in batteries, add to every pint of solution 1 drachm of bisulphate of mercury or a similar amount of nitrate of mercury (mercury dissolved in nitric acid). By employing this method, the amalgamation of the zincs is maintained continuously after the first amalgamation, which must be accomplished by method 1 or 2. 4. In the Bunsen, Grove, or Fuller battery the amalgamation may be accomplished by placing a small quantity of mercury in the cells containing the zincs. 5. Place a little mercury in a saucer with some dilute sulphuric acid. Dip the zincs into dilute acid. Then with a little strip of zinc or galvanized iron touch the mercury under the acid and rub it on the zinc. This will transfer a little to the surface, and a few minutes' rubbing will make the zincs as bright as silver. A very small globule of mercury is enough for a single plate.

(10512) N. P. E. asks for information concerning vellum. A. A fine kind of parchment prepared from the skins of calves, kids, and lambs. The skins are limed, shaved, washed, and stretched in hoops or other frames, where they are scraped and trimmed with the currier's fleshing knife, and next carefully rubbed down with pumice stone; they are lastly polished with finely powdered chalk or fresh slaked lime, and then dried. A green color is given with a solution of crystallized verdigris to which a little cream of tartar and nitric acid have been added, and a blue color with a solution of indigo. The surface is often finished with white of egg, and subsequent friction. The skins of sheep are commonly used for parchment, those of goats and wolves for drum heads.

(10513) C. L. T. asks for a formula for elastic glue. A. Elastic glue which does not spoil is obtained as follows: Good common glue is dissolved in water, on the water bath, and the water evaporated down to a mass of thick consistence, to which a quantity of glycerine equal in weight with the glue is added, after which the heating is continued until all the water has been driven off, when the mass is poured out into the molds or on a marble slab. This mixture answers for stamps, printer's rolls, galvano-plastic copies, etc.

(10514) S. Y. B. asks for a cement for mica. A. A colorless cement for joining sheets of mica is prepared as follows: Clear gelatine is softened by soaking it in a little cold water, and the excess of water is pressed out by gently squeezing it in a cloth. It is then heated over a water bath until it begins to melt, and just enough hot proof spirit (not in excess) stirred in to make it fluid. To each pint of this solution is gradually added, while stirring, 1-4 ounce of gum ammoniac and 1 1-3 ounce of gum mastic previously dissolved in 4 ounces of rectified spirit. It must be warmed to liquefy it for use and kept in stoppered bottles when not required. This cement, when properly prepared, resists cold water.

(10515) B. N. C. asks how to deodorize alcohol. A. Add to the barrel of alcohol a gallon of water saturated with chlorine gas; agitate thoroughly, let rest for twelve hours, then saturate with chalk (which, combining with the chlorine, forms chloride of lime) and distill. Filtering through animal charcoal after precipitating the chlorine with the chalk affords a very fair substitute for the redistilled alcohol. The fusel oil can be separated from alcohol, in small quantity, by adding a few drops of olive oil and thoroughly agitating in a bottle and allowing it to settle, and then decant. The olive oil combines with and retains the fusel oil.

(10516) B. F. K. asks how to do annealing. A. For a small quantity, heat the steel to a cherry red in a charcoal fire, then bury it in sawdust, in an iron box, covering the sawdust with ashes. Let it stay until cold. For a larger quantity, and when it is required to be very soft, pack the steel with cast iron (lathe or planer) chips in an iron box as follows: Having at least half or three-quarters of an inch in depth of chips in the bottom of the box put in a layer of steel, then more chips to fill spaces between the steel and also the half or three-quarters of an inch space between the sides of the box and steel, then more steel; and lastly, at least one inch in depth of chips, well rammed down on top of the steel. Heat the whole to and keep at a red heat for from two to four hours. Do not disturb the box until cold.

(10517) N. D. R. asks: 1. If the length of the wires from the secondary terminals of an induction coil affect the shock to any extent, the size of wire being No. 18 to No. 20 copper wire. A. The length of wire from the secondary of an induction coil will have little effect upon the shock given, since the resistance of these wires will be very small compared with that of the human body. 2. Why is it that Easter comes on a different day every year? Why not permanent? A. Easter is determined by the full moon nearest to the vernal equinox; hence it cannot be fixed for the same date each year. 3. I have heard that the puffing of a locomotive is due to the exhaust steam from the cylinder. If true, what means are employed to effect the same? A. The steam when it escapes from the cylinders is directed into the smokestack of a locomotive in order to increase the draft. It is the sudden ejection of the steam and its condensation which produces the sound called the puffing of a locomotive.

NEW BOOKS, ETC.

Flüssige Kristalle und die Theorien des Lebens. By O. Lehmann. Leipzig: Johann Ambrosius Barth. 55 pages; 16mo.; 30 illustrations; flexible cloth. Price, 50 cents.

Although, in leading up to his subject, the author makes a statement that has more foundation in popular belief than in biological experiment, the actual subject is conclusively and learnedly dealt with. The border between animate and inanimate forms of matter presents a wide and almost unexplored field of research, and work in it should be given every encouragement.

The Design of Steel Mill Buildings. By Milo S. Ketchum, C.E. (University of Colorado). Engineering News Publishing Company, 1906. Pp. 480. Price, $4.

Mr. Ketchum's excellent work hardly needs recommendation after the success which attended the first edition. Few books on this subject are provided with illustrations and algebraic tables which so excellently supplement the text. While the book is concerned chiefly with the construction of mill buildings, nevertheless much of the matter will apply equally well to all classes of steel-frame construction.

The Complete Automobile Instructor. By Benjamin R. Tillson. New York: John Wiley & Sons, 1907. Pp. 213. Price, $1.50.

Mr. Tillson has succeeded most admirably in condensing the practical knowledge necessary for one to operate and care for an automobile successfully. He has divided his book into questions and their answers. These are subdivided and classified according to their respective uses.

Induction Coils. How to Make and Use Them. A Practical Handbook on the Construction and Use of Medical and Spark Coils. By Percival Marshall. Thoroughly revised and enlarged by Kurt Stoze. New York: Spon & Chamberlain. 12mo.; paper cover; 70 pages; illustrated. Price, 25 cents.

A most excellent set of directions for making an induction coil and its accessories. The theory of induction is explained in a lucid, simple manner.

Modern Chemistry. Theoretical and Systematic. By William Ramsay, D.Sc. New York: The Macmillan Company. 24mo.; 9 figures; cloth; 2 parts, 329 pages. Price, 70 cents net.

This book is exactly what one needs to "brush up" on when he feels rusty in his chemistry. It contains both theory and description, each complete in itself, conveniently arranged for reference. An excellent book for advanced schools and colleges.

Photography for Students of Physics and Chemistry. By Louis Derr. New York: The Macmillan Company. 12mo.; cloth; 247 pages, 88 figures. Price, $1.40.

As the title indicates, this little volume goes more into the theoretical aspect of photography than the popular handbooks. It discusses lenses and their defects, diaphragms, color sensitiveness, and methods of color photography, as well as the best ways in which to develop, print, reduce, etc. Although the work is more advanced than the photographer usually considers necessary, it will be found useful by all who wish a good photographic reference book.

English Weights. With their Equivalents in Kilogrammes. By Frederick W. A. Logan. New York: Spon & Chamberlain. Pocket size; 89 pages. Price, 50 cents.

A useful little book for those who are obliged to convert English weights to their metric equivalents. Simply arranged.

Photographic Chemistry. By Paul N. Hasluck. Philadelphia: David McKay. 16mo, cloth; 160 pages, illustrated. Price, 50 cents.

Of the greatest possible service to the photographer, amateur or professional, who is not willing to work by mere "rule of thumb." For the beginner, enough elementary chemical theory is given to make the later development of the subject quite plain. Those familiar with chemistry can save time, if they wish, by skipping this portion of the work, and commencing with the photographical theory proper, which is complete in itself.

Principles and Practice of Agricultural Analysis. A Manual for the Study of Soils, Fertilizers, and Agricultural Products. Second edition, revised and enlarged. Vol. 1. Soils. By Harvey W. Wiley, A.M., Ph.D. Easton, Pa.: The Chemical Publishing Company. 12mo.; cloth; 618 pages, 92 illustrations. Price, $4.

A book which is indispensable to the agricultural chemist, and of the greatest value to the modern farmer. Written as it is by one of Dr. Wiley's experience and standing, it contains such methods only as have been carefully tested and found reliable. The section on nitrifying organisms fills a want in a department in which far too little practical work has been done on this side of the Atlantic.

Among the World's Peacemakers. Edited by Hayne Davis. New York: The Progressive Publishing Company, 1907. 16mo.; pp. 400. Price, cloth, $1.65 mailed; paper, $1.10 mailed.

The Arbitration Peace Congress held in New York, April 14 to 17, makes the appearance of a work of this kind valuable at the present time. The book is the epitome of the interparliamentary union, with sketches of eminent members of this international house of representatives and of progressive people who are promoting the plan for permanent peace which this union of lawmakers has espoused. We have made many provisions for mitigating the horrors of war, and are on the way to its ultimate abolition. It is only by the holding of peace congresses and the dissemination of literature like the present work that we can ever expect to mold public opinion to such a point that this relic of barbarism will be obliterated. The present work is an excellent one, filled with most interesting illustrations. The interparliamentary peace movement began October 31, 1887, when delegates from the British Parliament were presented to the President of the United States. The book is filled with very interesting data, and is one which we can commend to our readers.

Digest of United States Patents of Air, Caloric, Gas, and Oil Engines, and Other Internal Combustion Engines, 1789 to 1906. Five volumes. Drawings two volumes, Claims and Briefs two volumes, Indices and List of References one volume. Price, $50 per set of five volumes.

This work is the only one ever published comprising this class of existing patents, and the material has been prepared with great care and labor. The drawings are clear and distinct, and are as readily understandable as those of the patent copies furnished by the Patent Office. It contains all of the reissues, designs, and trade-marks granted during the above period, accompanied by the claims in full, and a brief description of the invention when necessary properly to interpret the claims. The definitions of the sub-classes are also included.

Especial care has been bestowed upon the arrangement of the patents to simplify and facilitate examinations, and to this end the several thousand patents are chronologically arranged under 208 subdivisions. To enhance the value of the Digest as a work of reference, additional sub-classes have been added.

In the general alphabetical indices a complete list of references cited is given by number, name, and date, as well as the interferences, the parties thereto, and the decisions.

The work will be found exceedingly useful by inventors, manufacturers, and attorneys, and particularly by those to whom the Patent Office is not available.

A Comparative Study of the Mayas and the Lacandones. By Alfred M. Tozzer, Ph.D. Report of the Fellow in American Archæology, 1902-1905. New York: Published for the Archæological Institute of America by the Macmillan Company.

In this treatise Mr. Tozzer gives only a suggestion of the great mass of data that he collected during his five years' stay in Yucatan and Southern Mexico. In an ethnological sense the situation that he studied is of the greatest importance. The two branches of the "Maya-Quiche" stock, the "Mayas" specially so called, and the "Lacandones," were originally the same. Since conquest, however, the "Mayas" have been in intimate contact with the Spanish population, while the "Lacandones" have been free from contamination. Apart from the interest attaching to the life and customs of a pure stock, we have the splendid opportunity of comparing the effect of Christianity and its ideals upon a race, one branch of which has been allowed to develop along its own lines.

Principles and Practice of Plumbing. By J. J. Cosgrove. Pittsburg: Standard Sanitary Manufacturing Company. Cloth; 12mo.; 267 pp.; 169 illustrations. Price, $3.

Covering as it does almost the entire field of plumbing, technical as well as theoretical, it is a work to be highly recommended as a handbook for all who have to deal with the problems of sanitation as they occur in everyday life. Excellent tables, showing the efficiency of commonly-used materials, the solubility of various salts in water, etc., are included in the volume, giving it great practical value for the architect and builder.

A Text Book of Electro-Chemistry. By Max Le Blanc. Translated from the fourth enlarged German edition by Willis R. Whitney and John W. Brown. New York: The Macmillan Company. 12mo.; cloth; 332 pages, 51 illustrations. Price, $2.60 net.

As the title indicates, a translation of the fourth German edition of the treatise by Prof. Le Blanc, with certain additions by the translators. It is composed of several more or less elementary chapters on dissociation and similar subjects, followed by a discussion of conductance, electro-motive force, electrolysis, polarization, etc. The experimental methods used are described as is the apparatus. A uniform system of notation is followed throughout the book. To be recommended as a textbook on the subject.

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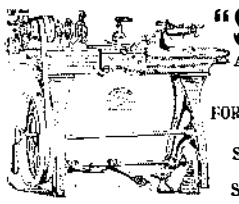

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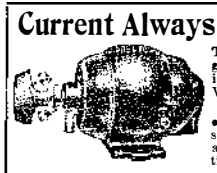

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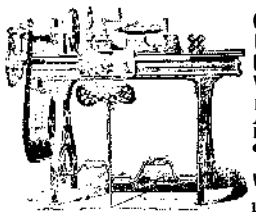

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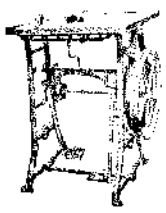

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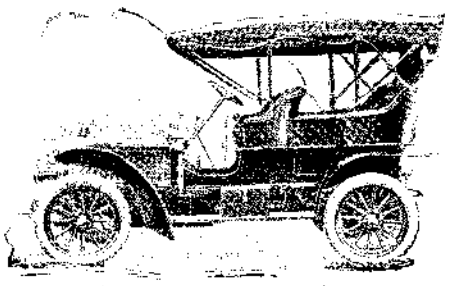

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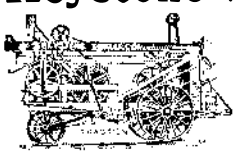

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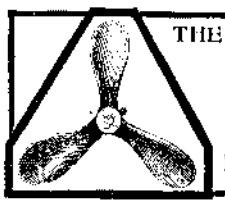

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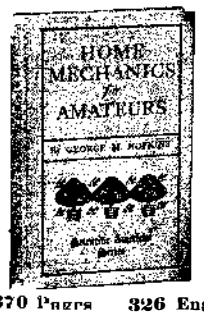

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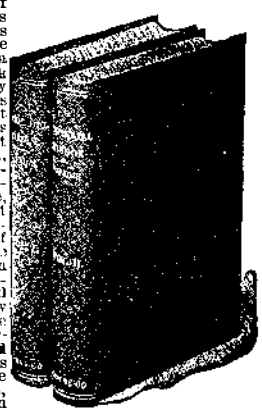

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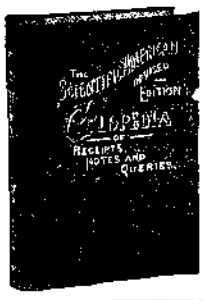

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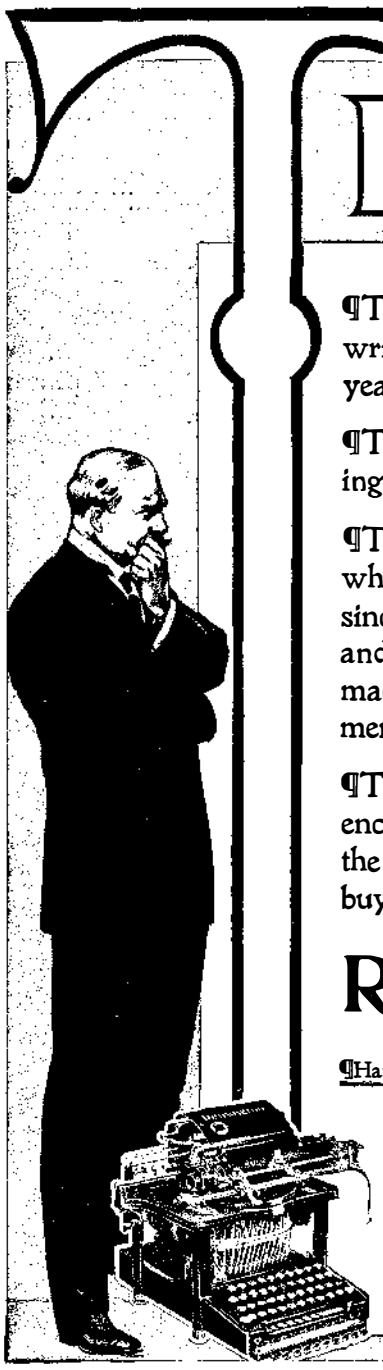

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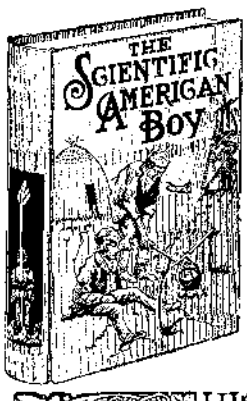

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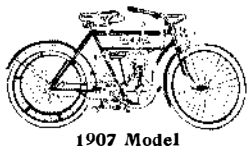

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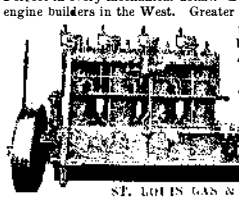

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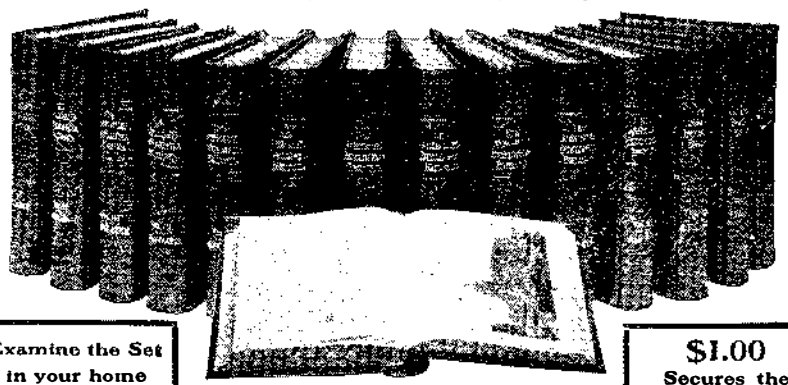

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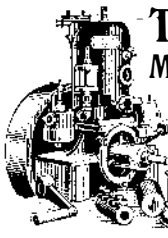

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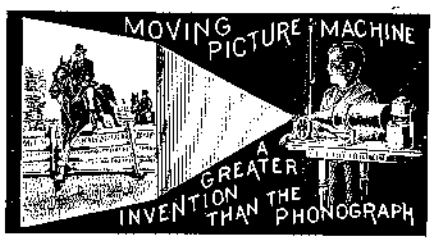

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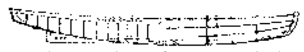

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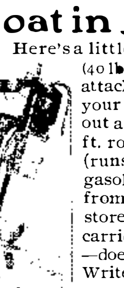

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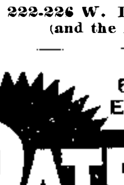

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A printed copy of the specification and drawing of any patent in the foregoing list, or any patent in print issued since 1863, will be furnished from this office for 10 cents, provided the name and number of the patent desired and the date be given. Address Munn & Co., 361 Broadway, New York.

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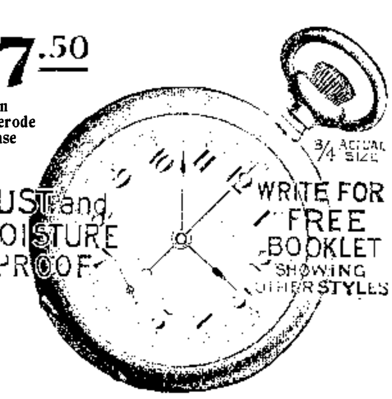

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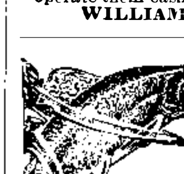

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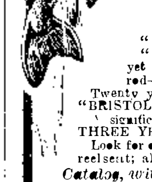

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