brittle, like glue. 2. In the burning of large sulphuric acid chambers, what amount (per cent) of the lead is likely to volatilize? A. The loss of lead would be about 25 per cent. By volatilization the amount driven off would be exceedingly small. 3. Will you mention any instances where acid chambers have been destroyed by fire? A. Works burned are the Marcellin, of Bridgeport, Bowker, of Elizabethport, Crenshaw, of Richmond, Merrimac, of Boston.

(32) A. L. B. says: Please tell me the chemical composition of elderberry juice, before made into wine, and if you think it practicable to buy the elderberries in large quantities cheaply without raising them on plantations? A. The chemical composition of the elderberry juice has probably never been determined. It is a mixture of various ingredients which would be very difficult to isolate. The answer to the second question depends entirely upon the amount of capital required for the purpose of raising the berries; if that exceeds in amount the value of a given quantity of berries at the market price, then of course it is best to buy. This is not a question of opinion, it is rather one of comparative values, and must be settled by obtaining the information relative to the possibilities of raising and also of disposing of the elderberries.

(33) S. S. S. asks: What pressure plates will stand with safety from an eighth to a quarter inch thick, made into a vessel to hold from 2 to 3 cubic feet of air, and what is the best metal for strength with least weight? A. Large tubes such as are used for boilers are as light and strong as anything you can get. A 10 inch tube will bear a pressure of 500 pounds with safety. They hold a little over half a cubic foot to a foot in length. Heads should be three-eighths wrought iron, raised and flanged, backed in and strongly riveted and calked.

(34) J. A. T. asks the cause of glass cracking in store fronts, say a 4 lighted half, glass AA double strength, about 36x60, with wrought iron mullions and muntin. They were bedded in putty, and crowded to place with wooden stops. Some of them crack within an hour after putting in, and others twelve months. The buildings are veneered brick. I have also had the same trouble using rubber tubing instead of putty. A. Glass of the size you mention seldom cracks in this climate when carefully set. Imperfect annealing may subject such glass to great strain in a severe climate. We should judge that iron mullions may have much to do in causing fracture in very cold weather. The large plates in New York windows are sometimes fractured in extreme weather from the strain caused by contraction. The crowding to place by wooden stops may also cause a strain by bending that might start a crack at any time. We have nothing better to offer than the suggestion of greater care in setting the glass perfectly free from strain in any direction.

(35) D. F. says: Inclosed I beg to hand you specimen of asbestos. Will you kindly infom me where I can find a market for this article, what it is used for, and what is the price per pound? A. The average spot value of asbestos at the mine is about $30 per ton. The price in New York ranges from $15 to $60 per ton, according to the length and strength of the fiber and its purity. It is used in making liquid and fireproof paints, roofing, piston packing, valve packing, flat packing, covering steam pipes and boilers, fireproof cements, sheet and roll millboard, flooring, felt, etc. It is often used with hair felts and other substances. H. W. Johns, of Maiden Lane, New York, is the largest dealer of it in this part of the country. The specimen sent however appears to be chrysotile, a variety of serpentine, found chiefly in Canada, and there employed, only to a limited extent, however, in the preparation of a variety of textile material. The Canadian Geological Survey could probably give complete information.

(36) W. T. M. asks how the liqueurs "Kümmel" and "Chartreuse" are made. A. The so-called "Doppelt Kümmel" is prepared by dissolving separately, each in a little 95 per cent alcohol, half a drachm oil of anise, and five drops each of the oils of calamus, bitter almonds, and coriander; also dissolve 1 to 1½ ounces oil of caraway in sufficient 95 per cent alcohol to make a clear solution. Incorporate the foregoing with 40 gallons French proof spirit, and add 10 pounds sugar dissolved in 5 gallons water. The green Chartreuse consists of:

Dried lemon balm	500	grams.
Hyssop in flower	250	"
Peppermint (dried)	250	"
Genepi	250	"
Balsamite	125	"
Angelica seeds	125	"
Angelica roots	62	"
Thyme	30	"
Arnica flowers	15	"
Buds of balsam poplar	15	"
China cinnamon	15	"
Mace	15	"
Alcohol at 85°	62	liters.

Digest for twenty-four hours; distill and rectify to obtain 60 liters; add 25 kilos of refined white sugar dissolved by heat in 24 liters of water; mix the whole and make up with water to 100 liters; mellow and color yellow with a mixture of blue coloring and infusion of caramel or saffron. Size, allow to repose, and filter.

(37) W. E. J. asks: Can you inform me where I can communicate with some one who has an invention for lighting the bottom of the sea where the water is from 100 to 150 feet deep, or put me in communication with some one who has the means of locating a wrecked vessel? A. We would refer you to the Edison Electric Light Company, 65 Fifth Avenue. Mr. Edison, we are informed, has experimented in this direction. Or you might write to Gen John Newton, Chief of Engineers, New York.

(38) J. Q. A. says: I have a summer coat made of mohair, dark gray in color, almost black. Perspiration has given it a very bad odor, though without changing the color. What will clean it without injury? A. Perspiration stains are removable by washing the garment in a strong solution of soda, with a subsequent rinsing with water.

(39) W. P. C. says: I want to know if you can tell me of a good cheap chemical bath that I can use to dip waste tin plate in, to deprive it of its plate to use over again as solder? I want to use hot water, and I know that chemicals will admit water to get hot enough to melt tin, and I want to know what chemical to use to superheat it and melt the tin plating so it can be saved to use over again. A. The accomplishment of your purpose is not practicable. Tin is frequently removed from refuse scraps by treatment with hydrochloric acid and subsequent recovery of tin chloride or tin crystals. This process is given in SCIENTIFIC AMERICAN SUPPLEMENT, No. 112.

(40) F. B. says: I have a paper roller with figures embossed in it, working together with a roller of metal (brass). On passing through a wet piece of cloth, the metal roller being hot, the figures on the paper roller get torn up, as the cloth sticks to it very badly. What substance shall I take, to make the paper roller hard, and smooth like glass and also watertight, so as to resist the action of dampness or heat. A. Try thin shellac varnish 2 or 3 coats, drying each thoroughly before putting on the next.

(41) A. M.—To whiten tarnished silver thimbles, rub with a brush and oxalic acid and wash clean with warm soap and water; polish with rouge on a brush.—Answer the questions from the Young Men's Christian Association conscientiously. If they think you worthy of membership, they will receive you.

(42) F. W. C. asks (1) how can I re-ebonize a maple rifle stock in the easiest way? A. Full information in regard to Dyeing Wood Black will be found on page 3301 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 207. The general process of ebonizing wood consists in the application of a solution of iron acetate, sometimes with logwood and sometimes simply alone. 2. What the preparation is which cartridge manufacturers grease their cartridges with? A. A mixture of beeswax and tallow is used. 3. An economical method of greasing small bullet breech caps of 0 22 inch caliber. A. We would recommend that they be dipped or immersed in the above.

(43) B. J. K. asks (1) the name of a work in chemistry that treats broadly on the subject of oxygen and oxidation. A. There is no single book on the subject desired. Roscoe and Schorlemmer's Treatise on Chemistry, vol. i., is very full, but a work on Dynamical Geology would probably be more satisfactory; Dana's Manual of Geology has a chapter in it devoted to this subject. 2. Is iron scale the peroxide of iron? A. The black or magnetic oxide of iron is the combination of ferric (per) oxide with ferrous (proto) oxide of iron. 3. Of what degree of oxidation is iron rust? A. Iron rust is the ferric oxide (peroxide). 4. About what per cent of iron or oxide of iron does ocher contain? A. The theoretical composition of limonite or ocher is 86·6 per cent ferric oxide, 14·4 per cent of water. 5. Are carbonate ores of iron as rich in metal as hematite or magnetic ores? A. Magnetite contains theoretically 72·4 per cent of iron, hematite 70, and siderate, the carbonate ore, about 56 per cent.

(44) J. A. C. asks for a receipt for making sarsaparilla sirup, such as is used in soda water. Also a receipt for making sarsaparilla such as is sold in bottles. A. Several formulas for sarsaparilla sirup will be found in SCIENTIFIC AMERICAN SUPPLEMENT, No. 77. The fluid extract to which we presume you allude is prepared by moistening 16 troy ounces of the powdered sarsaparilla with half a pint dilute alcohol; let it stand 30 minutes, then percolate until 3 pints have passed through; evaporate at a moderate heat in a water bath to 1 pint, add 10 ounces sugar, evaporate to 1 pint, and strain while hot.

(45) H. W. asks a formula for Gunther's mead, or one that is as good. A. The ordinary mead is prepared by fermenting honey and modifying the flavor by spices and oils. The following taken from our back files will probably be satisfactory: Take ten gallons of water, two gallons of strained honey with two or three ounces of white Jamaica ginger root, bruised, and two lemons cut in slices. Mix all together and boil for half an hour, carefully skimming all the time. Five minutes after the boiling commences add two ounces of hops; when partially cold put it into a cask to work off. In about three weeks it will be fit to bottle.

(46) M. J. B.—Your machine will run a small arc light very well. One of Browning's small arc lamps would probably be best suited to it. You can purchase these lamps from any of our leading opticians.

(47) F. D.—Your machine will undoubtedly work very well. We only suggested that the later form of Siemens armature might prove more satisfactory. Consult SUPPLEMENT, Nos. 222, 224, and 225.

(48) J. B. L. says: I have seven pounds of No. 16, and five pounds of No. 20 cotton covered copper wire, and wish to know if it can be used for making a dynamo electric machine, and what kind would be best to make to get the best results from the above wire. A. You would probably be able to make a successful machine by following the instructions given in SUPPLEMENT, No. 161.

(49) C. G. Y.—You can pursue a course of electric engineering in Cornell University, Ithaca, N. Y., but if you can secure a situation with some establishment like Edison's or the United States Electric Light Company, it would probably be better for you unless you are able to take both.

(50) T. H. M. asks: 1. Where can I buy a small outfit for electroplating? A. Any of our dealers in electric supplies can furnish you with the outfit you need. Consult our advertising columns. 2. How can I tin steel and iron so as to cover it with a thicker coat than is generally done with the ordinary process using muriatic acid? A. The articles may be well cleaned and dipped in melted tin covered with wax or tallow. 3. Are there any books, or SUPPLEMENTS of your paper, treating on either subject? A. SUPPLEMENT Nos. 310 and 436 give full information on electro plating.

(51) M. E. W. says: 1. In making the chromic acid batteries, in SUPPLEMENT, No. 159, what else can I use for the vessels, besides flower pots, as the acid soaks through and breaks them? A. You can purchase porous cells. 2. Why do you have to use a porous cell? A. The porous cell renders the battery more constant. 3. What will prevent the zinc from becoming so brittle when amalgamated? A. Use pure zinc and less mercury.

(52) W. S. asks: 1. How many feet of wire and what number should I use to make an electro magnet that will hold a weight of one pound? A. About 150 feet of No. 24 wire for cores seven-sixteenths or one-half inch diameter and one and three-quarters to two inches long. 2. Will one gravity battery 6 x 8 be sufficient? A. It would require two or three cells of gravity battery. 3. Is it the number of the wire or the amount of feet that makes the power, the battery being the same in both cases? A. It depends upon the kind of battery, its resistance, etc. For a battery of considerable resistance a fine wire is used, and for a battery of low resistance yielding a quantity current a coarse wire will be required. 4. What is the meaning of ohms of resistance? Is there any way of figuring it, in the way of force or pressure? A. An ohm is a unit of electrical resistance. It is about equivalent to 38 feet of No. 24 wire above referred to, or 330 feet of No. 9 iron telegraph wire (0·155 of an inch in diameter).

(53) J. H. S. asks: How many cubic feet of compressed air, at 200 pounds pressure per square inch, would it take to run a two horse power engine 2 hours; how many compressed to 600 per inch; also at 800 pounds per inch? How many cubic feet will it require to run a two horse power engine 2 hours? What kind of iron would it require to stand the above pressure with safety? Can I compress air and keep it for 3 or 4 days at a time? A. For 200 pounds pressure, 300 cubic feet; for 600 pounds, 100 cubic feet; for 800 pounds pressure, 75 cubic feet. An ordinary boiler shell ¼ inch thick, 3 feet diameter, double riveted, is sufficient for an air tank for 200 pounds pressure. Well made 10 inch wrought iron pipe with inserted wrought iron heads is strong enough for the higher pressure.

(54) J. E. B. says: I wish to cut down a poplar tree 12 feet in diameter, in such a manner as not to injure the timber. Please let me know the best way to do it. A. Ascertain which way it will naturally fall, make a soft bed for it to fall upon of brush, hay, or anything of that nature several feet thick. Then guy the tree with ropes to direct its fall upon the bed. Saw from the side that the tree is to fall, following up the saw with thin wedges to keep the tree from settling upon the saw. When the saw is nearly through, the wood will give way and the tree fall into its prepared bed.

(55) J. S. W. asks: What would be the best measurements of beam and depth for a canoe of 10 or 12 feet keel? The canoe is to be used in rapids and possibly in surf. A. A canoe of 10 or 12 feet keel, for rapids and surf, should have from 44 to 48 inch beam, 20 to 22 inch depth amidships, and 24 inch stern to be safe.

(56) F. P. P. asks: What is the receipt for killing hair on a person's body, or in other words what will remove the hair so it will not return? A. Boudet's depilatory, a frequently used preparation, is made by mixing 3 parts sodium sulphide (crystallized) with 10 parts finely powdered quicklime and 11 parts starch. It should not be applied longer than 2 to 4 minutes. It is said to be very effective and safe. Hair is likewise removed by means of electricity, and a description of the process is given in Duhring's "Diseases of the Skin," 3d edition, page 425.

(57) E. M. C. asks: 1. What is the best formula for a soluble ginger extract, such as is used by ginger ale manufacturers? A. The extract of ginger is made by packing 4 ounces powdered ginger in a percolator, moistening it with a little alcohol; then pour on alcohol until 1½ pints of tincture have passed through. Mix this with 8 ounces syrup. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 270, for a well recommended formula for ginger beer. 2. What is the best way to make lemon sirup from the fruit? A. Take 5 gallons lemon juice, 1 ounce best oil of lemons dissolved in half pint of alcohol; or the rinds of 16 lemons rubbed with sugar to extract the essential oil; dissolve 80 pounds sugar in the juice, and boil for 2 minutes. Skim, then strain.

(58) R. asks: 1. What preparation is there, that by writing on paper will eat or cut the letters away so as to form a stencil, or in other words, how is the papyrograph made? A. A description of the papyrograph, including the ingredients of the ink, will be found in SCIENTIFIC AMERICAN SUPPLEMENT, No. 225. 2. Give also a formula for making a composition for fastening the edges of pads, tablets, etc.? A. The substance used for this purpose consists of molasses and glue with coloring matter, such as fuchsine, similar to the composition of printers' rollers, with somewhat less molasses, however.

(59) A. C. F. asks about a driven well where the soil is sandy, water being found about 60 feet below the surface; it appears to be in the quicksand, beneath which appears to be clay. In getting water, the sand being fine and mixed with the water passes through the pipe, and is continually drawn up with the water, thus making the water muddy and impure. How can a well be driven under such circumstances so as to make it work well? A. There is no better way of keeping fine sand out of driven well pipes than to make the strainer longer than usual and cover with very fine brass wire cloth, about 60 mesh to the inch. When driven into quicksand, the fine sand that will pass through may be pumped up by working a pump strongly. The larger particles of sand will be drawn against the strainer, and in a short time form a filter stratum around the pipe, which will keep back the quicksand. In this way we have pumped out a half barrel of the fine quicksand, and obtained a clear flow that lasted many years. Sometimes doubling the wire cloth will add much to the durability of the strainer.

(60) P. K. says: I made a whistle 12 inches in the opening diameter; the bell is 24 inches long; the steam opening is one-sixteenth inch. The bell is No. 16 iron. The steam pipe is 2 inches, steam pressure 100 pounds. I have moved the bell all the way from one inch to six inches, but the whistle loses its tone after one-quarter the steam is turned on. Now, is the opening too large? Is the bell too thin iron, and is it too long or too short? Is the steam pipe large enough? Ought the bell to be larger than the steam opening? A. We have never seen a bell made of sheet iron. Should judge that the riveted seams might interfere with the ring. The bell should be the same size or diameter as the steam opening. We fear that the bell is not held firm enough over the steam opening, or may not be exactly round; so that the steam strikes the lip in the same relative position all around the rim, which is very necessary. There is always a best pressure to bring out the full tone of the whistle. There is little use in trying to force it with a full pressure of 100 pounds. The best whistle bells are made of hard brass or gun metal. A steel casting might make a good one, or a piece of boiler flue brazed to a wrought iron disk for a head; anything to make the bell a solid piece and set solid and central upon the steam opening, which should also be a true annulus.

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

W. W. W.—Probably tourmaline, but the specimen is so small and the crystals so indistinct that identification is not an easy matter.—C. R.—The specimen appears to be a partially decomposed variety of limestone or carbonate or lime.—H. H. W.—The specimen is crystallized calcite or carbonate of lime.

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July 8, 1884,

AND EACH BEARING THAT DATE.

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