Business and Personal.

The charge for Insertion under this head is One Dollar a line for each insertion; about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in the following week's issue.

For Sale—New and second hand lathes, planers, drills, shapers, engines, and boilers, belting, pulleys, and shafting. List sent free. W. P. Davis, Rochester, N. Y.

Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J.

Barrel, Keg and Hogshead Machinery. See adv., p. 29.

For best hoisting engine. J. S. Mundy, Newark, N. J.

Scoop Board Patent for Sale—No. 425,620, dated April 15, 1890. George & McGinness, Harlan, Iowa.

Best driers for grain, sand, clay, fertilizers, wet feed, green coffee, etc. S. E. Worrell, Hannibal, Mo.

Best Ice and Refrigerating Machines made by David Boyle. Chicago, Ill. 170 machines in satisfactory use.

The Improved Hydraulic Jacks, Punches, and Tube Expanders. R. Dudgeon, 24 Columbia St., New York.

"How to Keep Boilers Clean." Send your address for free 96 p. book. Jas. C. Hotchkiss, 112 Liberty St., N. Y.

Screw machines, milling machines, and drill presses. The Garvin Mach. Co., Laight and Canal Sts., New York.

Iron, Steel, Copper, and Bronze Drop Forgings of every description. Billings & Spencer Co., Hartford, Conn.

Split Pulleys at Low prices, and of same strength and appearance as Whole Pulleys. Yocom & Son's Shafting Works, Drinker St., Philadelphia, Pa.

Wanted—A good mechanical engineer in a large manufacturing establishment. Address, with references, post office box 1582, Philadelphia, Pa.

Guild & Garrison, Brooklyn, N. Y., manufacture steam pumps, vacuum pumps, vacuum apparatus, air pumps, acid blowers, filter press pumps, etc.

The best book for electricians and beginners in electricity is "Experimental Science," by Geo. M. Hopkins. By mail, $4: Munn & Co., publishers, 361 Broadway, N. Y.

☞ Send for new and complete catalogue of Scientific and other Books for sale by Munn & Co., 361 Broadway, New York. Free on application.

Notes & Queries

HINTS TO CORRESPONDENTS.

Names 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 This is for our information and not for publication.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 in this department, each must take his turn.

Special Written Information on matters of personal rather than general interest cannot be expected without remuneration.

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

Books referred to promptly supplied on receipt of price.

Minerals sent for examination should be distinctly marked or labeled.

(3149) G. M. asks: 1. Please define "versed sine." A. The portion of the initial radius of an arc which is intercepted between the sine of the arc and the arc itself. 2. Is the amount of variation of a galvonometer needle from the north due to the intensity or to the quantity of the current? A. Intensity and quantity of a current are synonymous. The deviation of a galvanometer is due to the intensity or quantity of a current.

(3150) J. D. asks: Will you please give receipt that will stick muslin to bunting? A. Boil together 2 parts shellac, 1 part borax, and 16 parts of water. The surface must not be greasy.

(3151) J. M. C. asks: Is not the tide of the ocean to the revolving earth as a pendulum is to a clock or as a governor is to an engine? Again, does it not hold the earth in check? In other words, is it not the regulator of the great timepiece? A. We do not see the analogy of your questions. The earth is not a tidal propelling power, like the clock to the pendulum. Nor do the tides govern the speed of the revolving earth like the governor of an engine. The tidal check is compensatory in equivalent opposite effect, and therefore cannot be a regulator of the great timepiece. They are in a minute measure antagonistic to the earth's regularity of motion.

(3152) Several readers ask: What is the difference between a square foot and a foot square? A. There is no difference in area or quantity of surface, but there may be a great difference in the shape. A foot square must be a rectangular surface having 4 equal sides 1 foot long. A square foot may be a surface 6 inches wide and 2 feet long, or any shape containing a square foot.

(3153) W. L. G. asks: 1. Will you kindly give me a few points in regard to the manufacturing, on a small scale, of nitrous oxide (laughing) gas? A. It is made by heating pure ammonium nitrate in a retort. The gas evolved must be passed through water and collected over warm water. There is no difficulty in making it, provided the original nitrate is pure. 2. Is it true that the nitric oxide is now used as a successful substitute for anæsthetical purposes? A. We never heard of such use, and do not see how it could be successfully carried out.

(3154) C. E. A. S. writes: I see in the daily *Sun* that Professor R. O. Doremus took ink from paper by the use of hypochlorite of sodium and sulphuric acid. Can you tell me the parts, and if it is the best ink eraser and the quickest? A. Such mixture would answer for most inks. Javelle water is also to be recommended. Use a little acid only. Oxalic and tartaric acids mixed and dissolved in water may be used.

(3155) Subscriber asks: How many degrees of heat are required in an ordinary core oven for a foundry? Can a sufficient heat be made with steam pipes at 80 pounds steam pressure? A. 240° Fah. are required for a core oven. You can obtain this with sufficient pipe at pressure stated.

(3156) R. P. writes: I observed a man cleaning a papered ceiling a few days ago. He used apparently a ball of ordinary bread dough, but as the work was being done rapidly and easily, I supposed there was some chemical used in the composition. The paper was brought out as bright as new. Will you kindly inform me through your valuable paper what composition will do this work? A. No chemical is to be advised for cleaning wall paper. Try a ball of bread crumb.

(3157) F. W. M. asks for the best preservative preparation to use on a Spanish cedar skiff to retain its natural grain and color. A. Raw linseed oil, to be followed after drying by a thin flowing coat of spar varnish. Do the varnishing on a hot day.

(3158) E. D. asks: Can carbon, being wholly burnt out of steel, be renewed? If so, how? How do you harden in oil? What allowance is to be made for expansion in tempering? A. When carbon is burned out of steel, it is past recovery for use as a cutting tool, unless it can be recarbonized and very much drawn down to fine the grain, which becomes coarse and crystalline by burning. Harden in oil the same as in water. Change of size by hardening depends entirely upon the shape of the piece as well as the quality of the steel and heat required to harden. Experience with special work is the only guide.

(3159) C. A. C. asks for a receipt for cleaning marble headstones that have been blackened by age and from trees, one that will not leave the stone yellow; also one for granite curbing. A. Cover the soiled part with a paste of quicklime moistened with a strong aqueous solution of sal soda for several hours, then remove the paste, wash the parts thoroughly, and polish if necessary.

(3160) J. S.—If the indelible ink was made from silver nitrate, the stains can be sometimes removed by moistening them with a brush wet with potassium cyanide dissolved in water, then wash the fabric well. Also try a solution in water of bichloride of mercury. Both are very poisonous.

(3161) H. M. R. asks: I would like to know if there is any other way of cutting ice than with an ice plow? If so, what kind, and where? A. Ice-cutting machines consisting of circular saws operated by steam power have been illustrated and described in SCIENTIFIC AMERICAN.

(3162) E. M. C. asks: Can any portion be removed from the center of around bar of metal and leave the bar stronger than it was before the portion was removed? Or can a hollow rod be made stronger than a solid one of the same dimensions and same kind of material? A. No.

(3163) F. C. D. asks: Kindly give me a receipt for flavoring various brands of cigars? A. Use any of the following: Ambergris, benzoin, musk, oil of bergamot, oil of lemon, tonquin beans, vanilla beans, oil of lavender.

(3164) F. W. C. P. asks: Will you please state which side of a belt should run on the pulley, the smooth or rough? A. A belt pulls the best with the smooth or hair side next the pulley. Common practice is the other way.

(3165) F. W. V. says: I have a ranch here, at Colton Station, Nebraska, of 3,000 acres, 2,000 of which I want to water so as to raise hay. I would like to know what would be my cheapest way to raise water 50 feet for this purpose, and what kind of power would be required, and what it would cost. There is water enough to be had. The Large Pole Creek runs through 600 acres, but it does not reach the 2,000. The water lies near the surface. Irrigated land here produces 2 tons to the acre. A. If you can get a water fall, a wheel and pumps will be easiest and cheapest to care for, but would require a large storage reservoir somewhere on the higher part of the ranch, so that a small wheel or power constantly running would do an average work. If water power cannot be had, wind mills or steam pumps would next be in order. Windmills require no fuel and are easy to care for. They can be put in various places and be made to lift by stages from one canal to another and save pipe laying.

NEW BOOKS AND PUBLICATIONS.

HENDRICK'S ARCHITECT'S AND BUILDER'S GUIDE AND CONTRACTOR'S REFERENCE DIRECTORY OF AMERICA, FOR THE YEARS 1891–92. New York: Samuel E. Hendricks & Co. Pp. 490. Price $5.

THE "ELECTRICIAN" ELECTRICAL TRADES DIRECTORY AND HANDBOOK FOR 1891. London: The *Electrician* Printing and Publishing Co. 1891. Pp. 729, cxix. Price $3.

The advertisements of leading electrical businesses make up a large part of this volume, and will be found a not uninteresting part of its contents. An immense number of addresses of electrical lighting and power stations all over the world form one part. Biographical notices of men distinguished in the electrical field with portraits form another portion. The portraits accompanying the biographies are worthy of special notice. This portion of the book alone is of value not easily estimated.

HANDBOOK OF NATURAL PHILOSOPHY. By Dionysius Lardner, D.C.L. Electricity, magnetism, and acoustics. Edited by George Carey Foster. London: Lockwood & Co. 1891. Pp. xix, 442.

A TREATISE ON THE CALKINS STEAM ENGINE INDICATOR. New York: E. & F. N. Spon. 1891. Pp. 114. Price $1.50.

Although this work is to a certain extent a treatise on a special make of indicator, it will be found of value by all engineers. It contains, in addition to a description of the special instrument to which it is dedicated, a large amount of general information and quite an extensive series of tables. A special planimeter is described, to be used for measuring indicator diagrams.

THE CLEANING AND SEWERAGE OF CITIES. By R. Baumeister. Adapted from the German, with permission of the author, by J. M. Goodell. New York: *Engineering News* Publishing Co. 1891. Pp. vii, 281. Price $2.50.

The subject of sewage disposal as treated in this volume is given largely from the European standpoint. It therefore has a special interest to the American engineer as showing how Continental authorities and engineers deal with the vexatious cloacine problem. The subjects of general systems of sewage, its purification, and of general municipal and domestic sanitation, including the earth system, pail disposal, and pneumatic tube removal, are all given place, and street cleaning is also included. The work is well illustrated and may be confidently recommended.

HANDBOOK OF CALCULATIONS FOR ENGINEERS AND FIREMEN. By N. Hawkins, M.E. Theodore Audel & Co. New York. No date. Pp. 330. Price $2.

This work is devoted to arithmetical and algebraical calculations, tables, rules, formulæ, etc., adapted to be of service to the practical engineer and fireman. It is illustrated and represents a very creditable collection of engineering information.

SCIENCE OF EVERYDAY LIFE. By John A. Bower. Cassell & Co. London, New York, etc. 1889. Pp. 128. Price 50 cents.

Matter, weight, the earth's envelope, air, combustion, and other general topics of science are here treated in popular form, with simple illustrative experiments where required. The little book is designed for children to a certain extent, but itl may, we are confident, be advantageously perused by children of a larger growth.

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