The Index of Patented Inventions, Wood-working Registered Trade Marks, Designs, Labels and Prints which usually appears on this page is this week omitted, the United States Patent Office being unable to supply it in time because of new arrangements which it is about to make for the printing of the Official Gazette. The index will be published in next week's issue.

electric motor is not affected by the material of the frame of the carriage to which it is attached. Nor does it make any difference to the motor by what metal it is inclosed. The reason for using ironclad motors on street cars is chiefly to prevent the escape of magnetic lines into the space around the motor No metal but iron can do this, and cast iron is cheaper than wrought iron. 2. Will wrought iron field magnets, instead of cast iron, in SUPPLEMENT 1195, double the efficiency of the motors? If not, what winding will do it? A. Wrought iron will transmit about twice as many lines of force as cast iron; hence a saturated magnet core of wrought iron will give twice the effect of one of cast iron. If pinion wheel is placed on top of gear wheel, is it as efficient as if placed on the side? A. The position of the driving gear does not affect the amount of power it transmits. 4. If not too small, how should motors in Supplement 1195 be wound so as to act as dynamos also? A. The winding of a motor does not need to be changed to make it generate as a dynamo. 5. Is there any special danger on an electric automobile, whether still or moving, in a thunder-storm? A. An electric automobile is not exposed to any more danger in a thunder-storm than any other. We do not recall ever hearing of any person being struck by lightning upon a railway train. 6. In the inclosed sketch, if U is a one-horse-power motor, with 3-inch pinion meshing into 30-inch gearwheel, connected to 18-inch rod, JH, and this joined to 6-foot lever HF, working on fulcrum G, five feet from power end, what horsepower will be obtained at A on the bent axle, DCABE, which is connected to lever, HF, by 18-inch rod, AF? A. With the arrangement you describe you will have at the end of the train of wheels and levers one horsepower less whatever has been lost in friction at the several bearings. No one can calculate this. It must be found by experiment, and will depend upon the condition of the machine. A horse-power is 33,000 foot-pounds of work done in a minute. It is not affected by the speed of motion nor by the weight lifted. If the speed is great a less weight will be lifted by a horse-power; and if the weight is great, the less will be the speed. Your arrangement reduces speed and increases pressure, or weight lifted, but the amount of power remains the same. The 30-inch gear moves one-tenth as fast as the gear which drives it, and the end, F, of the lever moves one-fifth as fast as the end, H. Hence F moves one-fiftieth as fast as the small gear on the motor.

(10059) J. F. C. asks: What is the fraction of power lost in the current produced by a generator which runs a motor, the connecting wires being not longer than 10 yards? That is, what is the relative power of motor and generator? Both are the same size. What size of a booster would be required to have both equal? A. A motor only thirty feet from the dynamo which furnishes the current for running it has little or no drop of potential from that of the dynamo, and needs no booster. The only loss is due to the heating of the coils

(10060) F. S. L. writes: I would like to know how to make a sparker or a spark coil, and in what way it differs from an induction coil. I want to make a spark coil to use to ignite an acetylene gas jet. A. Spark coils are made about ten inches long. The center is a core of iron wire as in an induction coil. It may be % inch in diameter. Insulate the core by wrapping it with paper which may be soaked in paraffine. Fit heads upon the ends of the core to hold the winding and wind four to six layers of about No. 12 B. & S. double cotton-covered wire upon the core. Insulate the layers with paper. This coil is put in series with a battery, and upon breaking the circuit a spark is produced at the break which lights the gas. There is no secondary coil.

In this is the difference between a spark and How To Increase an induction coil

#### NEW BOOKS, ETC.

PRACTICAL PAINTERS' WORK. Edited by Hasluck. Philadelphia: Paul N. Hasluck. Philadelphia: David McKay, 1906. 8vo.; pp. 160. Price, \$1.

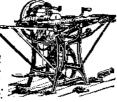
The reader will find that this book contains a fairly comprehensive digest of information which will be of considerable value to the painter and the workman in allied arts. s based upon a series of contributions by experienced craftsmen to the various publica-tions and supplies many valuable hints on the general principles and processes of the art of which it treats.

MODERN POLYPHASE MACHINERY. By Andrew Stewart, A.M.I.E.E. London: S. Rentell & Co., Ltd., 1906. 12mo.; pp. 296. Price, \$2.

The use of the alternating current is daily becoming a factor of greater importance in the general subject of electricity. Mr. Stew-

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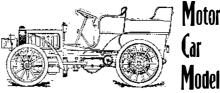
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GLASS WRITING, EMBOSSING AND FASCIA WORK. Edited by Paul N. Hasluck. Philadelphia: David McKay, 1906. 32mo.; pp. 160. Price, 50 cents.

The information detailed in this handy little volume is edited by a writer who has contributed largely to the literature of practical handicrafts and it is in the convenient form of a comprehensive series of short articles. It will be found of value for the artisan engaged in work of this character, as well as for the practical man in general,

Notes on Electrochemistry. By F. G. Wiechmann, Ph.D. New York: McGraw Publishing Company, 1906. 12mo.; pp. 145. Price, \$2.

The latest contribution to the literature of electrical chemistry—to-day a subject which is rapidly coming to occupy a place as one of the most important practical arts-is this book by Dr. Wiechmann. While the compass of the work is limited, it gives an excellent general summary of the present state of the art. The subject is treated in a practical manner without the elaboration of abstruse theories. Unfortunately no descriptions of the actual apparatus used are given, the author contenting himself with elaboration of the principles underlying the process.

ELECTRIC WIRING, DIAGRAMS, AND SWITCH-BOARDS. By Newton Harrison, E.E. New York: The Norman W. Henley Publishing Company, 12mo.; pp. 272. Price, \$1.50. 1906.

This excellent little book was written especially for the electrical artisan, the object being to give a practical treatise on electric wiring, the construction of switchboards, and other related subjects. Not only is the subject of building wiring discussed, but brief explanations of the principles of transmission and the types of electrical machinery employed are added to the text. The discussions are usually concise, though, unfortunately, the text contains a number of mistakes which it is hoped a second edition will correct.

PRACTICAL PATTERN MAKING. By F. W. Barrows. New York: Norman W. Henley Publishing Company, 1906. 12mo.; pp. 326. Price, \$2.

The author is thoroughly conversant with his subject. While the literature of pattern making is voluminous, still there always seems to be ample room for an acceptable work. The work describes in lucid language the principles which underlie pattern making, as well as the more practical side. It is very well illustrated.

Bossism and Monopoly. By Thomas Carl Spelling. New York: D. Apple-ton & Co., 1906. 16mo.; pp. 358. Price, \$1.50.

The author states that: "The purpose of this book is not to humiliate Americans by pointing out their lack of public spirit and need for a moral awakening in all that pertains to government, but is rather to state boldly and without an attempt at concealment true conditions as the author sees them. It is better to know the worst and to apply the remedy than to go straight to destruction under a delusion." The author's Preface is dated November, 1905. Since that date there has been much "muckraking," productive of great good. The work is a valuable one dealing with important economic questions.

TRANSMISSION OF HEAT THROUGH COLD STORAGE INSTITUTION. By Charles F. Paulding, M.E. New York: D. Van Nostrand Company, 1905. 18mo.; pp. 41. Price, \$1.

A special book on a special subject. The literature of ice making and refrigeration is quite extensive already, but there always SAVINC! seems to be a field for a book which deals with one corner of a large industry. The re-frigerating engineer will find this book invaluable.

> PRACTICAL HANDRAILING. Edited by Paul N. Hasluck. Philadelphia: David Mc-Kay, 1905. 18mo.; pp. 160. Price, **\$1.**

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PHYSICAL OPTICS. By Robert W. Wood. New York: The Macmillan Company, 1905. 8vo.; pp. 546. Price, \$3.50.

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Practical Brickwork. Edited by Paul N. Hasluck. Philadelphia: David McKay, 1906. 18mo.; pp. 160. Price,

English practice is described. The book can be read with profit by all those who are engaged in or are interested in masonry. The work is well illustrated.

REFERENCE BOOK FOR STATICAL CALCULA-TIONS. By Francis Ruff. New York: Spon & Chamberlain, 1905. 16mo.; pp. 136.

This work gives force diagrams for frameworks, instructions for statical calculations, etc., for all classes of engineering work. With its aid practical men can carry out any desired statical calculation with ease and rapidity. It is filled with illustrations and

NEW METHODS OF TESTING EXPLOSIVES. By C. E. Bichel. Translated and Edited by Axel Larsen, M.I.M.E. London: Charles Griffin & Co., Ltd., Philadel-phia, 1905. 8vo.; pp. 62. Price, \$2. The literature on the subject is limited, owing to the fact that until fifteen years ago black powder and dynamite were almost the only explosives used in practical mining. New explosives require new research to test their

engineer. PERIMENTAL RESEARCHES ON THE CON-STITUTION OF HYDRAULIC MORTARS. By Henri le Chatelier. Translated by J. L. Mack. New York: McGraw Publishing Company, 1905. 16mo.; pp. 132. Price, \$7.

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New York: Spon & Chamberlain, 1905. 18mo.; pp. 159. Price, \$1.

Of books on manual training there are no end, but there always seems to be a field for another work. The author has succeeded in illustrating his book with a number of very helpful photographs, showing the proper po-sition of the hands. Manual training has certain elements in common, whether the instruction is given in England or the United States. Therefore, the book is not rendered useless by the difference in practice. The exercises are carefully chosen and are well illustrated.

MANNHEIM AND MULTIPLEX SLIDE RULES. By L. W. Rosenthal, E.E., A.A.I.E. E. Chicago: Eugene Dietzgen Company, 1905. 18mo.; pp. 59.

Slide rules are coming more and more into use among draftsmen, and the pamphlet before us describes two excellent slide rules.

INJECTORS: THEIR THEORY, CONSTRUCTION, AND WORKING. By W. W. F. Pullen. New York: D. Van Nostrand Company, 1906. 12mo.; pp. 208. Price,

The third edition of this excellent book needs little recommendation, as it has been before the engineering public for over a dozen The injector is described and illustrated in practice and theory, and its possible advantages and failings are discussed clearly and concisely. The author develops theoretical calculations on the subject of water injection to a limited extent, but not to such a degree that the book will prove of no value to the non-technical man.

MECHANICS FOR ENGINEERS. By Arthur Morley. New York: Longmans, Green & Co., 1905. 12mo.; pp. 282. Price, \$1.20.

Engineering students require a thorough knowledge of the principles of mechanics in a far more general manner than the students of the usual scientific courses. The present volume has been written for the use of engineering students, and with this object in view the gravitational system of units has been adopted in English measures. Graphical vector methods for the solution of problems have been inserted in certain of the chapters, and while such exercises often take up more time than the easy arithmetical ones, their solution will undoubtedly be found excellent practice though the author advises that the student should not try to avoid it.

Water Softening and Treatment. By William H. Booth. New York: D. Van Nostrand Company, 1906. 8vo.; pp. 308. Price, \$2.50.

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Kurzes Repetitorium der Organischen CHEMIE. Von Dr. Kurt Dammann. Freiburg im Breisgau: Herdersche Verlagshandlung, 1906. 14mo.; pp. 256. Price, \$1.25.

Dr. Dammann's excellent work is in nowise intended for a textbook, but is designed to be used in connection with the regular course of instruction in organic chemistry. The work is exceedingly thorough, and includes the very latest phases of the science on which it treats. It will be found of great value in instances where time is lacking for extended investigations of standard text or reference books, and the student will find it splendid for purposes of review. The arrangement into divisions and subdivisions with a great number of formulas is good.

SCIENCE AND THE MANUFACTURER. Keith Quinton. London: Guilbert Pitman, 1906. 14mo.; pp. 86. Price, 80 cents.

The close relation and intimate association of science and industry to-day is so universally admitted, that the statement of the fact needs little proof. In "Science and the Manufacturer' is given an interesting account in a brief manner of how science is necessary in certain industries, and in fact, how to-day it is indispensable for the proper development of manufacturing or other work. The book is interestingly illustrated from photographs, and while rather limited in scope, will undoubtedly be found interesting by the reader.

OCEAN AND INLAND TRANSPORTATION. By Emory R. Johnson, Ph.D. New York: D. Appleton & Co., 1906. 12mo.; pp. 395. Price, \$1.50.

The reader will find this discussion an interesting treatise on the economics of transportation by water and an excellent complement to "American Railway Transportation," by the same author. The book is based largely on information secured from government and other official sources, as well as from private individuals in commercial and transportation enterprises. As the volume of water transportation is greatly in excess of the inland water commerce, about four-fifths of the book is taken up with a discussion of the former. The historic development of the various lines of transportation and communication, as well as the growth of the commerce between the various countries, is interestingly discussed.

Engineering Mathematics Simply Ex-PLAINED. By H. H. Harrison. London: Percival Marshall & Co., 1906. 12mo.; pp. 165. Price, 75 cents.

This book is designed for the use of the young engineer apprentice who is beginning the study of mathematics, or for the artisan whose knowledge of the subject is limited. It is intended to take the place of the orthodox textbooks, which are usually crammed with academic exercises which are difficult of comprehension, and merely tend to give the student a certain amount of dexterity in the manipula-tion of symbols, while a clear comprehension of the principles is seldom imparted thereby. The instruction given by the author in this book has at least one excellent quality—it accustoms the student to think for himself.

TURNING FOR BEGINNERS. By J. Lukin. B.A. London: Guilbert Pitman, 1906. 16mo.; pp. 128. Price, 60 cents.

During the author's long life he has given to the world a number of books on amateur mechanics. This book will undoubtedly prove of interest to any amateur, although the practice and designs are English.

AN INTRODUCTION TO THE STUDY OF COLOR PHENOMENA. By Joseph W. Lovibond. New York: Spon & Chamberlain, 1905. 8vo.; pp. 48. Price, \$2.

The theory is illustrated by a series of geometrical figures, bringing the salient points into one harmonious whole, and has been awarded the silver medal by the International Jury of Awards of the St. Louis Exposition. The new system of color nomenclature need not, of course, displace any arbitrary or popular color terms, but may be used to define the limits within which such terms may be permissible. Our color nomenclature certainly needs reformation.

THE BATTLES OF LABOR. By Carroll D. Wright, Ph.D., LL.D. Philadelphia: George W. Jacobs & Co., 1906. 12mo.; pp. 220.

This very interesting volume is based upon four lectures, each of which is well worth reading. The last of the four, however is of special value, as therein the author expounds special value, as therein the author of his personal views and opinions based on long

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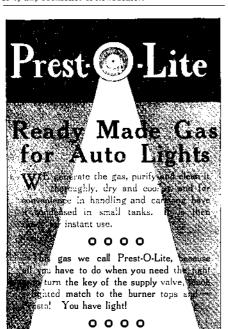
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METALLURGICAL CALCULATIONS. By Joseph W. Richards, A.C., Ph.D. Part I. New York: McGraw Publishing Com-pany, 1906. 8vo.; pp. 208. Price, \$2.

Prof. Richards' book forms one of the most important steps in the application of science to metallurgy. It is a reprint of the serial running in "Electrochemical and Metallurgical Industries," which, however, has been largely elaborated and brought up to date. A serial which is now appearing will be published as Part II. and a later serial as Part III., thus completing the work. The treatment of the subject is logical and clear, though, unfortunately, the book is lacking in reference to other literature on the subject.

STEAM TURBINE ENGINEERING. By T. Stevens and H. M. Hobart. New York: The Macmillan Company, 1906. 8vo.; pp. 814; 516 illustrations. Price, \$6.50.

Messrs, Stevens and Hobart's book is un doubtedly the outcome of a vast amount of patient and extensive research and investiga-It contains a remarkable collection of data with reference to steam turbines gathered from all sources in Europe and America. A large part of this information, in addition to being tabulated, has been plotted in curves. Besides the extraordinarily complete collection of statistics given, the authors have also provided many illustrations showing the destructive characteristics of the different leading types of turbines. The whole is elaborated by clearly-written and comprehensive text.

A SCHEME FOR THE PROMOTION OF SCIEN-TIFIC RESEARCH. By Walter B. Priest. London: Stevens & Sons, Ltd., 1905.

8vo.; pp. 62. It is the object of the author to submit for consideration proposed legislative provisions, incorporating means whereby incentives means to scientific research may be made operative by the agency of law in those directions wherein the prosecution of such research may lead to results of general utility. The plan is quite an elaborate one.

MODERN LOCOMOTIVE ENGINEERING WITH QUESTIONS AND ANSWERS. By Calvin F. Swingle, M.E. Chicago: Frederick J. Drake & Co., 1905. 16mo.; pp. 630. Price, \$3.

This handsomely gotten-up pocket-book is a plain, practical treatise on the construction, care, and management of modern locomotives, Boiler construction as applied to locomotives is dealt with in detail. All the leading types of valves and valve gear are fully described. Valve setting is illustrated in all its details, An entire chapter is devoted to the study of the indicator and its application to the locomotive. Compound locomotives receive special attention. Locomotive equipments, including electric headlights and mechanical stokers, are not forgotten. Particular attention is given to the important subject of breakdowns and what to do in case of emergency. The air brake is fully described. The book is admirably illustrated, and is a distinct contribution to the

chell. London: The Trade Papers Publishing Company, Ltd., 1905. 12mo.; pp. 175.

While there is a number of works in which the subject of gilding, bronzing, and lacquering is treated, there has up to the present time been no convenient and concise book treating this branch of the decorative art exclusively. The book here discussed is largely based on writings in various publications, and is excellently edited by an expert on the subject, Frederick Scott-Mitchell, who has been associated with the painting and decorating trades for over a quarter of a century.

THE PHANTOM OF THE POLES. By William Reed. New York: Walter S. Rockey Company, 1906. 12mo.; pp. 283. Price, \$1.50.

NAVAL POCKETBOOK. Founded by Sir W. Laird Clowes. Edited by Geoffrey S. Laird Clowes. London: W. Thacker MARTINKA & CO., Mfrs., 493 Sixth Ave., New York. & Co., 1907. Pocket edition. Pp. 965. Price, \$3.

LES TREMBLEMENTS DE TERRE. Leur Origine Electrique Possible. Les Tremblements de Terre au Pérou. Par Emile Guarini. Paris: H. Dunod et E. Pinat, 1906. Pp. 26. Price, 50 cents.

POOR'S RAILROAD MANUAL APPENDIX AND DIARY. Special Edition, 1906. 12mo.; pp. 284.

THE INFINITY OF THE STARRY UNIVERSE.

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By John Lowry Adams. Sydney:
Turner & Henderson, 1906. 8vo.;
pp. 39, 4 plates, 2 diagrams.

THE MILKY WAY. The Solution of the
Problem of the Milky Way, Showing
it to be a Special Shadow Effect. By John Lowry Adams. Sydney: Turner & Henderson, 1906. 8vo.; pp. 44, 12 figures.



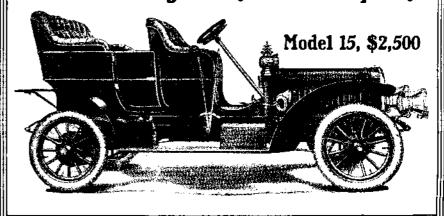
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