NEW BOOKS AND PUBLICATIONS.

THE ART OF TEA BLENDING. N. P. Fletcher & Co., Hartford, Conn.

The idea of tea blending arose from the fact that a more pleasing and satisfying beverage, and less costly, could be produced from a variety of teas scientifically mixed than could be obtained from any one tea. The book is intended as a hand book for the tea trade and a guide to tea merchants, brokers, dealers, and consumers in the secret of successful tea mixing.

ILLUSTRATED CATALOGUE. Drawing materials, Surveyors' instruments, etc. Keuffel & Esser, New York.

It is hard to imagine any want of draughtsmen and surveyors, in the way of tools and appliances for their work, for which this catalogue does not give a wide choice from which to supply the deficiency. And it is most beautifully gotten up, too, the engravings being original and made from drawings of the goods offered by the firm.

ARCHITECT'S AND BUILDER'S POCKET COMPANION AND PRICE BOOK. By Frank W. Vodges. Henry Carey Baird & Co., Philadelphia. Price $2.

Perhaps the best recommendation that can be made of this compact and meaty little pocket reference book is to state that seven thousand copies of former editions of it have been sold, thus encouraging the publishers now in its reissue, "enlarged, revised, and corrected." It is a little book which does not argue, but shows results in tables and formulas, rules and suggestions, and is carefully indexed.

THE TINMAN'S MANUAL AND BUILDER'S AND MECHANIC'S HANDBOOK. By I. R. Butts Seventh edition. Cupples, Upham & Company, Boston.

This is a book which has acquired no little popularity, because it gives in a simple manner, a great many valuable and practical directions to journeymen, without any pretense that most of the matter so presented is new or original. Receipts for the use of japanners and varnishers, directions for mechanical drawing, and numerous tables for artificers help to fill up the 200 pages.

PHYSICIAN'S DAILY POCKET RECORD. S. W. Butler, M.D. Published by *Medical and Surgical Reporter*, 115 South Seventh Street, Philadelphia, Pa.

The book is now in its eighteenth year, and is most favorably known among physicians. In addition to the blanks left for records are the metric system, general posological table, doses for hypodermic injection, inhalation, and for suppositories and pessaries, treatment in poisoning, poisonous bites and wounds, asphyxia and drowning, examination of the urine, and new remedies and ~~pharmaceutical~~ novelties. The book is of a convenient pocket size, bound in leather.

PLASTER AND PLASTERING; OR HOW TO MAKE AND USE MORTARS AND CEMENTS. By Fred. T. Hodgson. Industrial Publication Company, New York.

This little book is one of an industrial series issued by the same publishers, and is intended as a practical guide for those who follow the trade, as well as for the information of all having anything to do with the building industry. It mentions the characteristics and differences of the leading kinds of cements, describes the ordinary and some very little known methods of making plasters, gives rules for measuring and estimating on work, and presents several plates with elaborate designs in ornamental stucco work.

PATENT LAWS OF THE UNITED STATES. A Text Book. By Albert H. Walker. L. K. Strouse & Co., New York.

This book is written by a lawyer, for "the bar and the bench." It is a most elaborate and comprehensive exposition, from a professional standpoint, of the state of the law as it stands to-day, based on the Constitution and Statutes of the United States, and as interpreted in some twelve hundred and fifty Federal and State judicial decisions. Every page bristles with references to cases in which the rule of law has been decided or points of equity passed upon. The treatise is intended to "cover the entire field" of patent law practice, from the commencement of the government, and the first statute about patents enacted in 1790, down to September of the present year. In the appendix may be found the successive patent enactments, and various forms of patent pleadings. The book also bears evidence of thorough original investigation, as well as a great deal of hard labor. It cannot fail to be of great value to the old practitioner, and of almost incalculable benefit to the beginner.

DIE VERKEHRS-TELEGRAPHIE DER GEGENWART, MIT BESONDERER BERUCKSICHTIGUNG DER PRAXIS. (Telegraphic Intercourse of the Present.) Von J. Sack. Wien, Pesth, Leipzig: A. Hartleben. 1883. Pp. 303. Price 3 marks = 4 fr. 101 illustrations.

In the present volume, which forms the fifth of Hartleben's electro-technical library, we have a very concise, yet quite complete description of nearly every form of electrical telegraph used for communication between distant places. In the first chapter we have the needle and dial apparatus described; in the second the different registering and printing systems, including the Morse, Hughes, and Phelps; in the third the various relays are described; in the fourth the alarms employed to call the attention of the operator to the fact that a message is about to be sent. In the fifth chapter the automatic systems of Wheatstone, Little, Hefner-Alteneck, and Jaite are described, but the American systems, both the Leggo and Rapid, are omitted. The various duplex, quadruplex, and other multiplex systems are described in the sixth and seventh chapters, while the cable systems occupy the eighth chapter. The book is without index, and in many respects inferior to the other volumes of the series, but is nevertheless the best book for the price on this subject that we have seen. It should be studied in connection with vol. xiv. of the same series on "Telegraphic Conductors."

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest, should remit from $1 to $5, according to the subject, as we cannot be expected to spend time and labor to obtain such information without remuneration.

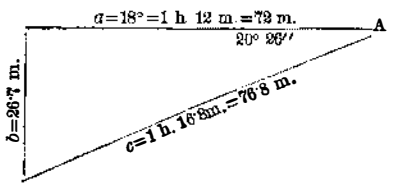
Any numbers of the SCIENTIFIC AMERICAN SUPPLEMENT referred to in these columns may be had at the office. Price 10 cents each.

Correspondents sending samples of minerals, etc., for examination, should be careful to distinctly mark or label their specimens so as to avoid error in their indentification.

(1) G. J. H. writes: I have a machine for placing labels on round cans; could you give me a formula to make an adhesive matter that would pick up the label? I use glucose, but the atmosphere affects it, consequently the machine does not do its work regularly. A. The use of a soluble glue or a mucilage in combination with glycerine suggests itself as being suitable for your purpose. Soluble glue is prepared by dissolving glue in acetic acid, the vessel containing the mixture being kept in hot water until a perfect solution is produced.

(2) O. R. writes: I have a large celluloid mirror which in moving has become scratched and broken. Is there any way in which I can recoat the celluloid to bring it back to its former beauty and whiteness? A. The celluloid is polished in the same manner as ivory and horn. Dress out the scratches and finish up the broken place with pulverized pumice stone and water; then finish with a buff of soft leather and oxide of tin with water, and whiting and water to gloss with a rag.

(3) L. N. writes: Find time twilight begins and ends in latitude 40° 51′ north, when the sun's declination is 20° 25′ north. Zenith distance is 108°, or 18° below horizon. A. The duration of twilight for your latitude with the declination stated is 1 hour 17 minutes, at 18° depression for the ending. Authorities do not agree as to this amount by two or three degrees, nor can it possibly be an exact quantity, from the variations in the conditions of the atmosphere and the personal equation of the eye. Twilight being conceded to begin at sunset, by adding the duration above, the time of ending is obtained. The right angled triangle is formed by subtracting the sun's declination from the latitude when the sun is north, or adding when the sun is south. Using the hour angle equivalent to 18° for the leg a, then leg $b = a$ cot. A, and the $\sqrt{a^2+b^2}=c$, the hour angle required, as here illustrated:



(4) O. A. W. asks: Can I use a rubber tube to convey alcoholic vapors from the alembic to the condensers? A. Yes.

(5) H. D.—The reason why the needle points to the terrestrial pole is still one of the mysteries of the physical nature of magnetism and electricity. The terrestrial magnetic pole, or the strongest one, if there are two, as is claimed, is situated at about 75° north latitude and 85° west from Greenwich at the present time, and is still moving westward, or around a circle about 15° from the north pole. Observations show that the line of no variation has moved westward about 85° in 200 years, which if it continues will complete a rotation in from 800 to 900 years. The cause of the recession of the needle at any given point becomes apparent when you lay out the course of the magnetic pole around the terrestrial pole upon a globe, and view this circle from any place in mid latitude. You will see from the station at Paris that the western variation has now reached its limit and must commence to return. The change is slow at this time and variable from other causes. The azimuth of Polaris will continue to decrease for about 200 years, when its distance will be about half a degree, in conformity with the fact that in consequence of the precession of the equinoxes the north pole is swinging in a great circle among the stars, and will return to its present point in about 26,000 years.

(6) C. H. I., in writing of the bulging of the wall of a building in Boston, says he believes that the bulging of the front was owing to the greater contraction of the mortar in the back courses of brick rather than to the swelling of the thin joints of cement used in the front. Is this so? A. We are of the opinion that the Portland cement had but little to do with the bulging of the wall. It is the experience of New York builders that a close laid facing with Portland or any other cement requires a close, well laid backing. The weight of the whole front compresses the porous mortar backing, and will bulge a front not anchored.

(7) J. H. F. writes: In respect to a dispute about a brake attached to a cylinder on a stop cylinder printing press: Before the brake was attached there was always a slight quiver or shake when the cylinder stopped. But before the quickest feeder could place the sheet against the guides, the cylinder was perfectly still. I claim that attaching the brake does not affect the register, either in colored or book work; am I right? A. The shaking or vibration of the cylinder is generally caused by the back lash of loose gearing or gearing that has been worn. The brake is no doubt an improvement. If the amount of vibration was large, it would certainly affect the register, although you might not notice it; besides, the brake will tend to save wear upon the teeth, which is always greater when there is back lash.

(8) J. H. W. asks how many gallons of water are required for a steam boiler per horse power, say at 60 pounds pressure. A. At the Centennial Exhibition and tests, 30 pounds steam per horse power per hour was taken as standard; this is a little less than half a gallon, but it depends much on the character and condition of the engine through which the steam is worked. The quantity of water may vary from one-third of a gallon to two-thirds of a gallon and even one gallon in a very bad engine.

(9) A. M. L. writes: I use well water in my steam boiler and find it is gradually incrusting it. Croton water would cost three dollars per day or more, and I can pump water much cheaper. On the other hand I lose considerably on coal by incrustation in boiler and in frequent cleaning out. Can this be overcome? If so, what is the best remedy? A. If your water has much lime in its composition, you should blow off for a short time once or twice a day. Your engineer can judge, by observation of the delivery of blow off pipe, when it ceases to blow out lime or other deposit. Try gum gambier; it will tend to keep deposit loose, so that blowing may be effective. Use one pound of the gum, dissolved in water and pumped into boiler, to each ton of coal burned.

(10) H. P. writes: 1. Will one Grenet 12-inch cell (half a gallon) be sufficient to operate a Ruhmkorff induction coil, giving a four-fifths inch spark? A. Yes. 2. Would a smaller Grenet cell answer? A. One somewhat smaller might answer, but the larger one is to be preferred. 3. If the electrodes of such a coil should be placed so far apart that a spark could not pass, would there be any danger of a spark passing inside the coil through the coatings to spoil it? A. In a properly constructed coil there is no danger from internal discharges. 4. Would the coil sustain any other injury in such a case? A. No; but the perforation of the insulating coatings would render the coil useless. 5. Is there any particular make of these coils that is preferable to the others? A. Richie's coils are considered as satisfactory as any.

(11) L. O. B. asks: 1. Will the dynamo machine described in SUPPLEMENT, No. 161, be capable of charging the storage battery illustrated in SCIENTIFIC AMERICAN, No. 26, vol. xliv., sufficient to run one Edison lamp? And if so, for how long? A. The battery may be charged by the dynamo, but it would require considerable time. A battery of several elements would be required to run an Edison lamp. Better make one of the more recent storage batteries and charge it with a larger dynamo. 2. How can I increase the size of drawings to make dynamo of double the power? A. Increase the size fifty per cent, and wind with wire of the same size. It is advisable however to make the larger machine on the more recent plans of Siemens.

(12) R. H. S. asks how many pounds pressure a boiler made like the one illustrated on page 2891, in SUPPLEMENT, No. 182, ought to bear, and how many pounds of steam it will take to run an engine with 2 inches diameter of cylinder and 4 inches stroke. Also what thickness the casing of the above mentioned boiler should be? A. 1. It will be quite safe at 160 pounds pressure. 2. It will depend upon the amount of work you put on the engine. 3. The casing may be of sheet iron, say one-eighth of an inch thick, but it should be lined with fire tile or brick.

(13) B. T. W. asks: What, if anything, will prevent water from freezing, such as is kept for the purpose of extinguishing fires on bridges, boats, buildings, etc.? A. Salt is usually employed as an anti-refrigerant; a saturated solution of salt and water does not begin to freeze until near zero temperature. A partially or half saturated solution with 3 per cent glycerine in covered casks will probably serve your purpose.

(14) J. G. N. asks if the new invention for coating iron and steel with iridescent copper, vol. xlv., No. 5, page 70, July 30, 1881, could be used for brass, copper, or tin? If not, how could such effect be brought forward? A. As to the possibility of applying the mixture to brass, copper, or tin we are unable to say without experimenting. Puscher's solution for coloring metals is described as follows, and is probably quite as desirable as the one referred to: To prepare the solution dissolve 1½ ounces sodium hyposulphite in one pound water and add 1½ ounces lead acetate dissolved in half a pound of water. When this clear solution is heated to 190° to 210° Fah., it decomposes slowly and precipitates lead sulphide in brown flocs. If the metal is now immersed in it, a part of the lead sulphide is deposited thereon, and according to the length of time and consequent thickness of the deposited lead sulphide the various and beautiful luster colors are produced. In five minutes there may be imparted to brass articles a color varying from a beautiful gold to a copper red; then a carmine red; then dark, then light aniline blue, to a blue white like sulphide of lead; and at last a reddish white, according to the length of time they remain in the solution used. The colors possess the most beautiful luster, and if the articles to be colored have been previously thoroughly cleaned by means of acids and alkalies, they adhere so firmly that they may be operated on by the polishing steel. To produce an even coloring, the articles to be colored must be evenly heated. If, instead of lead acetate, an equal weight of sulphuric acid be added to the sodium hyposulphite, and the process carried on as before, the brass is covered with a very beautiful red, which is followed by a green, and changes finally to a splendid brown with green and red iris glitter.

(15) W. T. asks how to render printer's ink (which has been printed and become dry on the paper) again "wet," or as it was immediately after being printed, so that it would take bronze, as in ordinary printing with size and bronze. A. We know of no means by which an ink once printed can be softened again, for it dries by the evaporation of the volatile constituents, which cannot be added to the ink unless the mass be thoroughly mixed. Glycerine if added to an ink in proper proportions, according to the percentages of the other ingredients, will produce an ink which will not readily dry. The best and most satisfactory plan, however, would be to apply to a German maker of inks for an article such as you desire, an ink thinned with a suitable amount of size.

(16) W. W. S. H. writes: 1. Can you tell me how to temper mill picks? A. There is nothing peculiar in hardening mill picks, only that they should be as hard as possible and moderately tough. The greatest care should be taken to avoid burning the steel. Where there is much of this work to be done, the picks can be heated in a pot of cherry red hot lead, then dipped plumb into clear water at about 60°. Do not draw the temper. The hardening by the ordinary smith's fire can be well done if charcoal is used, and not hurried through the fire. Hurry burns the corners. Much also depends upon the shape of the pick, as to whether it is a sectional or leaf pick, or a thick, solid pick, the last being the most difficult to manage, on account of the sharp edge and thick back. They should be laid across the fire, so as to heat the eyeas fast as the edge. 2. How much steam pressure is a boiler of the following dimensions capable of standing: Length of boiler 12 feet; diameter, 44 inches; has 48 lap welded tubes, 3 inches in diameter; has steam dome on top, 18 x 24 inches? The boiler is made out of charcoal iron $\frac{25}{100}$ of an inch thick. Longitudinal seams double riveted, other seams single riveted. Heads are ½ inch thick, well braced. It has been in constant use since June, 1875. It is free from scale, and has been well taken care of? A. We cannot advise as to pressure allowable on your boiler, as we do not know the condition. A new boiler would be allowed 98 lb. to 105 lb. 3. Give rule for finding proper size of steam pipe for steam engine. A. From ¼ to ⅓ the diameter of cylinder, according to the velocity at which engine is run.

(17) T. D. G. asks for the best method of tinning cast iron boxes before running the Babbitt metal in. I have used alcohol and sal ammoniac, and heated the casting until it fused the latter, but cannot get the tin to adhere to the casting. A. Make the inside of the boxes clean, wet the parts to be tinned with muriate of zinc and sal ammoniac, made by dissolving zinc in muriatic acid to saturation. Then add about 10 per cent of crude sal ammoniac pulverized—as soon as dissolved it is ready for use. Then put a piece of block tin in the box and heat until the tin is melted, then rub the tin over the surface with a stick of wood. Throw off the surplus.

(18) J. P. B. asks what are the average wages of a good journeyman machinist, and what are the wages of a good foreman machinist? A. The wages of journeymen machinists vary greatly, as with the experience and reliability that is found in the various grades of workmen. A first class man with a good character, capable of doing all kinds of work, will obtain $2.75 to $4 00 per day. The average mechanic gets from $2.00 to $2.50. Many get but $1.50. It is not easy to make an average that is of any value where the terms are so variable. Foremen get from $3.50 to $7.00 per day. This also is not satisfactory, as the man makes the price. It is impossible to lay down any rules on such matters, as the wages paid depend very greatly upon the expense of living in the locality in which the machinist is sojourning.

(19) J. D. G. asks: Will glass rubbing on a wire cable wear the cable as much as brass? A. Hard Bohemian glass has very little friction and wear when the pressure is light and lubricants are used. The only trouble will arise from heating and cracking. Neither glass nor brass will wear well or save a dry cable from wearing. We should prefer hardened steel or an alloy of 6 ounces tin to 16 ounces copper.

(20) T. V. G. asks: 1. If there is any difference, which would start and draw the heavier load—a locomotive with 7 foot drivers, or one with 3 foot drivers, both to be of same heft, and engine supposed to be strong enough to slip the drivers? A. Theoretically, no difference; but we think practically, 7 foot drivers. 2. Which would draw the more—a locomotive with six drivers or one with four drivers, both to have the same amount of weight upon drivers? A. Practically, a locomotive with six drivers.

(21) A. W. B.—The following is the formula for the mucilage said to be used on the United States postage stamps:

Dextrine	2 ounces.
Acetic acid	1 "
Water	5 "
Alcohol	1 "

Add the alcohol to the other ingredients when the dextrine is completely dissolved.

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November 13, 1883,

AND EACH BEARING THAT DATE.

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