have in heavy gales been thrown up from the bottom of the sea (30 feet deep) and lodged on top of the breakwater, entirely uninjured.

(17) W. M. asks: 1. Our steam gage indicates 12 lbs, steam even when the boiler is cold. and there is no steam at all. Will the gage show 12 lbs. more than the true pressure when the steam rises? A. Yes. 2. We are running a 6 inch circular saw at about 500 revolutions per minute. We have gummed the saw twice, and have taken off about 1/2 inch in the diameter of it; but since we gummed it the last time we have been troubled by the saw running toward the log. What is the rem-edy? A. The saw ought to be hammered. 3. The saw is not flat: the side toward the log is convex about 1/4 inch. Ought this to be so? A. No. It is the cause of the difficulty before mentioned.

(18) S H. L. says: I have some very soft castings of iron; while cutting a thread on them, all the cuttings stand on end. What is the cause? A. Magnetism, created by friction produced by using a dull tool.

(19) W. H. G. asks: 1. What will be the effect of carefully retempering a good quality of steel, say a tap 11/2 inches in diameter and 15 inches long, carefully repeating the tempering 5 times? Will the rise of thread be increased or decreased? A. No. 2. Will the cutting quality be affected? A. Yes, it will deteriorate.

(20, E. H. says: I am an engineer on a tug her boiler is constructed in locomotive fashion. with 42 flues 214 inches in diameter; firebox is 4x3 feet. The flues in the firebox end leak constantly. If I stop them and blow out, they stop leaking, but commence to leak again as soon as I have occasion to carry a hot fire. A. Probably the tubes are too close together, so that the circulation is imperfect. If so, more moderate firing and steam ing will doubtless be the only remedy.

(21) O. G. B. asks: What is the best mode of constructing a firebox under a horizontal tubular boiler to burn slabs and sawdust? The boiler is 48 inches in diameter and 10 feet long, with 36 three inch tubes. What length and width of grate sur face would be required? A. Make the furnace from 1/4 to 1/8 larger than for burning wood. See p 59, vol. 3C.

(22) J. C. C. asks: 1. What disadvantage is there in a small upright double cylinder engine with both cranks on one shaft? I do not hear of any such being made. A. There are many such engines in use, but ordinarily a single engine is considered simpler. 2. What power could I get from such an engine, the cylinders being 2 inches in diameter and of 4 inches stroke? A. Horse power=pressureon piston in lbs. per square inch \times speed of piston in feet per minute+33,000. 3.What would be the best way to set the valves to get the most power? A. Cut off steam at about 34 of the stroke. 4. In what relation to each other would it be best to set the cranks? A. At right angles. 5. Will brass wear as long, for the cylinder and other working parts, as iron? A. Yes. 6. Will the double cylinder engine give more power than one cylinder, of the same niston surface as both? A. No. How can I make a writing fluid that is green when first written with, but turns black on drying? A. Take 15 parts by weight bruised gall nuts and 200 parts water. Boil for an hour, and then add 5 parts sulphate of iron, 4 parts iron borings and 1 part indigo dissolved in 3 parts sulphuric acid

(23) H. H. H. asks: What is the weight on the crosshead of a 10x20 inches engine, with connecting rod 60 inches long and pressure 50 lbs.? Please give the rule. A. The pressure of the steam in lbs. per square inch, multiplied by the area of the piston in square inches. To this must be added the weight of the moving parts, when they act so as to increase the strain.

(24) B. R. F. asks: What is the best means cleaning a basement of roaches? A. Put 1 drachm phosphorus into a flask with 2 ozs. water, plunge the flask into hot water, and when the phosphorus has melted pour the contents of the flask into a mortar with 2 or 3 ozs. lard. Triturate briskly, adding water and 1/2 lb. flour, with an ounce or two brown sugar. This paste is said to effectually destroy roaches.

(25) H. J. M. says: I want to construct a small boiler for driving light machinery. Will tin plate stand a pressure of 15 lbs, per square inch, the buller being 2 feet square by 6 inches deep? A. You can use tin if you make the boiler cylindrical, from 8 to 9 inches in diameter. What are the yellow shining particles in the piece of stone enclosed? A. It is mica.

(26) M. A. J. asks: Will a wrought iron rod, after being heated a number of times from 70° to 212° Fah., cease to be affected as to contraction and expansion by the heat? A. Any material under these conditions will have its coefficient of expansion affected in time, and after long use may cease to be sensibly influenced by change of temperature. It is a general law that all machines, including animal mechanism, wear out in course

(27) R. H. J. esks: How many gallons will flow per minute through a ¾ inch nozzle on a 3 inch hose, with 40 lbs. pressure per square inch ? A. About 7 cubic feet. 2. How much will flow through a % nozzle on a 2 inch hose with the same pressure? A. About 1.5 cubic feet.

(28) D. C. C. asks: 1. I have been running an engine 22 by 21 inches stroke, with a 9 foot flyfind out how many horse power this engine is? A. to make an experiment with a brake or dynamometer. 2. Can the steam make any difference in the power when it makes the same number of strokes per minute with 40 lbs. as with 80 lbs.? A. The steam is, no doubt, wire-drawn, if the engine does as well with 40 as with 80 lbs. of steam. (29) C. R. asks: Can I burn a hole about 7 inches in diameter through a cast iron plate nearly linch thick, by the use of the oxyhydrogen blowpipe? I cannot get at it to drill it. A. It could be done, but it would be very expensive. We think that if you can reach it with a blowpipe you can probably devise some arrangement to attack the material with a tool.

(31) H. W. G. asks: Why do kerosene against the aeriform anvil at a point where the at-lamps, especially those made of brass, sweatoil, mosphere is far less dense than it is here; so in or why does oil collect on the sides of lamps filled with kerosene? A. It is due to the evaporation of the oil drawn up through the wick by capillary attraction while the lamp is not in use, which is condensed in part upon the cold surfaces of the lamp. Try an airtight cap.

(32) H. R. E. asks: Can you give me a re cipe for an ink for writing on zinc, that will stand the action of sulphuric acid? A. No. The sulphuric acid will dissolve the zinc at once.

(33) F. M. asks: Is there any way to temper machinists' tools, such as straight edges and squares, without warping them? A. Make them out of old saw blades, which require no tempering.

(34) F. B. S. asks: How can I make the eggs of Pharoah's serpents? 'A. These are little cones of sulphocyanide of mercury which, when lighted, give forth a long, serpent-like, yellowish brown body. Prepare nitrate of mercury by dissolving red precipitate in strong nitric acid as long as it is taken up. Prepare also sulphocyanide of ammonium by mixing 1 volume sulphide of carbon, 4 strong solution of ammonia, and 4 alcohol. This mixture is to be frequently shaken. In the course of about two hours, the bisulphide will have been dissolved, forming a deep red solution. Boil this until the red color disappears and the solution becomes of a light yellow color. This is to be evaporated at about 80° Fah, until it crystalizes. Add little by little the sulphocyanide to the mercury solution. The sulphocyanide of mercury will precipitate; the supernatant liquid may be poured off, and the mass made into cones of about half an inch in hight. The powder of the sulphocyanide is very irritating to the air passages, and the vapor from the burning cones should be avoided as much as possible. To ignite them set them on a plate or the like, and light them at the apex of the cone.

(35) W. S. H. asks: How can I temper a thin circular saw, about 2 inches in diameter and thick, without springing it? A. Heat red hot lace between two flat perforated iron plates, and lower into oil, quenching right out.

(36) N. R. asks: How are wood screws cut? have made a die that cuts the thread well enough, but I cannot form a point. A. This is done by a special patented machine.

(37) H. P. G. and others ask: 1. What is the nature of an explosion of gunpowder? Does it press equally in all directions? A. The effect of an explosion of gunpowder is simply due to the sudden conversion of the grains from the solid into the gaseous state. With gunpowder we have a volume of gas, which would normally occupy a a space three hundred times as great as the grains occupied, liberated rapidly, but still in a perceptible interval, and for this very reason gunpowder is the safest projectile agent thus far discovered. For if, as in the case of nitro-glycerin, this large volume of gas were liberated all but instantaneously, the strain upon the gun would be so great that it would, in all probability, burst the breach before it started the ball. 2. Why does not the ramming, in blasting rocks, blow out before the rock splits, for it cannot possibly be made stronger than the rock? A. See answer to A. J. K., on this page.

(38) A. J. K. says: A sand blast is made by pouring dry sand upon the powder in a drill hole. When the powder exploded, why is the loose sand not driven out, and the rock left uninjured? A. The pressure of the gas at the moment of its liberation is, of course, equal in every direction. It must also be borne in mind that before this volume of gas has expanded to the density of the atmosphere it must have displaced a column of air which exerts a pressure of something over a tun on every square foot of surface. With nitro-glycerin a volume of gas, 900 times that of the liquid used, is set free all but instantaneously. It can readily be seen that the sudden development of this large volume of gas, which becomes at once a part of the atmosphere, would be equivalent to a blow by the atmosphere against the rock ; or what would be a more accurate representation of the phenomenon, since the air is the larger mass, and acts as the anvil, a blow by the rock against the air.

(39) F. B. asks: Will an explosion of unconfined nitro-glycerin upon the surface of a rock split it? If so, why? A. Take a light wooden surface, say one square vard; the pressure of the air against the surface is equal to about 9 tuns, but the air presses equally on both sides, and the molecules wheel, making 120 turns per minute. How can I have such great mobility that, when we move the surface slowly, they readily give way, and we en-The only way to ascertain the power definitely is counter but little resistance. If, however, we push it rapidly forward, the resistance greatly increased for the molecules must have time to change their position, and we encounter them in this passage If now we increase the velocity of the motion to the highest speed ever attained by a locomotive say one and one fifth miles per minute, we should counter more particles, and find a resistance which no human muscle could overcome. Increase the velocity ten times, to twelve miles a minute, (the velocity of sound) and the air would oppose such a resistance that our wooden board would be shivered to splinters. Multiply again the velocity ten times, and not even a plate of boiler iron could withstand the resistance. Multiply the velocity once more by ten, and we should reach the velocity of the earth and its orbit, about 1.200 miles a minute, and, to a body moving with this velocity, the comparatively dense air at the surface of the earth would present an almost impenetrable barrier, against which the firmest rocks might be broken to fragments. Indeed this effect has been several times seen, when meteoric masses moving principle is this theory based? A. No satisfactory with these planetary velocities penetrate our own

the case of nitro-glycerin, the rock strikes the atmosphere with such a velocity that it has the effect of a solid mass, and the rock is shivered by the blow

(40) E. W. P. asks: 1. What will dissolve utta percha? I have tried naphtha, but without success. A. Gutta percha is dissolved readily by benzole, chloroform, bisulphide of carbon, oil of turpentine, and the essential oils generally. 2. Will it answer for mending rubber? A. Yes.

(41) J. H. H. asks: 1. Can you give me information as to the temperature required to melt copper, zinc, lead, iron, and brass? A. Copper 1990° Fah., zinc 773°, lead 617°, cast iron 2780°. The molting point of brass is variable, and depends altogether upon the proportion of its ingredients. 2. How can I make insulated wire for battery use? A. Coat copper wire with gutta percha.

(42) E. says: I have a fine oil painting of the Madonna and Child. It is 30 years old; and from age and ill usage it has become badly cracked. Is there any preparation by which these cracks can be hidden or taken out? A.Itsappearance would be improved by careful retouching and varnishing. The taking out of a crack is not possible. What kinds of colors are used for coloring storeocopic views? A. Aniline colors are used.

(43) S. G. R. asks: 1. In preparing glycerin ve make a lime soap. What is the cheapest and best way of converting that into soda soap? A. Who makes such a lime soap with glycerin? Glycerin forms soluble compounds with lime and soda. 2. What is the best work on the manufacture of soap? A. Morfit's book has a high reputation.

(44) A. S. M. asks: How can I make muffles for haking a charcoal composition in, to render it porous for filtering purposes? A. Muffles are earthenware ovens, usually formed with an oval top and flat bottom. They open at one end and are closed everywhere else, except a few narrow slits in the top and sides.

How is rubber made to retain flock, for plane covers? A. The flock is rolled on while the rubber is in a softened state, by passing between two revolving cylinders heated by steam

(45) J. M. McC. says: We have a large cistern under a factory, for the purpose of holding rain water for scouring, etc., which has lately been filled partially with hard water, but principally by rain. After letting it stand a few days, we have used said water and it really seems as hard as the well water. Please to inform me why this is? We are confident that it is more than half soft or rain water. A. It is probable that there were sufficient lime salts in the hard water to make all the water in the cistern hard, when the waters mingled together.

(46) P. O. T. asks: In estimating the percentage of tannin in bark, leaves, etc., by means of protochloride of tin and muriate of ammonia, how is the resulting precipitate measured? A By means of a glass-stoppered cylindrical jar, properly graduated to cubic centimeters.

(47) L. A. W. asks: What is the real cause of the fulling up of flannel by washing? A. It is due to a combination of causes, but principally to the rubbing; and where soap is used, this action is very much accelerated.

(48) W. A. P. asks: What is Berlin bronze, and how is it applied on cast iron? A. The trade does not seem to be familiar with the name.

(49) J. H. P. asks: There is something that is put in tincture of iodine, so that, when the latteris applied to the skin, it leaves no stain. What is it? A. The tincture (so-called) referred to may e obtained by adding, to the alcoholic solution of

iodine, ammonia or hyposulphite of soda. What can be put into ink that will give it a fine gloss, something like a varnish gloss? somesugar of milk.

(50) G. B. McD. asks: 1. Are platina and platinum the same? A. Yes. 2. If 10 ozs. 225.6 grains silver be melted with 28 ozs.0.014 grains platinum, what will the nature of the alloy be as to malleability, ductility, and specific gravity? What will be the melting point of the above alloy? A. Only a trial will answer this, as the properties, etc., of the two bodies are not found in the alloy. 3. Can copper be successfully electro-plated with steel? A. No. 4. How can I procure a list of dates and number of patents issued by the Patent Office since 1858? A. This list will be found in the volumes of the SCIENTIFIC AMERICAN.

(51) P. S. asks: What is ground lime composed of? A. You probably mean sulphate of lime orgypsum, also known as plaster of Paris, which is a combination of lime and sulphuric acid. +ypsum from 400° to 500° Fah, and ground to a fine powder, has the peculiar property, when mixed with water, of recombining with the water, and binding or setting into a hard mass. To this property plaster of Paris owes its value in the arts.

At a certain elevation, above the lower portions of the earth and beneath the summit of the higher portions, there is a line termed the thermal line, cause the stratum of the atmosphere at that hightis warmer than the strata either above or below it. What is the cause of a greater heat in this stratum than is found elsewhere? A. The existence of this thermal line has only been made known recently; and until the investigations of Glaisher and others are more advanced, explanations would be mere guesswork.

Do rays of light from the sun approach the earth in straight lines? If they do not, in what kind of lines do they approach it? A. They move in straight lines until they encounter the earth's atmosphere, when they are bent into irregular curves by the different refractive powers of the various strata of the atmosphere.

(53) H. C. Z. asks: What am I to use to soften hard rubber balls? A. Boil them for some time in soft water.

What can 1 use to give old books a better appearance? A. We do not know.

COMMUNICATIONS RECEIVED.

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

On Proportioning Gears. By T. A. C.

On Parasites. By D. V. D.

On Tides. By E.S. On Hard Rubber Thermometers. By J. M. B.

On Salicylic Acid. By G. H. B.

On Science and the Pope. By G. R.

On Dentistry. By S. B. P. On the British Patent Laws. By A. H.

Also enquiries and answers from the following. F. C. R.-T. F. W.-T. H. P.-E. G. W.-J. B. C.-W. B. H.-W. G.-O. B. T.-A. R. F.-J.W. N.-T.C -F. R.-S.-T.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeatthem. If not then published, they may conclude that, for good reasons, the Editor de-cines them. The address of the writer should al vays be given.

Enquiries relating to patents, or to the patenta blity 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 enquiries analogous to the following are sent: "Who sells insulated copper wire? Who makes woolen textile machinery (pickers, breakers, and finisher cards)? Who makes horseshoes with movable calks? Who makes balanced slide valves for locomotive use? Who manufactures toy balloons? Who sells platinum, and what is its cost?" All such personal inquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set a part for that purpose, subject to the charge mentioned at the head of that solumn. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

INDEX OF INVENTIONS

Letters Patent of the United States were

Granted in the Week ending

April 13, 1875,

AND BACH BRARING THAT DATE.

[Those marked (r) are reissued patents.]

	Air compressor check valve. E. S. Winchester	161,99
	Alarm box, fire, McCullough and Anderson	162,08
	Annunciator, electric, E. Gray	162.05
	Arbor, elastic, B. Bannister	162,01
	Bale tie, M. T. Brown	162,02
	Bale tie, J. M. Goldsmith	162,05
	Barrels, vent for beer, Hindemyer et al	162.06
	Bath, electro-therapeutic, J. W. Moliere	162,09
	Bed bottom, J. B. Hepion	161,96
	Bed bottom. Owens and Chamberlin	162.09
	Bedstead, cct, S. C. Lusk	162,08
	Bedstead fastening, E. Deetz.	162,03
	Billiard cushion. Held and Bensinger	161.88
	Boiler, steam, F. Hungerford	161.96
	Boiler man hole cover, H. Collinson	161.99
	Bolt. door. W. H. Birge.	162.01
	Boot beels etc. hurnishing G H Bliss	161 85
1	Boot sole metal fastening G. McKay	169 00
	Bottle T W Suppott	169 11
	Bottle, I. W. Sylliott	104,11
	Bottle stopper, A. Christin	101,00
	Brick machine, J. F. Clark	162,09

Will soluble glass do to coat a tin vessel with so as not to be corroded by sulphuric acid? **A**. Yes.

(30) H.B. B. asks: If the tensile strength of cast iron is 15.000 lbs. per square inch, how will a fly wheel rim of 1 square inch sectional area sustain 50,000 lbs.? A. If the 30,000 lbs. is tensile strain, and the tensile strength of the material is 15,070 lbs., of course the wheel would not realst it.

atmosphere. The explosions which have been wit- accuracy of these observations is open to grave nessed are simply the effect of the concussion , doubte.

(52) J. T. asks: Why does a sunbeam, admitted into a darkened room through a square, triangular, or other aperture of irregular contour. always form a circular or oval image on the floor or opposite wall? A. In case the opening is of sufficient size, the image will be of the same form as the opening; but when small, other rays enter besides those moving in parallel lines, and (by crossing) approximate the form of the image to a circle.

Observation seems to have given rise to and to confirm a theory that the nearer to the hour of noon the moon changes, the greater is the probability of foul weather: and the nearer to the hour of midnight this occurrence takes place, the greater the probability of fair weather. On what explanation of these phenomena is given, and the

Brick machine, I. Gregg, Jr	162,058
Bridge, iron, J. B. Eads	162,045
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