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 next issue.

NEW BOOKS AND PUBLICATIONS.

AMERICAN HEALTH PRIMERS. Edited by W. W. Keen, M.D. Sm. 12mo, cloth, 50 cents. Philadelphia: Lindsay & Blakiston.

Promises to be a useful series of simple and sensible volumes on subjects pertaining to sanitary science and the preservation of health, mostly written by well known Philadelphia physicians. Judging from the two volumes already printed—"Hearing, and How to Keep it," by Dr. Ch. H. Burnett, and "Long Life, and How to Reach it," by Dr. J. G. Richardson—the great aim of the series will be not to make every man his own doctor, but to put within the reach of all such practical sanitary knowledge as may prevent in a large degree the necessity of calling in the doctor, and increase the efficiency of his services when unpreventable sickness does come.

OUTLINES OF FIELD GEOLOGY. By Archibald Geikie, LL.D., F.R.S. London: Macmillan & Co. 12mo, cloth, pp. 216. Price $1.

A revised and enlarged edition of Professor Geikie's admirable lectures on the means, methods, and enjoyments of outdoor work in geology. Whether the nature student intends to become a geologist, or only seeks to acquaint himself with so much of the geologist's field work as may increase the intelligent enjoyment of his everyday rambles, this little work cannot fail to be instructive, suggestive, and useful.

THE ELECTRIC LIGHT IN ITS PRACTICAL APPLICATION. By Paget Higgs, LL.D., D. Sc. London and New York: E. & F. N. Spon. 8vo, cloth, pp. 240.

A simple matter of fact review of what has been done in the way of electric lighting, with illustrations of the principal lamps and machines in use or proposed. Considerable attention is given to the question of cost. Those who have followed the recent history of the electric light, in the SCIENTIFIC AMERICAN and SUPPLEMENT, will find little that is novel in the book; still it sums up fairly well the chief results thus far accomplished, and will be useful as a handy book of reference. To such as wish to learn the present condition and immediate prospects of electric lighting, without entering into elaborate or abstruse discussions, the work can be safely commended.

NEW ENCYCLOPEDIA OF CHEMISTRY. Philadelphia: J. B. Lippincott & Co. 40 parts. 50 cents each.

Parts 36 to 40 of the new encyclopedia of chemistry, as applied to the arts and manufactures, cover the important subjects, quinine, silver, soap, soda, steel, sugar, sulphur, tin, wine, water, and zinc. The work now completed forms two handsome volumes, with numerous wood cuts and many full page plate engravings of manufacturing processes. Though based on Dr. Muspratt's well known work, the new encyclopedia is essentially new, and aims to be an improvement on its model.

THE AMERICAN BICYCLE. By Charles E. Pratt, A.M. Boston: Houghton, Osgood & Co.

The author describes his little book as a "manual for the observer, the learner, and the expert" at bicycle riding; an art that promises to become with time and the improvement of our roads a practical and useful art, not a mere pastime, as most people now regard it. The manual is well written, and contains much that bicyclers and those interested in bicycling will find useful and entertaining.

ENCYCLOPEDIA OF THE INDUSTRIAL ARTS, MANUFACTURES, AND COMMERCIAL PRODUCTS. Edited by George G. André. New York: E. & F. N. Spon.

This encyclopedia is intended to give an account of new manufactures and those modifications of older arts due to recent progress in industrial science and invention. Subjects will be treated mainly from the manufacturing and commercial points of view, by manufacturers and producers, or by men familiar with the processes of manufacture and the details of production. Especial attention is to be given to waste products. The work, in super royal 8vo, will be published in about 30 monthly parts of 64 pages each, with numerous illustrations. Parts 1 to 4 discuss acids, alcohol, alcoholic liquors, and alkali. Price 75 cents a part.

THE ETCHER'S GUIDE. By Thomas Bishop. Philadelphia; Janentzky & Co.

The author believes that any one who can make a fair pen and ink or pencil drawing can master the art of etching with little difficulty. He describes the tools and processes of the art with simplicity and directness, with so much of practical instruction and illustration as will enable the beginner to prove what artistic stuff there is in him. Natural capacity and perseverance, of course, must ultimately determine whether pleasure or profit is likely to come from the study.

SOME FACTS ABOUT THE GREAT TIDAL WAVE OF MAY, 1877. By J. P. Josephson. Sydney, N. S. W.: Thomas Richards.

A paper read last winter before the Royal Society of New South Wales, bringing together the more important observations and incidents attending the great tidal wave which swept across the South Pacific, after causing so much destruction along the South American coast, May 9, 1877.

THE NEW CARPENTER'S AND BUILDER'S ASSISTANT AND WOODWORKER'S GUIDE. By Lucius D. Gould. New York: Bicknell & Comstock.

A revised and enlarged edition of Mr. Gould's practical handbook. It is illustrated by twenty-seven plates, contains several useful tables and a full vocabulary of the terms used in carpentry.

AMES' ALPHABETS. By D. T. Ames. New York: Bicknell & Comstock.

Mr. Ames is one of our most accomplished penmen, and all his alphabets show an artistic sense as well as a skillful hand. Several of his designs are novel, and all seem well adapted to the use of architects, engravers, engineers, artists, sign painters, and draughtsmen.

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.

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 this office. Price 10 cents each.

(1) A. J. R. writes: In the South, when pine woods are cut down oaks invariably grow up and take their places, and when oaks are cut down pines alone will grow up. Why is it? A. The pines exhaust the soil of certain elements that are necessary to their growth, while they do not take the elements required by the oaks. Therefore when the ground is cleared and the seeds of the two kinds of trees are sown, the tree that the soil is best adapted to will survive. The case is similar when oaks are cut down.

(2) H. J. W. asks: What kind of lime water is it which is to be used with milk in the treatment of nervous diseases, as noted several issues ago in your paper? A. The lime water is made as follows: Place hydrate of lime in about 100 times its weight of water; in a short time a saturated solution, known as lime water (liquor calcis, B. P. and U. S. P.), results. It contains about 16 grains of hydrate of calcium ($Ca2HO$), equivalent to about 11 or 12 grains of lime (CaO) in one pint.

(3) "Spring" asks: 1. Is there a less expensive method than the steam or caloric engines by which the screw in a boat 18 feet long by 3½ feet wide and 13 inches deep may be propelled? A. No. 2. Have springs of sufficient power to run two or three hours been used, and with what success? A. Not with success; you had better apply the power required to wind up the springs, directly to the propulsion of the boat.

(4) E. B. R. asks whether there are any steam engine governors made that will feel a change of one revolution a minute over the given speed of the engine? If not what is the least number of revolutions of the engine over the regular speed that a good governor will feel? A. Any sensitive governor will feel a change of one revolution, but not so as to affect any change on the engine, as the lost motion and friction of the connections must be overcome. Many, we believe, do affect the engine by a change of 2 or 3 revolutions.

(5) A. P. asks: 1. How many valves does the water pass through from the time it leaves the boiler in the shape of steam until it enters it in the shape of water again? A. Ordinarily 3 steam and 3 water valves. 2. Which travels through more space, the crank or the piston, and why? A. The crank pin; in the proportion of 2 to 3·1416; the piston travels twice the diameter of the circle, while the crank pin travels the circumference. 3. How will I find the dead center of a crank? A. Key up all joints close, place the crank on the center by the eye; then travel the crank so as to move the crosshead, say 1 inch, or any other given distance, on the slides. Note the position of some point on the fly wheel and mark; then turn the crank back till the cross head has reached the same position on the slide and mark on fly wheel. Again reverse the movement of the crank, until it has traveled back one half the distance between the two marks—it is then on the center.

(6) R. K. asks: 1. Has the art of tempering steel practiced in Damascus years ago and supposed to have been lost, been recovered? A. Steel is still worked in Damascus as it was years ago; but the secrets of the art are well kept. It is said that the kind of steel used has more to do with the quality of the work than the process of working. 2. Are there any books relating to experiments connected with it? What books treat of hardening, case hardening, and tempering? A. "The Manufacture of Steel," by Overman.

(7) J. H. A. asks if the strength of ropes an be computed so as to give one a satisfactory result. Nystrom says a rope 2 inches in diameter will break at 20,106 lb.; Haswell, 31,938; Jones & Laughlin, 18,651; Frank Van Ceeve, 25,536; and Haswell says the U.S. Navy test is 14,000 lb. to 1 square inch area, which would give for a 2 inch diameter rope 43,982 lb. The extremes vary 25,331 lb. on a 2 inch diameter rope. A. Much depends upon the quality of the hemp and the mode of manufacture. The best authorities give for strength of 2 inch diameter hemp rope 10 to 12 tons, and working load 30 to 36 cwt.

(8) G. J. asks if a boiler, 54 inches in diameter, with 55 tubes 4 inches diameter outside, head ⅝ inch thick, plates $\frac{5}{16}$ inch thick, is any stronger than a plain cylinder boiler. I have a table for the strength of cylinder boilers, and would like to know if it can be trusted for flue and tubular boilers.

Factor of safety for $\frac{5}{16}$ inch iron.

Ex. A boiler, 54″) 6·250 (115·74
54
85
54
310
270
400
378
220
216
4

The safety valve should not be loaded over 115·74 lb. to the square inch. The figures are one third the bursting pressure. Will that hold good in all cases? A. The rule applies to the cylinder part of all boilers. By the rule of the government inspectors, a cylinder 54 inches in diameter, made of iron $\frac{5}{16}$ inch thick, and having a tensile strength of 55,000 lb. per square inch, would only be allowed a working pressure of 88 lb. per square inch.

(9) C. F. writes: You say the power of the steam engine is calculated by multiplying together the area of the piston in inches, the pressure in pounds per square inch, the length of the stroke in feet, and the number of strokes per minute, and divide by 33,000. Is the following correct, according to the above: Cylinder, 10½ diameter, 2 feet stroke (that is, the cylinder is 2 feet long), 60 pounds of steam, 80 revolutions per minute.

Area of cylinder, 86·5937
60 lb. steam.
5195·6220
2 feet stroke.
10391·2440
80 rev. per minute.
Divided by 33,000)831295200(25·190
66
171
165
62
33
299
297
29

Answer: 25·190 horse power.

A. No; 80 revolutions is 160 strokes. Your result should be doubled.

(10) W. H. S. P. asks for the number of threads on machine taps running from ⅛ of an inch up to 1 inch, varying $\frac{1}{16}$ in size, and from 1 inch up to 3 inches, varying ⅛ in size, that is, standard thread. A.

STANDARD AMERICAN THREADS.

Diameter in in..	¼	$\frac{5}{16}$	⅜	$\frac{7}{16}$	½	$\frac{9}{16}$	⅝	¾	⅞	1
Threads per in..	20	18	16	14	13	12	11	10	9	8
Diameter in in..	1⅛	1¼	1⅜	1½	1⅝	1¾	1⅞	2	2¼	2½
Threads per in..	7	7	6	6	5½	5	5	4½	4½	4
Diameter in in..	2¾	3	3¼	3½	3¾	4	4¼	4½	4¾	5
Threads per in..	4	3½	3½	3¼	3	3	2⅞	2¾	2⅝	2½
Diameter in in..	5¼	5½	5¾	6						
Threads per in..	2½	2⅜	2⅜	2¼						

Angle of threads, 60°; flat surface at the top and bottom—⅛ of the pitch.

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

H. A. W.—Magnetic iron pyrites—pyrrhotite, with quartz. It is not auriferous.

COMMUNICATIONS RECEIVED.

On a Monster Gar Fish. By H. N. G.

On Hydraulic and Fireproof Inside Walls and Ceilings. By J. D.

Where does the Sun get His Power. By P. B.

On Croton Oil for Skin Diseases. By A. K.

[OFFICIAL.]

INDEX OF INVENTIONS

FOR WHICH

Letters Patent of the United States were Granted in the Week Ending

June 24, 1879,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

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Band tightening and tying apparatus, S. H. Gilman	216,844
Beer, fining shaving for, A. Lachenmeyer	216,868
Belt fastener, Budlong & Talcott	216,827
Belting, round, F. H. Underwood *et al*	216,916
Bit stock wrench, Q. S. Backus	216,776
Boiler furnace, W. Scully	216,900
Book, blank, A. J. Maxwell	216,799
Boot and shoe soles, machine for shaping, J. B. Johnson (r)	8,776
Boot and shoe uppers, etc., crimping machine for, Stoddard and Fifield	216,768
Bottle, nursing, S. W. France	216,734
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Box, A. Wuensch	216,927
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Casters, J. H. Schlott, Freeport, Ill.
Cream, manufacture of, W. Cooley, Waterburg, Vt.
Cresylic acid, volatilizing, J. H. Valentine, Providence, R. I.
Elevators, S. A. Bates *et al*, Pittsburg, Pa.
Fence, metallic, apparatus for erecting, Washburn Moen Mfg. Co., Worcester, Mass.
Fire Extinguishing apparatus, H. S. Parmelee, New Haven, Conn.
Fuel, artificial, C. E. Lester, New York city.
Hose coupling, W. J. Stevens *et al*, New York city.
Locks, time, E. Holmes, Brooklyn, N. Y
Marine signal, W. B. Barker, Hoboken, N. J
Paving block, A. H. Elliott. New York city.
Photography, Carvalho & Marks, New York city
Pumps, steam, G. W. Dixon. Spring Lake, Mich
Railway brakes, S. P. Tallman, Dunellen, N. J
Spinning machinery, T. Mayor, Providence, R. I.
Spinning rings, G. D. Edmands, Milford, Mass.
Targets, C. W. Boughton, Titusville, Pa
Telephones, H. M. McIntire, Easton, Pa.