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.

NEW BOOKS, ETC.

NINTH SPECIAL REPORT OF THE COMMISSIONER OF LABOR. The Italians in Chicago. A Social and Economic Study. Prepared under the direction of Carroll D. Wright. Washington. 1897. Pp. 409.

EUCLID: Books I-IV. By Robert Deakin. The University Tutorial Series. London: W. B. Clive. New York: Hinds & Noble. Pp. 309. Price 70 cents.

The object of the extensive series of books, of which this forms one of the volumes under the department of mathematics and mechanics, is to provide candidates for examinations and learners generally with text books which shall convey, in the simplest form, sound instruction, in accordance with the latest results of scholarship and scientific research. The writer of this volume has had more than twenty years' experience in teaching Euclid to large and small classes, and this book presents the results of his endeavors to reduce the labors of teachers and students.

MANUAL OF HYDRAULIC MINING. By T. F. Van Wagenen. New York: D. Van Nostrand Company. Pp. 95. Price $1.

A second edition of this excellent little hand book comes out very appropriately at this time, when, on account of the general interest felt in the Klondike region, so many people are desirous of learning something of practical mining operations. This book necessarily does not claim to cover the whole subject, with all its engineering problems, but is written for the practical working miner, who will here find valuable details and much to aid him in intelligent prospecting, while guiding his judgment in the actual work.

LETTERING FOR DRAFTSMEN, ENGINEERS AND STUDENTS. By Charles W. Reinhardt. New York: D. Van Nostrand Company.

To facilitate attaining excellence in purely freehand lettering is the object of the simple lessons and numerous plates and other illustrations presented in this volume, by a draftsman of high attainments. The author does not present ornate, carefully engraved alphabets, but such as may be readily mastered, enabling the draftsman to do the best class of work in the shortest possible time.

SLIDE VALVES. By C. W. MacCord, Jr., M.E. New York: John Wiley & Sons. Pp. 168. Price $2.

This is a book for practical men, on principles and methods of design, with an explanation of the principles of shaft governors. The book contains 101 illustrations, and its subject matter comprises a revision and rearrangement of articles heretofore presented in a mechanical and engineering serial publication.

CHEMISTRY FOR PHOTOGRAPHERS. By Charles F. Townsend, F.C.S., F.R.P.S. New York: Spon & Chamberlain. Pp. 158. Price 75 cents.

This simple and practical hand book is designed to be of especial value to the beginner and amateur, as well as affording a valuable text book for the experienced photographer. Its explanations of the chemistry of the subject are as simple as it seems possible to make them, and its treatment of developers and various printing processes covers a wide range.

BIBLIOGRAPHY OF X RAY LITERATURE AND RESEARCH. Edited by Charles E. S. Phillips. New York: D Van Nostrand Company. Pp. 68. Price $2.

This book contains a historical retrospect of and a ready reference index to the literature of a subject which has occupied a very prominent place in the public mind for the last eighteen months. The editor also adds a chapter giving practical hints on setting up and operating apparatus for this description of work.

REPERTORIUM DER TECHNISCHEN JOURNAL-LITTERATUR. Herausgegeben im Kaiserlichen Patentamt. Jahrgang 1896. Berlin: Car Heymanns Verlag. 1897. Pp. 563. Price $4.50.

The present bibliography is of great value to all those who are interested in the technical literature of the day. It is interesting to note the number of papers which have been read to obtain the entries. The entries are made in the language in which the articles are published, and an excellent index renders the whole collection of value to the English-speaking reader.

COMMERCIAL DIRECTORY OF THE AMERICAN REPUBLICS. Compiled by the Bureau of American Republics, International Union of American Republics, Joseph P. Smith, Director. In two volumes. Washington. 1897. Pp. 1069.

This volume comprises the addresses of manufacturers, merchants, shippers, banks and bankers engaged in foreign trade, together with the names of official maps, commercial statistics, industrial data and other information concerning the countries of the International Union of American Republics, the American Colonies and Hawaii. This volume treats of the Argentine Republic, Bolivia, Brazil, Chile, Colombia, Costa Rica, Ecuador, Falkland Islands, the greater republic of Central America, Guatemala, Guianas, Haiti, Hawaii, Honduras and British Honduras. This book will prove of value to those interested.

CARPENTRY AND JOINERY. A Text Book for Architects, Engineers, Surveyors and Craftsmen. Fully illustrated and written by Banister F. Fletcher and H. Phillips Fletcher. London. 1898. Pp. 293.

One of the authors of the present book is the author of "A History of Architecture," which will long rank as one of the important works upon the subject. It is chiefly notable for its remarkable analysis of the various styles. In the present book the authors have made a concise treatise both for reference and for the instruction of students on the important subjects of carpentry and joinery. Of course, the practice is English practice, and some of the tools appear queer enough to American eyes. Still, the chapters relating to joints used in carpentry, roofs, scaffolding, floors, framing, etc., certainly are of value to the student. There are 420 illustrations in the book. They serve admirably to elucidate the text.

HIGH MASONRY DAMS. By E. Sherman Gould. New York: D. Van Nostrand Company. 1897. Pp. 88. Price 50 cents.

The present volume replaces the original number 22 of the Van Nostrand Science Series, bearing the same title by John B. McMaster. The splendid treatise of Mr. Wegmann upon the same subject has so completely superseded all other treatment of the mathematical features involved that it would be useless to revive old material. The present work cannot but prove of value to all civil engineers.

A MANUAL OF FISH CULTURE. Based on the Methods of the United States Commission of Fish and Fisheries. With Chapters on the Cultivation of Oysters and Frogs. Washington. 1897. Pp. 340.

This is a very valuable book containing an excellent description of the modern methods of fish culture as carried on by the remarkable bureau known as the United States Commission of Fish and Fisheries. It is illustrated by 35 plates.

Received.

STIRPICULTURE; or, the Improvement of Offspring through Wiser Generation. By M. L. Holbrook, M.D. New York: M. L. Holbrook & Company. Pp. 192. Price $1.

THE KING'S DAUGHTER AND THE KING'S SON. By a King's Daughter. New York: Fowler & Wells Company. Pp. 288. Price $1.

TRUE DETECTIVE STORIES. From the archives of the Pinkertons By Cleveland Moffett. New York: Doubleday & McClure Company. Pp. 250. Price $1.

LEE'S VEST POCKET POINTERS FOR BUSY PEOPLE. A Ready Reference Manual. Chicago: Laird & Lee. Pp. 230. Price, morocco, gilt, 50 cents.

WHIP AND SPUR. By Col. George E. Waring, Jr. New York: Doubleday & McClure Company. Pp. 245. Price $1.

NOT IN IT. By Anna Olcott Commelin. New York: Fowler & Wells Company. Pp. 96. Price 75 cents.

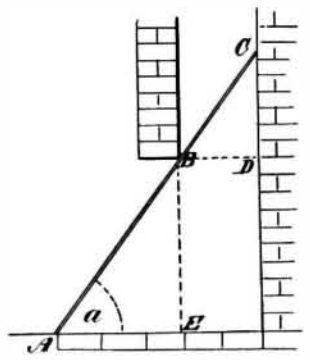
Notes & Queries

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
Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same.
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.

(7292) W. H. asks: 1. What current and E. M. F. are used with the electric needle in removing hairs from the body? A. About 6 cells of carbon zinc battery, bichromate plunge battery, will do it. For battery, see SCIENTIFIC AMERICAN SUPPLEMENT, No. 792, 10 cents. 2. Am I right in supposing one electrode is held to some part of the body and the other placed to base of hair to be removed? A. Yes. 3. What kind of needle is necessary? A. Platinum. 4. Is a direct or alternating current required? A. Direct. 5. What SUPPLEMENT treats on the subject? A. See "Medical and Surgical Electricity," by Beard and Rockwell, page 538, price $5.50 by mail.

(7293) J. S., New City, N. J., writes: 1. Will some of your correspondents of the SCIENTIFIC AMERICAN give the solution of the following problem? What is the longest straight pole that can be run up a chimney, the height of the mantel being 48 inches and the depth from front to back 16 inches? A. Solution by C. W. L. Filkins, C.E., Instructor in Mathematics, Adelphi College, Brooklyn, N. Y.:



Let A C = l; B D = b; B E = mb.

Then by right triangles—

$$BC = \frac{b}{\cos a}; \text{ and } AB = \frac{m\,b}{\sin a}$$

but l = B C + A B.

$$\therefore l = b\left[\frac{m}{\sin a} + \frac{1}{\cos a}\right]$$

For maximum l

$$\frac{d\,l}{d\,a} = 0 = b\left[\frac{-\,m\cos a}{-\sin^2 a} + \frac{\sin a}{\cos^2 a}\right]$$

Whence $m\cos^3 a = \sin^3 a$

and $\tan^3 a = m$

$$\therefore a = \tan^{-1}\sqrt[3]{m}$$

$$\therefore l_{(m\,b\,x)} = b\left[\frac{m}{\sin(\tan^{-1}\sqrt[3]{m})} + \frac{1}{\cos(\tan^{-1}\sqrt[3]{m})}\right]$$

Make m = 3, by condition of problem, and

$$a = \tan^{-1}\sqrt[3]{3} = 55°\ 15'\ 50.6''$$

$$\therefore l_{(m\,b\,x)} = b\left[\frac{3}{\sin 55°\ 15'\ 50.6''} + \frac{1}{\cos 55°\ 15'\ 50.6''}\right] = 5.4056\ b.$$

If b = 16 inches—

$l_{(m\,b\,x)}$ = 86.49 inches
= 7 feet 2½ inches, nearly.

2. Please give the best method for calculating change gears for screw cutting foot lathes, both simple and compound. A. Rule for gearing lathes for screw cutting: Read from the lathe index the number of threads per inch cut by equal gears, and multiply it by any number that will give for a product a gear on the index; put this gear upon the stud, then multiply the number of threads per inch to be cut by the same number, and put the resulting gear upon the screw. For compound gear: If the gear on the compound stud is two to one, then multiply the threads on the leading screw by two and proceed as above. See Kent's "Mechanical Engineer's Pocket Book," $5.00 by mail, which gives tables and rules for other compound gears.

(7294) E. E. D. asks: When was the last total eclipse of the sun? Give the day and the date. (Visible in the United States.) A. The last total eclipse of the sun, visible in the United States, occurred on January 1, 1889. The line of totality ran from California through Nevada, Idaho, Montana, and North Dakota.

(7295) B. asks: Will you kindly give in SCIENTIFIC AMERICAN a description of the process for enlarging pictures, making life size portraits from small photos, tintypes, etc.? A. Valuable information on photo-enlarging and enlarging apparatus is contained in our SUPPLEMENT, Nos. 451, 977, and 1053, price 10 cents each by mail.

(7296) J. G. B. asks: What per cent loss would be advisable to figure on electrical circuits of different voltage, say 2,000, 1,000, 500, 220, 100 volts? What is the customary loss on different voltages? A. The drop in voltage on a line should be very small indeed, only a few volts, not one per cent.

(7297) G. W. asks: 1. How can electric motor described in SUPPLEMENT, No. 641, be wound for a dynamo by using cast fields, so that it could be used to charge a storage battery? A. You do not need to rewind motor of SUPPLEMENT, No. 641, to use it as a dynamo, provided it has a cast iron field magnet. Drive it with power and it will give out current. It is then a dynamo, and will charge three storage cells in series. 2. How many lamps would it run, and what candle power? A. It will light three or four 4 candle power lamps. 3. What kind of armature do you suggest? A. It does not require any change.

(7298) W. M. M. asks: 1. What theoretical per cent advantage is gained by the substitution of say ¾ inch balls for ⅜ inch balls in the ordinary bicycle bearing? A. The only theoretical advantage that can be derived from the larger ball may be found in the greater rolling diameter; but practically, the increased bulk of balls and hub will make any theoretical advantage a negative quantity. 2. Will you give a formula for the determination of the above by which other sizes may be calculated? A. The problem is a practical one, depending entirely upon the admissable size and weight of the hub and its mechanism. There is no formula that will apply to a case having so wide a range of practice in construction as the ball bearing system has developed. 3. Theoretically, is the contact in the two or three point contact ball bearings now in common use a purely rolling contact, or is it a combination of rolling and sliding contacts? A. The two-contact system of ball bearings is essentially a purely rolling contact. The three-point contact system may be a combination of rolling and sliding contact and subject to considerable friction. 4. Theoretically, are both these forms of bearings equally correct and free from friction, and if not, which is the more correct form? A. Both systems are correct in regard to some requirement of design and condition of construction. Theoretically, the two-contact system is the more efficient as regards friction.

(7299) J. A. R. says: Please give in your next issue what you consider the best combined toning and fixing bath formula for solio paper. A. 1. For solio paper use the formula recommended by the makers. The following are formulas for combined baths. The operation of toning and fixing is much simplified by using the combined bath. The print coming out of the printing frame is left in the bath till the color is arrived at, then washed and dried. The bath is composed of two solutions, and will keep for a long time. Dissolve water 24 ounces; hyposulphite of soda, 6 ounces; sulphocyanide of ammonia, 1 ounce; acetate of sodo, 1½ ounce; saturated solution of alum, 2 ounces. Fill the bottle containing the solution with scraps of sensitized paper, bad prints that are not fixed, and leave it for a day. Then filter and add the following solution: Water, 6 ounces; chloride of gold, 15 grains; chloride of ammonium, 30 grains. It is necessary to print deep enough, and to leave the prints in the bath till, in looking through them, the desired color, brown dark or bluish, is observed. Used for Omega and other paper.

2. Chloride of gold	1 gr.
Phosphate of soda	15 "
Sulphocyanide of ammonium	25 "
Hyposulphite of soda	240 "
Water	2 oz.

Dissolve the gold separately in a small quantity of water and add it to the other solution.

3. Water	32 oz.
Hypo	8 "
Chloride of gold	15 "
Nitrate of lead (c. p.)	75 "

(7300) E. F. R. writes: 1. I am building a telephone from the circuit described in "Experimental Science," on page 582 of the edition of 1890, and want to know if an induction coil of 150 ohms will work properly on a short line of about 250 feet with return wire, also, if two batteries will be sufficient to call over the line if it is iron wire or should I use copper wire, and what size? A. The primary of the induction coil has a resistance of about 0·5 ohm; the secondary, about 150 ohms. One cell Leclanche battery will be sufficient at each end of the line. For so short a distance the regular No. 12 A. W. G. galvanized iron wire will answer very well. 2. Will a Hunning type transmitter do? A. Yes.

(7301) J. H. C. asks: 1. How much power can be realized from a waterwheel of five hundred horse power capacity running a dynamo, the dynamo to operate motor three miles away? A. About 375 horse power, if modern machines are used, and line properly constructed. 2. What size wire would it take, and what voltage would be most satisfactory? A. Using the three phase system for transmission, with a loss of 5 per cent in the line, you would require three wires each number 0 0 0 0 B. and S. Particular conditions may change the size of wire a trifle. Generate the current at a potential of 1,000 volts two phase, step up to 3,000 volts by means of transformers and transmit by three phase to save copper. If energy is to be used for both light and power, it can be transformed at the receiving end to 120 volts two phase. This gives you the advantage of the three phase for transmission and that of the two phase for generating and distribution. Alternating.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

DECEMBER 28, 1897,

AND EACH BEARING THAT DATE.

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

Alarm. See Bicycle alarm. Burglar alarm. Low water alarm.	
Alkalies, apparatus for electrolytically producing, J. Hargreaves	596,157
Amalgamator, J. Jean	596,370
Animal trap, W. H. McWhirter	596,334
Annunciator, A. D. Neale	596,426
Armature winding and coil, A. F. Batchelder	596,136
Automatic regulator, H. H. Tracy	596,191
Baby chair, N. P. Lindahl	596,425
Baby jumper and rocking chair, combined, A. M. Babcock	596,451
Badge, bouquet and perfume holder, combined, J. Hansen	596,156
Bag. See Mail bag. Paper bag.	
Balling machine, G. J. Torrance	596,253
Bandage, H. W. Meinhardt	596,171
Barrel, cask, or vessel, metallic, W. Stern	596,188
Bath. See Shower bath.	
Bearing, ball, J. P. Thomas	596,310
Bed, J. Arn	596,340
Bed, J. Kaschenbach	596,166
Bed, spring, F. H. Herterich	596,208
Beer and means for cleaning same, apparatus for dispensing, C. Cronin	596,432
Bell for street cars, electrical signal, Orr & Galvin	596,085
Bevel gage, L. Manning	596,413
Beveling and trimming machine, C. N. Smith	596,429
Beverage and compounding same, Vogel & Hatscher	596,222
Bicycle, L. Kugler	596,072
Bicycle, H. W. Libbey	596,275
Bicycle alarm, F. B. Sanders	596,127
Bicycle coupling, T. H. Sanderson	596,353
Bicycle, electric, H. W. Libbey	596,272 to 596,274
Bicycle gear, J. B. Entz	596,104
Bicycle handle bar clamp, C. E. Seymour	596,341
Bicycle lock, H. W. Cotton	596,396

(Continued on page 30)