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 sal ammoniac 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