NEW BOOKS AND PUBLICATIONS.

MODERN HIGH EXPLOSIVES. By Manuel Eissler, Mining Engineer. John Wiley & Sons, New York.

This book is one for the engineer, the contractor, and the manufacturer of explosives—full details of the methods of production being given as a part of the explanation of the nature and power of the various explosives. The production of glycerine is followed, from its first manufacture in a commercial way in 1850 down to the most recent and greatly improved processes; the dangers, and the best protection against them, in making nitroglycerine are pointed out, and the various kinds of dynamite—from those made with infusorial earth and a large percentage of nitroglycerine down through those with lower explosives and chemically combining with the nitroglycerine—are described as to their manufacture, storage and transportation, and effectiveness for various uses. Gun cotton and the fulminating compounds are likewise fully treated, also electricity as applied to blasting operations, many examples being given from well known engineering works and the author's practical experience in mining. The applications of these explosives for military purposes are only mentioned briefly, the design of the work being principally to promote industrial ends, and, by disseminating more correct ideas, render the handling and use of these powerful destructive agents more safe.

THE MATERIALS OF ENGINEERING. By R. H. Thurston. John Wiley & Sons, New York.

This is the third volume of Professor Thurston on this general subject, the present book being devoted to the non-ferrous metals and their alloys—copper, tin, zinc, brass, bronze, etc. It treats generally of the properties of the metals and their alloys, and their manufacture and working, but will be more especially useful for what it says relative to their strength—elastic limits, resistance to compression and transverse stress, etc.—under varying conditions. The volume tabulates and analyzes a great number of tests of brasses, bronzes, and like alloys, made by the United States Government, and by the author personally at the Mechanical Laboratory of the Stevens Institute of Technology.

MODERN FOREST ECONOMY. By J. Croumbie Brown, LL.D. Oliver & Dowd, Edinburgh.

This is the eleventh volume of the author on subjects directly connected with that indicated in the title of the present book. He believes in forest culture and preservation, and has especially studied the subject as it is brought to mind by the present and past conditions in England and Scotland, and in the various countries of Europe, as also in South Africa, where he was for some time Professor of Botany at the Cape of Good Hope. The present volume treats of the true elements of forest economy and forest administration, classing the latter as a science of no mean order, and advocating the organization of schools of forestry. It is well worth the reading of those who are now so earnestly urging that something be done to prevent the total destruction of our own forests which is so rapidly going on.

WROUGHT IRON AND STEEL IN CONSTRUCTION. John Wiley & Sons, New York.

A hand book of rules and tables for the strength of wrought iron shapes used as beams, struts, shafts, etc., manufactured by the Pencoyd Iron Works.

METROLOGICAL SYSTEM OF THE GREAT PYRAMID. By F. A. P. Barnard, LL.D. John Wiley & Sons, New York.

This is a reprint of a paper read before the American Metrological Society, in which President Barnard summarizes the tenets of the pyramid faith, and investigates the deductions made by those who thus believe, besides advancing a new theory of his own.

THE METHOD OF LEAST SQUARES. By Mansfield Merriman. John Wiley & Sons, New York.

The elimination of error in numerical observations, and the best method of reaching as nearly as possible absolute accuracy in measurements and computations more or less indirect, is here made the subject of a carefully prepared text book by the Professor of Civil Engineering at the Lehigh University. It has been the endeavor of the author to present this by no means simple subject in a manner so plain and direct, that civil engineers who have not had extended mathematical training may be assisted thereby, and the numerous practical examples given afford a comparatively easy road to the acquirement of such knowledge of the higher mathematics as is essential to the engineer, while the book is one in which the industrious student will make rapid progress.

Notes & Queries

HINTS TO CORRESPONDENTS.

Name and Address must accompany all letters, or no attention will be paid thereto. This is for our information, and not for publication.

References to former articles or answers should give date of paper and page or number of question.

Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all, either by letter or mail, each must take his turn.

Special Information requests on matters of personal rather than general interest, and requests for **Prompt Answers by Letter**, should be accompanied with remittance of $1 to $5, according to the subject, as we cannot be expected to perform such service without remuneration.

Scientific American Supplements referred to may be had at the office. Price 10 cents each.

Minerals sent for examination should be distinctly marked or labeled.

(1) O. K. L. asks: Can water 80–90° Fah. be forced by means of a hydraulic force pump under pressure 70-80 pounds into the pores of wood which has been cut across the grain in blocks a quarter of an inch thickness and put in an air tight copper or iron vessel? If so, how long a time would it take for the water to reach the center of the blocks of wood a quarter of an inch thick? Would exhausting the air from the vessel (and so in part from the wood blocks) before permitting the water to come in, facilitate the penetration of water subsequently forced under hydraulic pressure, as before described? A. Water should penetrate the blocks of wood, under the circumstances mentioned, in a few minutes. The air in the wood would be compressed to about one-fifth its volume, and would be absorbed by the water, which might take several hours. If the compression is only for a few minutes, it is possible that the air, not being absorbed, would drive out part of the water by its expansion. Exhausting the air at first would insure the immediate penetration of the water under pressure. Fill the vessel with steam, and allow it to condense; this will probably produce sufficient vacuum.

(2) T. P. Y. asks: What kind and size of pipe is best to lay from a spring of ordinary soft water, 80 rods distance and 25 feet fall, for family and barn use? Will it be best to take a slight curve from a straight line to save a sag, or not? A. The size of pipe depends upon the quantity of water you may require and the capacity of the spring; 1 inch pipe will give a constant flow of 5 gallons per minute, 1¼ inch pipe 9 gallons per minute, 1½ inch pipe 15 gallons. A galvanized iron pipe is best. It will make no difference about the sag, except as every bend from the straight line increases the friction, and this would not be saved by laying the pipe in a circuitous line.

(3) F. W. F. says: I have a flat iron casting about three feet long and two wide, which represents in relief the siege of Troy. Can I cover this with a film of metallic copper or treat it with any solution to make it resemble the bronze so much admired? A. You will find a description of Process for Bronzing Iron in No. 235, SCIENTIFIC AMERICAN SUPPLEMENT. Also Imitation Bronzing in SCIENTIFIC AMERICAN SUPPLEMENT, No. 28.

(4) A. B. wants to know how best and cheapest to get rid of partially decayed pine and oak stumps, and cheap and simple device or implement for pulling them? Or is blasting cheapest and best, reducing them to fragments so they can be handled and burned? A. A wooden lever with three clevises, chains and hooks makes a simple and easily arranged device for pulling stumps. For blasting them see SCIENTIFIC AMERICAN, December, 1, 1883, page 341.

(5) R. M. H. says: 1. Providing the slide valve on a locomotive has a certain lead, can lead be either increased or decreased by any other means than by slipping eccentric? A. We understand that it cannot except by altering the construction of the valve. 2. Has the reversing lever any other control over the valve than its name implies, and to regulate the throw or travel of slide valve, independent of any influence on lead? A. The reversing lever regulates the amount of the throw of the valve or cuts off the steam when on center, having no control over the lead.

(6) P. T. asks the best mode for pumping out a lake containing about 250,000 cubic yards water, the kind of pump to be used, amount of horse power to accomplish certain results, cost of pumps, etc. A. A pump and boiler capable of pumping out your lake in 50 days of 20 hours each will cost about $1,000 in New York. Boiler 12 horse, steam cylinder 8x12, water cylinder 10x12. Much depends upon how high the water has to be pumped and length of pipes required, which for such a pump should be 6 inches suction, 4 inches force.

(7) J. E. T. says: I have been trying to do a little tinning, such as dipping table cutlery in a pot of melted block tin, and have met with rather poor success. My melted tin seems to be too thick, and will not run off smooth, but leaves the knife rough. How shall I make the melted tin thinner or run smooth on article tinned? A. You may have used your tin bath too long. The tin absorbs a little iron, or it may be too cold. A little powdered salammoniac sprinkled on the surface tends to clear it.

(8) J. F. L.—Water meters are read in the same manner as gas meters. The 1st dial is cubic feet up to 100; 2d dial is cubic feet by 100 for each figure; 3d dial 1,000 cubic feet for each figure, and so on to the 6th, each dial indicating 10 times the amount of the whole of the preceding dial. Always read the figure behind the index in the direction that it moves. The index hands alternate to the right and left in their motion to accommodate the plan of gearing.

(9) J. L. asks if water impregnated with sulphur will be injurious to steam boilers, and how to determine whether sulphur is present in the water. A. Yes. The sulphur combines with the iron, making it brittle. If you suspect sulphur in the water, you may detect it by the smell of bad eggs. If there is too little to detect in this way, boil a clean piece of silver (quarter dollar) in some of the water; sulphur turns it black.

(10) M. M. W. asks if there is any preparation of metal in liquid form of unlimited supply that is cheaper than quicksilver? A. There is none.

(11) J. P. says: I want to cast a number of small bells not exactly the usual shape, and cannot use copper because it requires too much heat to melt it. What combination of metals of low fusing point can I use, and is there any process of making the base metals sonorous? A. You cannot make any combination of metals properly sonorous at a low fusing point.

(12) E. C. H. asks about mica and isinglass. Can they be bent or moulded into any shape? Do they stand a high degree of heat when applied in the form of water or steam? Is there any work published which treats of these articles? A. Mica is the proper name for isinglass. It is a silicate of alumina, with a little potassa. It is not plastic or capable of being moulded. It will stand any heat below red. In steam and boiling water it is disposed to become opaque by dissolving of potassa from the surface. See Dana's Mineralogy for a description and analysis of all kinds of mica.

(13) C. F. A. asks: What is nickel, and where does it come from? Please give a short account of it. A. Nickel is a metal first known more than a hundred years ago. Its ores are mined the same as iron, copper, etc. It mostly comes from Germany, France, and England. There are mines in the highland range in the State of New York, and other places. It has also been found in small quantities in the meteorites that fall upon the earth.

(14) C. B. R. asks the name and character of insects sent; they were found attached to a rope swing on a scrub oak tree. A. The specimens are the larvæ and pupæ of the Twice-stabbed Ladybird (*Chilocorus bivulnerus;* family Coccinellidæ), a common and very useful little beetle, preying as larva and imago on plant lice and scale insects. The larva is easily recognizable by its body being covered with very stout, long, black, prickly spines, the perfect beetle being black with a red spot on each wing case. The specimens evidently attached themselves to the rope to undergo their transformation.

(15) I. K. asks: 1. What is the surest way for a family to find out if there is any sewer gas in their house? A. Sewer gas has a peculiar pungent, sickening odor; when once familiar with it a person will readily recognize it in a house. The surest way is to have a reliable plumber examine the premises. If you cannot trust a plumber, obtain the services of some of our sanitary engineers or experts. 2. What is the best way to clean or renovate old steel engravings? A. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 44, 115, 124, for directions for cleaning old steel plate prints.

(16) W. S. asks where one can be educated for civil engineering, and what primary learning is required. A. There are special courses of civil engineering at the School of Mines of Columbia College, and also at the College of the City of New York. The great school of civil engineering in the country is the Rensselaer Polytechnic at Troy, N. Y. The requirements vary with the institution, and can be ascertained by consulting the catalogues. These can readily be procured by application.

(17) S. E. C. asks a recipe for making sulphur soap? A. Take half a pound white curd or castile soap (recent), 1 ounce best flowers of sulphur (levigated), 1 fluid ounce rectified spirit (strongly colored with alkanet), and sufficient attar of roses to strongly scent the mass. Beat the whole together, to a smooth paste, in a marble or Wedgwood mortar. The spirit and coloring matter may be omitted at will, and as a toilet soap one-half the above quantity of sulphur will be found sufficient.

(18) A. B. J. asks for a solution or dip that will give luster to tinned articles. A. Tin may be cleansed by a rapid scouring with potash lye and a rubbing with a hard substance. Sometimes dipping into hydrochloric acid is beneficial, but the first operation is generally necessary. Answer to query 8 in the SCIENTIFIC AMERICAN for May 10, 1884, gives some information on this subject.

(19) D. S. writes: The elm with us is infested by some insect; a majority of the leaves are like the one I inclose herein. What are the cause and remedies for it? A. It is impossible without better specimens to say precisely what the insect is, but we think likely that it is the canker worm, which injures the elm as well as the apple tree. The most approved remedies are as follows: To prevent the pests from going from tree to tree, a band of canvas or paper is wrapped around the trunk and besmeared with tar or a mixture of tar and molasses, which must be frequently applied; or a band of rope or closely twisted hay is put around the trunk and over this a tin band about 4 inches wide, so placed that the rope shall be at the middle of the two, in such a manner that there will be a cavity below and a free edge above it. If these insects are prevented from ascending the tree, they will deposit their eggs below the obstruction and near it, and the eggs can be destroyed by a single application of kerosene oil. This should be done about March in this latitude, and earlier further south. If the worms have been permitted to hatch, as soon as they are large enough to be seen jar them from the trees and sweep away with a pole, as they hang by their threads, and burn or otherwise destroy them. If the worms have matured and gone into the ground for winter quarters, plow the ground late in the fall so as to expose the pupæ to frost and to their natural enemies. See also Professor A. S. Packard's article on the canker worm, page 304 of SCIENTIFIC AMERICAN SUPPLEMENT, No. 19.

(20) U. M. F. Co. ask for a cement that will set almost instantly for uniting leather together. A. Gutta percha dissolved in carbon disulphide to form a mass of treacly consistence forms a very good cement for splicing leather. The parts to be joined must be thinned down, a small quantity of the cement is then poured on each end, spread so as to thoroughly fill all the pores of the leather; the parts are warmed over a fire for a few minutes, applied quickly, and hammered well together.

(21) J. E. N. writes: I make a "burnish ink" for shoes of extract logwood, potassa bichromate, and copperas which does not strike in deep enough. Can you suggest the addition of anything, that is cheap, that will make it bite well, or can you furnish a good formula? A. The following are the proportions of an ink similar to your own, but perhaps it may give better results: Make a strong decoction of logwood, preferably in soft water, by boiling; then add iron sulphate, at the rate of 2 ounces to the gallon, with half an ounce each potassium bichromate and gum arabic. Powder the last three ingredients and even the logwood if you like, as it will take the color out quicker; or you can use the prepared extract of logwood at the rate of 1 ounce to a gallon of water. A solution of iron sulphate in 12 times its weight in water is used sometimes. See also SCIENTIFIC AMERICAN SUPPLEMENT, No. 157, for formula for shoemaker's ink.

(22) K. S. N. L. Co. write: We are experimenting with paints, japans, etc., in our nut locks, to prevent rust, and have been recommended to you for the name of any paint or any combination of chemicals, or receipt, which when applied to iron will prevent or in a large measure do away with rust. A. The following by M. Zein is worthy of trial: Mix 80 parts pounded brick, passed through a silk sieve, with 20 parts litharge; the whole is then rubbed up by the muller with linseed oil, so as to form a thick paint, which may be diluted with spirits of turpentine. Before it is applied the iron should be well cleaned. From an experience of two years upon locks exposed to the air and watered daily with salt water, after being covered with two coats of this mastic, the good effects of it have been thoroughly proved. See also article on "Varnishes for Protecting Iron," SCIENTIFIC AMERICAN SUPPLEMENT, No. 226.

(23) J. N. says: An artesian well, one foot in diameter, throws 25 gallons per minute, and the overflow will all run through an inch pipe. Now, if I drive an inch and a half pipe down to the same depth, close by, can I expect the same overflow, that is, will as much water run over the top of inch and a half pipe as will run over the top of a foot pipe, the other conditions being alike? A. No. The friction in the 1½ inch pipe will slightly retard the flow; otherwise much depends upon the freedom of the opening at the bottom. A 2 inch pipe will be better, and will yield a full flow with a strainer and perforated section at the bottom.

(24) F. G. asks: What are the ingredients of what are called "aniline" colors or "French water colors," "Egyptian colors"—all of the same nature? A. These colors are simply solutions of aniline dyes, many of which can be directly dissolved in water, while others are soluble in alcohol. A little gum water can be added to give consistency if necessary.

(25) R. H. asks the receipt for making the composition called star metal, used for car bearings. A. The composition of the star metal as sold by dealers is only known to those that make it. The following is as near as possible to the composition, and suitable for heavy bearings:

Copper.....	1 part by weight.
Tin.....	10 " " "
Antimony.....	1 " " "

This can be varied to suit almost every requirement by adding tin.

(26) S. & T. say: Having a reservoir full of water and a certain size of pipe out of bottom running down a hill, will more water be discharged 200 feet below than will be at 100 feet, say a 1 inch pipe throughout? The question is whether the additional fall will cause the water to enter the 1 inch any faster in the one case than the other. Should not the inlet be larger? A. If lengths between each station are the same, no more water will be discharged at 200 feet than at 100 feet. Make the upper section larger for more flow at the bottom.

(27) F. C. C. desires us to inform him the best and safest engine for light work, such as to run coffee mill, sewing machine, pump up small amount of water, etc.; something cheap but good and particularly safe, and where to purchase it; something that would be safe in the hands of a lady or young girl. A. There are several forms of gas engine, which, as well as the hot air engine, are safe, and not very expensive.

(28) J. H. writes: I have a lot of cotton stockings which when worn color the feet, the dye coming out; they have been washed and boiled to no effect. Will you please tell me how to fix the color? A. We know of nothing to recommend you. The coming off of the coloring material is an evidence that an inferior quality of dye was used. Colored hosiery should be put into a strong solution of salt and water, and dried in the shade or in a heated room before use. Wash on the wrong side in lukewarm water with pure soap, perfectly free from acid, rinse well in clean cold water, and then dry as previously stated.

(29) T. F. B. asks for some practical work giving instruction in the art of wood engraving for a lad who has an inclination in that direction. A. There are no books of any real value to a beginner in this direction; it requires a pretty long apprenticeship, and is very tedious work, and then success or failure depends largely upon the natural capacity of the individual for this peculiar work.

(30) J. F. K. asks the highest boiler pressure the government allows to be carried. A. This is for the government inspector to decide, according to the build and strength of the boiler, and the use to which it is put. There are no specified limitations.

(31) J. H. P. asks if there is any known method of softening raw ox hide, so that it can be moulded into any shape, and then will recover or assume its original strength, without becoming stiff and brittle like glue. A. There is not, except by tanning, and that gives the substance a decidedly different nature; all ox hides, when dry, are naturally stiff and

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 inform 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.

INDEX OF INVENTIONS

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July 8, 1884,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

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