

TIFIC AMERICAN of March 10, 1900, immediately began, and we were unable to check it until today, when we happened to think of using muriatic acid. We immediately applied a dilute solution of the acid to the tray, using a cloth to take off the black coating. After rinsing we applied a solution of soda and other tests without any action of the mercury. We would, therefore, advise our brother photographers to never use an aluminium tray for intensification, but if they have already spoiled a tray by it to try the acid, which we think would prove effective in every instance. A. We suppose it is not possible that every one who has to do with chemicals should first study their chemical actions sufficiently to avoid the mistake of our correspondent of putting a chemical into his tray which would dissolve it. He knows the fact regarding aluminium now and is not likely to repeat the experiment. Experience is a good schoolmaster, though her instruction comes high, it has been said.

(10019) F. L. asks: 1. What causes the humming in electric street railway motors? They are noiseless when new, but after about six months or a year, they begin to hum. A. If this statement is true, we are not able to give a reason for it. There is no electrical cause which after this or any other period will develop a humming noise, nor any mechanical cause for such a universal effect. We suggest a broader investigation to see if all motors hum at the end of six months. 2. In cast-welding rail joints do they allow for any expansion or contraction? If so, how? A. No. If the joint is made stronger than the force of contraction, the rail will not break. If the rail is held down more rigidly than the force of expansion, it cannot break away from its fastenings. Hence, it will stay in its place both in winter and in summer. This is the theory. 3. Is there any direct incorporation of the metal in the rail and in the cast? I have heard some claim there is not, while others claim that the rail is fused at one or two points, generally about the size of a half dollar, where there is a direct union of the two metals. A. There is firm adhesion. We do not know whether there is incorporation or not of the two metals. 4. We have made a box-kite, with 2 cells, 16 inches long, and 15 inches square, with about 10 inches clear between them. When we try to set it up it will dive down, after going up about 25 or 30 feet, sometimes hitting the ground and breaking some of the sticks. A. We advise you to apply to the Weather Bureau at Washington, D. C., for the plans and construction of a box-kite.

(10020) J. B. P. asks: 1. Will you please advise me of some compound, or chemical, that will clean scales from a boiler, while boiler is in use, without any risk of burning the boiler, by water foaming? A. For keeping a boiler clear of incrustation there is nothing so easily managed as caustic soda or potash lye. Dissolve about a quarter pound of the soda or lye for each horse-power of the boiler in a barrel or tub of water and connect it with the suction of the feed water pump. Use the boiler for a day with the soda in. Then blow out from the boiler after the fires are drawn or banked or when the engine stops, to the level of the lower gage cock or bottom of water gage and pump up with fresh water to high water mark. Use the boiler next day as usual and at night after fires are drawn and walls cooled below the temperature of injury to the boiler, blow out all the water and clean out the boiler. This may be repeated according to the condition of the boiler, once or twice a month. See Davis' book on "Boiler Incrustation," \$1.50 by mail. 2. Can I charge a set of storage cells by connecting them in series, in main circuit, batteries having the same capacity, in amperes and voltage, as the circuit, and will the batteries cause the lamps to burn dim? Would an ammeter connected in the circuit answer to tell when the batteries were charged? A. Connect the cells in series and to the line through the ammeter and a rheostat by which the amount of current can be adjusted. A good charging rate is 2½ amperes per square foot of positive plates, reckoning both surfaces. The final voltage should be 2½ volts per cell. This you must determine by a voltmeter in shunt with the cells. Stop the charging when this is reached. As you must put the cells in shunt with the lamps on the circuit, the charging of the cells cannot affect the light if the dynamo has capacity enough to charge the cells and light the lamps at the same time. A good book for one having charge of a storage battery is Treadwell's, price \$1.75 by mail.

(10021) E. L. C. writes: Kindly inform me how to copper-plate—a good heavy plate. I wish to plate some steel and iron wire, 2 feet long and about 12 gage. I would also like to plate some wood a good heavy copper plate. I have tried a receipt from some book, but with little or no success, as the plate will not stay on the iron or steel when I rub or try to polish it, and some will not take at all. A. Your trouble probably is not due to the defects of the description in the book which you have followed, but to your own inexperience. The only way to become an electroplater is to learn the trade from some one who understands it practically. No description can prevent you from making mistakes, or tell you how to recognize the proper working of the process and the proper condition of the bath and the article to be plated. Had yours been all right, the coating would have formed prop-

erly and adhered. Such points must be learned by actual experience in actual work. We are not electroplaters and cannot teach electroplating. We recommend Watt's book, price \$1.

(10022) G. A. H. asks: Can you give a description of a sketching camera that reflects direct from the photograph and not from a transparency or negative, and how to arrange the reflectors and lens in a lantern to do the same? A. We think you will find what you want in a "sketching camera" in Hopkins' "Experimental Science," price \$5.00, by mail. He there describes a camera for projecting opaque objects, so as to project them upon a screen, as slides are projected by an ordinary lantern. If you place the screen where you wish the picture to fall as you sketch it, you will have a sketching camera for the direct use of a photograph, or any opaque object.

(10023) W. S. D. writes: I wish to make a storage battery large enough to light two 16-C. P. incandescent lights for a few months, several hours a day. I would kindly ask you to please give me your opinion as to which book to get for the construction of such a battery, and if you could give me some information, I would be very thankful to you. A. We can supply you with the following books on the storage battery: Salomon's "Accumulators," price \$1.50; Treadwell's "Storage Battery," price \$1.75. Prices are by mail. We do not, however, advise amateurs to attempt the construction of a storage battery for real work. It is well enough to make a few cells for experimental purposes. Amateurs cannot expect to make cells which will have much endurance or efficiency, as compared with the cells made in a properly equipped factory, and by experienced workmen. In your case you wish to light 16-candle-power lamps. These are rarely made for less than 50 volts. You will then need twenty-five cells with five or seven plates each. The cost will be very much greater than for the same amount of light obtained in some other way. The labor of making so large a number of cells is a great deal. You need as many cells as if you had a greater number of lamps. If you really must have electric lights from a storage battery, we would say buy the battery.

(10024) L. H. R. asks: 1. Does a static electric machine depend for its volume of electricity on the superficial size of plate or velocity, and will a sufficient series of plates at a greater speed give off very much electricity at a high speed on one large disk, at 200 or 300 revolutions? Please answer an old reader in query column next issue, to satisfy a difference of opinion. A. The discharge of a static machine depends upon several conditions, size of plate, swiftness of rotation, dryness of plates, absence of dust, etc. The spark cannot much exceed the radius of the plates in length, since it will find the distance less between the combs if the balls are separated more than half the diameter of the plates, and will pass between the combs, taking the axle of the machine on its way across. This is the reason for using as large plates as convenient. Glass is the best substance for the plates. Since there is a limit to the safe speed for glass, hard rubber is now used a great deal. This can be run at any speed desired, and a very strong spark can be produced. It is better to use several smaller plates than one large one, because of compactness and neatness of appearance. A well-made machine with two 18-inch plates of hard rubber, driven by a quarter horse-power motor, gives a steady stream of sparks at 1,800 revolutions per minute. It may also be driven by hand, though no one can maintain that speed very long. 2. Are mica plates superior to glass? A. Mica differs very little from glass in its inductive capacity, and would serve equally well for the plates of a static machine, if pieces of sufficient size could be had at a moderate cost.

(10025) F. A. V. asks: Please inform me how a small dry battery for a pocket search-light may be recharged from a 110-volt direct-current circuit. The batteries become exhausted very quickly, and it is rather expensive to be continually buying new ones, while I have the 110-volt circuit to draw from, where the minimum amount of current charged for is not being consumed. A. A small pocket dry battery is not worth recharging. They are thrown away when exhausted. To reduce a 110-volt current to 4 or 5 volts for this purpose would be very wasteful. A pocket search-light is a luxury which those who carry must be willing to pay for. The battery is never durable, and soon gives out whether used or not. It is usually overrated. 2. What resistance in the way of 16-candle-power lamps should be used in a 110-volt direct-current circuit to enable it to be used for electroplating? What should the voltage and amperage be? A. The voltage for electroplating varies with the metal to be deposited. It is from 0.5 volt to 7 volts. The amperes depend upon the area of surface to be plated. The data are to be found in such books as Langbein's, which we send for \$4, and Watt's, which we send for \$4.50. 3. I have an ammeter whose limit is 20 amperes. How many lamps in series or parallel should be connected in the 110-volt circuit to obtain a reading on the ammeter? What is the resistance of a 16-candle-power lamp? A. If your ammeter does not register till 20 amperes are flowing, you will require forty lamps to make it indicate any current. The resistance of an incandescent lamp when hot is about 220 ohms.

(10026) G. W. asks: 1. What length of spark must my induction coil produce to make an X-ray apparatus for examining objects such as a leg or arm? A. A coil giving an 8-inch spark will answer for the thinner parts of the body, but for every kind of service one giving a 14-inch spark should be had. 2. What kind of tube would be the most suited for this work? A. There are many makers of tubes, whose advertisements are frequently to be found in our columns. A higher vacuum is required for use with a coil than for use with a static machine. All good tubes are now made with adjustable vacuum. 3. Can you give me directions for making a fluoroscope? A. You had better buy your fluoroscope.

(10027) J. E. P. asks: 1. How to remove the elements from a Hercules battery cell after the salts have crystallized, forming a solid mass of zinc, carbon, and jar. I have about a dozen cells in this condition, and it is impossible to get the elements out of the jars. A. We would suggest that you soak your cells in water, thus dissolving the crystals which have formed. This will be a slow operation. It will hasten matters to dig out all the crystals which can be got at with any sharp-pointed tool. Sulphuric acid will dissolve the substance more rapidly, but it will also consume the zinc, which you are probably desirous of saving. In this case prevention is better than cure. 2. Can satisfactory results be got from compressed air in an ordinary steam cylinder, and how high a pressure is necessary per rated horse-power of engine to get best results? The best steam engine is also the best for compressed air. Only a very little higher pressure or longer cut-off is needed to give the same results for air as with steam for power.

(10028) J. L. C. asks: 1. Can you give details of construction of an acetylene search light that will project a narrow beam of light? A. An acetylene search light presents no peculiar conditions. Place the light in the focus of the reflector. Have the reflector adjustable so that it can be brought nearer or slid farther from the burner. You can adjust for best projection of the beam as may be required. 2. How would be the best way to reinforce the above light to increase the size of the burner, or to add individual burners? A. You cannot obtain all sizes of burner for acetylene. To increase the illumination you must add to the number of burners. They are usually placed tandem, and not abreast, when used for projection.

(10029) C. H. H. asks: 1. What kind of flux would you use for soldering platinum to copper, or a cement such as is used in incandescent lamps? A. Copper and platinum may be soldered together by the use of any ordinary flux and soldering tool. In making incandescent lamps, they are melted together by a blowpipe; that is, welded together. Carbons are attached to the platinum wires in a lamp by means of a cement whose composition we do not know. 2. What is the white powder used inside of cartridge fuses, and where can same be purchased? A. Any inert powder, not combustible, can be used in inclosed fuses. We have not analyzed this powder in any fuse, and cannot tell what is used. 3. How would you calculate the amount of resistance to use on arc lamps for theatrical lighting purposes? A. Dimmers for theaters are probably designed by trial and experience. Make a variable resistance and cut in enough to reduce the lights to the lowest point desired, unless you would prefer to purchase a dimmer from the companies who already have the data for them in their possession. We should do this if we needed a dimmer. 4. Can an ordinary force pump be used for compressing air up to say 40 pounds per square inch? A. A force pump can compress air till the pressure equals the power of the pump to hold it, and then the pump will leak or burst. If the pump is strong enough, it will hold 40 pounds.

(10030) C. B. H. asks: Is it possible for the human eye to possess any of the features of a camera? I have noticed peculiarities about my own eyes being able to see objects a second time, after looking away from the object looked at, especially if in the shadow. The force of this lasts several seconds, being of greater strength with certain colors, etc. Will you have the kindness to answer this query, without reciting it in the columns of your paper? A. It is not a peculiar experience that you can still see an object before the eye after you have gazed intently at it for a brief time. Everybody can do the same. If you look at a colored object, say a bright blue, the object seen afterward will be a yellow. We call these objects seen after the object has disappeared, after-images, and the color presented by one of these is the complementary of the color presented by the object itself. Such an after-image will drift before the eye in a very curious fashion along a dimly-lighted wall, larger than the object if the wall be farther away from the eye than the object was, and smaller if the wall be nearer. This proves that the image is in the eye and is simply projected against the wall in the line of sight. You will find these matters discussed in books of physics under the name Accidental or After-Images. As you send no post-office address, but only your name, we can only reach you by publication of the information in our columns. We think too that the matter is of general interest, so as to justify its publication. Quacks often

prey upon the fears of the nervous by means of these after-images.

(10031) C. L. K. asks: Will you please advise me through your query column how to get the various broken parts of the mercury column in a thermometer together after they have been separated in shipping? A. To reunite the parts of a broken mercury column in a thermometer, first try jarring it by taking it in the hand and striking the arm suddenly downward as if to give a blow with a hammer, being careful that there is nothing in the way of the arm which the thermometer can hit. If this does not accomplish the object, tie a sufficiently strong cord to the thermometer, and whirl it rapidly around the head. In this way centrifugal force and momentum may bring the mercury together. As a last resort cool the bulb in a freezing mixture, and contract the mercury till it is all in the bulb at the bottom of the tube. When the instrument warms again, the thread of mercury will be continuous. The break in the column of mercury is caused by minute air bubbles in the mercury and on the glass. These are pushed down by the mercury as it contracts into the bulb, and so the column becomes continuous when the mercury expands from the bulb again. If there is a small cistern at the top of the tube, the mercury can be heated till the broken portions are driven up into this cistern, thus accomplishing the same object as if the bulb is cooled.

#### NEW BOOKS, ETC.

FINANCIAL RED BOOK OF AMERICA. 1905 Edition. New York: Orlando C. Lewis & Co., 1905. 4to.; pp. 496. Price, \$10.

This work is a list of the wealthy people of the United States, containing about 18,000 names of individuals and estates of wealth, giving office and residence addresses, business connections, and other details arranged alphabetically by States, subdivided by cities and towns. Those who wish to reach by correspondence or otherwise a wealthy class of people will do well to purchase a copy of this book. We have recently used this work successfully, and the percentage of unclaimed letters was so small that its accuracy seems assured. The book is edited by Charles D. Burbank.

THE PRINCIPLES AND PRACTICE OF IRON AND STEEL MANUFACTURE. By Walter Macfarlane, F.I.C. New York: Longmans, Green & Co., 1906. 12mo.; pp. 266. Price, \$1.20.

The author treats his subject on original lines; for instance, the usual sequence is reversed, and the finished products are discussed first, while the treatment of the iron ore is developed toward the end of the book. The work is illustrated both by engravings and diagrams, and many of the twenty-three brief chapters will be found of value, including those on "Iron and Steel Castings," "Malleable Castings," and the "Testing of Materials." Valuable hints for the manufacturer are given in the appendix, such as the Analyses of Finishing Materials and Softeners, Typical Analysis of Pig Iron, etc.

THE APPLICATION OF GRAPHIC AND OTHER METHODS TO THE DESIGN OF STRUCTURES. By William W. F. Pullen. Manchester: The Technical Publishing Company, Ltd., 1905. 12mo.; pp. 341. Price, \$2.

This book has been used by many engineers since the appearance of the first edition, and it has been found useful in many cases where the graphical methods are the only instruments needed by which particular numerical results are easily obtained. In the second edition the author has rewritten the chapter on "Struts," and has dealt with the question at greater length than in the earlier book. An appendix contains useful notes for the further elucidation of points in the original text.

GARBAGE CREMATORIES IN AMERICA. By William Mayo Venable, M.S. New York: John Wiley & Sons, 1906. 8vo.; pp. 200; 45 figures. Price, \$2.

The municipal authorities of the United States are beginning to realize, though unfortunately at a late date, that the disposal of garbage and other municipal wastes is a question of the utmost importance, and, if properly executed, the handling of the wastes may be turned to pecuniary account for the benefit of the city. Mr. Venable's book is a review of the work that has already been done in the field of crematory construction, and it is based upon the actual inspection and the investigation of installations already in operation, and the analyses of the features of design, as set forth in patented inventions. The text includes many fully-illustrated examples of crematories in use throughout the country.

THE MORTON MEMORIAL VOLUME. A History of the Stevens Institute of Technology. With Biographies of the Trustees, Faculty, and Alumni and a Record of the Stevens Family of Engineers. Edited by Prof. F. De R. Furman. Hoboken: Stevens Institute of Technology. Half morocco; quarto, 663 pages, illustrated. Price, \$10.

This book was originally planned as a souvenir of the twenty-fifth anniversary of the Stevens Institute of Technology. The late President Henry Morton of the Institute de-

voted much of his time to the collection of data and the preparation of illustrations for it at no little expense, and after his death the executive committee of the Alumni Association fittingly decided to make the volume a memorial to this eminent thinker and investigator, at the same time commemorating the period during which he was president of the college. The splendidly illustrated and printed book is a unique contribution to the history of engineering and engineering education in this country. The original plan of the work was somewhat changed when it was placed in the hands of Prof. Furman, its editor, and the section relating to the history of the Institute was considerably enlarged, while that dealing with the anniversary celebration itself was materially curtailed. To the engineer in general and to the student of science that part of the volume concerning the engineering work of the Stevens family, and of Col. John Stevens in particular, will prove of great interest. The limitations of this notice prohibit even a summary of the remarkable achievements of these pioneers in engineering, but it will surely be proper to say that no up-to-date engineering library is complete without an account of some of the work done by these investigators. The third section of the work is an admirable series of biographies of the trustees, faculty, and alumni, with complete lists of the writings of many of these, including the late Dr. Morton, and Profs. Mayer, Thurston, Wood, Leeds, Denton, Jacobus, and Pond.

**MODERN STEAM ROAD WAGONS.** By William Norris, A.M.I.C.E., M.I.Mech.E. New York: Longmans, Green & Co., 1906. 8vo.; pp. 172. Price, \$3.

In this book will be found illustrated descriptions of many of the best-known makes of vehicles of the class discussed. Practically-written chapters on "Roads and Power Required," "Boilers," "Wheels," "Brakes," and "Steering" are given. The subject of boilers is treated in a practical manner, and the discussion is based on the author's personal experience. Many of the best-known kinds of wheels are illustrated, described, and criticised. The remarks on lubrication and the advice as to the choice of oils will be found of use by employers of steam wagons.

**ADVANCED ALGEBRA.** By Arthur Schultze, Ph.D. New York: The Macmillan Company, 1906. 8vo.; pp. 557. Price, \$1.25.

This book is planned in accordance with the theory that a number of topics taught in the customary systems of advanced algebra may be omitted without injuring the courses. Some of these topics may be studied to advantage after the student is familiar with calculus. Consequently, the author has omitted a number of topics, for instance, multiple roots, Sturm's theorem, etc. In addition, numerous graphical methods have been included which are not found in the usual textbook, such as the graphical method for solving cubics. The examples given for solution by the student are excellent.

**THE PRINCIPLES OF ELECTRIC WAVE TELEGRAPHY.** By J. A. Fleming, M.A., D.Sc., F.R.S. New York: Longmans, Green & Co., 1906. 8vo.; 670 pp.; illustrated. Price, \$6.60.

Since Marconi's first practical demonstrations of the possibility of wireless telegraphy, the literature of the subject has become fairly extensive, and includes a number of valuable writings. The present volume, by Dr. Fleming, undoubtedly one of the foremost of the English experts on electric wave telegraphy, is one of the latest and one of the best of these contributions. The volume is based largely on courses of Cantor Lectures delivered before the Society of Arts in London from 1900 to 1905. The author attempts to gather together the most important information resulting from the enormous research work carried out in the last ten years on the subject of Hertzian waves in their application to telegraphy; and while there is great difficulty in properly appraising the value of the numberless new schemes and appliances constantly being developed, nevertheless the fundamental principles are fairly well fixed, and the work will be found of assistance as a textbook, for it presents in compact form useful information, data, and formulae.

**EXPERIMENTAL ELECTROCHEMISTRY.** By N. Monroe Hopkins, Ph.D. New York: D. Van Nostrand Company, 1905. Pp. 284. Price, \$3.

The readers of the SCIENTIFIC AMERICAN SUPPLEMENT will be familiar with many of the points discussed in this excellent book, for the volume appeared almost entirely in that publication, a fact which the author fails to mention. The author begins with a brief historical review of the subject, and the student will find it of advantage to carry out some of the classical experiments described in the introduction. Extremely interesting is the author's strong presentation of the theory of electrolytic dissociation, which he supplements with numerous experiments to prove its truth. It is not possible here to describe the many different branches of the subject which the author treats at greater or less length; but the chapter on Electrolytical Induction is of particular value, as well as that on Electrolytical Conduction. The analytical discussion is very short, and will be useful more as a suggestion as to what can be done than as a guide for analytical purposes, for this is hardly a proper subdivision of the

science. The book is well printed and splendidly illustrated with engravings which fully supplement the text, and it will be found of great interest to all those interested in electrochemistry.

**THE DISPOSAL OF MUNICIPAL REFUSE.** By H. de B. Parsons. New York: John Wiley & Sons, 1906. 8vo.; pp. 186; 73 figures. Price, \$2.

The discussion of this excellent work by a practical consulting engineer is based upon the author's observations and records while in the employ of New York city, for the purpose of designing a plant intended for the disposal of municipal refuse. The information, which was collected at considerable trouble and at the expense of much time, is presented in a clear and concise form, and will be found of value to those undertaking to improve municipal conditions in this respect. The work is not a treatise on the designing of details for the final disposition of city refuse, but rather a compendium of the characteristics of the materials collected, the use to which they can be put, and the principles underlying their sanitary and economic handling.

**AN INTRODUCTION TO ASTRONOMY.** By Forest Ray Moulton, Ph.D. New York: The Macmillan Company, 1906. 12mo.; pp. 557. Price, \$1.25.

Prof. Moulton presents a clearly-written and precise account of the present state of the science of astronomy. The work will be easily comprehended by the student or the amateur in the study of astronomy, as neither mathematical nor extensive scientific training is necessary to understand the principles and explanations set forth. The text is supplemented with a large number of excellent illustrations, which tend to make the subject discussed of great interest in a popular manner. In addition the author provides numerous suggestions and exercises for practical observations both with and without the telescope. In general, the book gives the reader a well-balanced and thorough general conception of the astronomy of to-day.

**AN ELEMENTARY TREATISE ON PHOTOGRAPHIC METHODS AND INSTRUMENTS.** By J. A. Flemer. New York: John Wiley & Sons, 1906. 8vo.; pp. 438. Price, \$5.

This book has been written primarily with a view toward overcoming some of the existing prejudices against photographic surveying, and it does much to demonstrate that this branch of the science may rightly be assigned to a legitimate place in the curriculum of every modern photographer, filling as it does a particular gap in the general series of photographic methods heretofore recognized. Photographic methods are discussed for geological surveys, meteorological observations, hydrographic surveys, military surveys, etc. The book indicates in a general way how photography may be applied to topography by describing the simple processes and methods, particularly those of a graphic character, that will suffice to direct beginners in their practical application, leaving it to experience and subsequent special study to determine the measure of success.

**MOTOR VEHICLES FOR BUSINESS PURPOSES.** By A. J. Wallis-Taylor. New York: D. Van Nostrand Company, 1906. 12mo.; pp. 298. Price, \$3.50.

It is hardly necessary to detail the advantages which the self-propelled vehicle for commercial purposes possesses over the methods of transporting heavy loads by means of horses. Not only is the subject already of vast importance to the manufacturer and the merchant, but its importance is constantly growing. The present book contains much valuable information to assist the purchaser or user of the motor vehicle to ascertain the respective merits of the various systems and their adaptability to special requirements. While a few of the various types of motors have been given extended description, the general survey of the subject is sufficient to supply the reader with a working knowledge of the systems involved.

**HANDBOOK OF METALLURGY.** Vol. I, Copper, Lead, Silver, Gold. By Dr. Carl Schnabel. Translated by Henry Louis, M.A. New York: The Macmillan Company, 1906. 12mo.; pp. 1,123. Price, \$6.50.

While there are numbers of textbooks and treatises upon various subdivisions of metallurgy, it is a curious fact that there does not exist in the English language a single complete discussion of this tremendously important subject. This recent and most exhaustive work on the subject in any language is from the pen of one of the best-known metallurgical authorities of the world, and his many years' practical experience as a teacher and as an investigator in his own country and abroad, have given him especially favorable opportunities of studying metallurgical methods in general use in nearly all the countries of Europe and America. This is the second edition of the book, and it is as nearly up to date as it has been possible to make it.

**IN THE HEART OF THE CANADIAN ROCKIES.** By James Outram. New York: The Macmillan Company, 1906. 8vo.; pp. 466. Price, \$2.50.

If we imagine the glorious scenery of Switzerland magnified many times in its extent, divested of the unpleasant features which the tourist hordes bring with them, and sur-

rounded by and constituting a wilderness absolutely primeval, we see before us a picture of the Canadian Rockies. Mr. Outram has presented us with a splendid account of the beauties of this region. The illustrations, many of which are from photographs taken by the author, are beautiful. The lover of the mountains will find in this beautiful volume a story of travel and mountaineering that will make his heart ache for the freedom of pines and the snowclad peaks above them. The book is based upon series of articles which have appeared in various periodical publications.

**ELEMENTARY ELECTRICAL ENGINEERING IN THEORY AND PRACTICE.** By J. H. Alexander, M.B., A.I.E.E. New York: D. Van Nostrand Company, 1906. 8vo.; pp. 208. Price, \$2.

This excellent little book gives the theory and practice of elementary electrical engineering, not only for junior and senior students, but for working electricians as well. It is based upon lectures delivered before evening classes of young artisans and, as will be understood, is consequently well adapted for the instruction of students possessing no extended previous knowledge of technical subjects. The illustrations, which include many diagrams, are very good.

**THE LAW OF HEAVY AND LIGHT MECHANICAL TRACTION ON HIGHWAYS IN THE UNITED KINGDOM.** By C. A. Montague Barlow, LL.D., M.A., and Joynson Hicks, New York: Sir Isaac Pitman & Sons, Ltd., 1906. 12mo.; pp. 302. Price, \$3.50.

With the growing use of mechanical means of transportation, and especially with the tremendous development of the motor vehicle, the legal problems involved are becoming more complicated every day. This book discusses at length, and with many cited decisions, the laws and acts governing the subject in England, Scotland, and Ireland, and is brought up to date by giving the motor car acts in force and discussing them in a general manner. Besides this, it contains in an appendix all the Local Government Board's orders extant.

**A COMPENDIUM OF SPHERICAL ASTRONOMY.** By Simon Newcomb. New York: The Macmillan Company, 1906. 8vo.; pp. 444. Price, \$3.

The present volume is the first of a projected series having the double purpose of developing the elements of practical and theoretical astronomy for the special student of the subject, and of serving as a handbook for convenient reference for the use of the working astronomer in applying methods and formulae. Prof. Newcomb's extended experience as a teacher at the Johns Hopkins University and as an independent investigator pre-eminently fit him for such an undertaking. His world-wide reputation as an astronomer gives all the recommendation necessary for his book.

**DIRECTORY OF THE ENGINEERS' CLUB OF PHILADELPHIA.** 1906. Corrected to April 7 inclusive. Pp. 123.

**LUMINOUS BODIES HERE AND HEREAFTER.** (The Shining Ones.) Being an Attempt to Explain the Interrelation of the Intellectual, Celestial, and Terrestrial Kingdoms, and of Man to His Maker. By Charles Hallock, M.A. New York: The Metaphysical Publishing Company, 1906. 12mo.; pp. 110.

**MOTEURS A COLLECTEUR A COURANTS ALTERNATIFS.** Par Dr. F. Niethammer. Paris: Edité par "L'Eclairage Electrique," 1906. 8vo.; pp. 129.

**THE IRON AGE DIRECTORY.** A Classified Index of Goods Manufactured by Advertisers in the Iron Age. Tenth Annual Edition. New York: David Williams Company, 1906. Pp. 317. Price, 25 cents.

**TABLES FOR THE USE OF BLACKSMITHS AND FORGERS.** By John Watson. New York: Longmans, Green & Co., 1906. 32mo.; pp. 88. Price, 90 cents.

**THE ESTIMATORS' PRICE BOOK AND POCKET COMPANION.** A Guide to Prices of all Kinds of Building Materials. With Handy Rules, Tables, and Information for the Estimator. By I. P. Hicks. New York: David Williams Company, 1906. 32mo.; pp. 172. Price, \$1.

**A NEW THEORY OF THE UNIVERSE.** By the Rev. J. Cosand. Printed for the author by the Methodist Publishing House, Tokyo, Japan, 1906. 32mo.; 65 pp. Price, 25 cents.

**INDEX OF INVENTIONS**  
For which Letters Patent of the United States were Issued for the Week Ending June 12, 1906.  
AND EACH BEARING THAT DATE  
[See note at end of list about copies of these patents.]

Animal trap, M. Kreff... 823,126  
Armature coils, frame for winding, De Planque & Biggerstaff... 823,265  
Automobile headlight control, J. S. Detrick... 823,163  
Awning side attachment, W. Armstrong... 823,496  
Badge and watch guard, Martin & Stockton... 822,969  
Baking pan for pastry crusts, M. C. Hadlock... 823,216  
Baling press, G. B. Ammons... 823,151  
Baling press self-feeder, C. E. Bower... 823,815  
Band cutter and feeder, H. W. Smith... 822,998  
Barber's pole, W. T. Cobb... 822,923  
Bearing roller, W. H. Russell... 823,083  
Bed bottom, spring, J. G. Smith... 822,999  
Bed bottom, spring, G. A. Mellon... 823,427  
Bed, folding, W. C. James... 823,045  
Bed, folding, J. F. Wilmet... 823,456  
Bed, infant's, Gamber & Heer... 823,271  
Bedstead, H. F. Babcock... 823,152  
Belt shifter, B. McDonald... 823,352  
Bending machine, Clemenstern & Kuehne... 823,394  
Bell and gong, C. H. H. Tatum... 823,473  
Bicycle aerial, F. G. Banfill... 823,005  
Bicycle attachment, L. De Rame... 823,161  
Binder, loose leaf, W. J. Schultze... 823,192  
Bit. See Bridge bit.  
Block, A. B. Tarbox... 823,231  
Boiler, C. Vanderbilt... 823,486  
Book back, solid, A. C. Hafely... 823,168  
Bottle closure, L. Lawton... 822,960  
Bottle closure, H. S. Brewington... 823,026  
Bottle closure, G. Kirkgaard... 823,125  
Bottle coupon, I. H. Vendig... 823,008  
Bottle fastener, P. M. Peterson... 823,437  
Bottle holder, C. Stevens... 823,304  
Bottle, non-refillable, G. D. Grey... 823,116  
Bottles, device for securing corks in, F. W. Schroeder... 823,370  
Bottles, jars, and similar vessels, closure for, S. C. Kindig... 823,124  
Bottles, jars, and other vessels, self-fixing protective covering for, M. G. Olivier... 823,355  
Bowling alley, H. B. Lahr... 822,959  
Box covering machine, W. A. Cardy... 823,032  
Box lid holder, G. Mueller... 822,975  
Bracket, A. H. Bliss... 823,024  
Bracket, J. S. Detrick... 823,162  
Brake beam, H. W. Frost... 823,403  
Brake beam fulcrum, H. W. Frost... 823,403  
Brake shoe, F. P. Callier... 822,924  
Brewers' and distillers' slop, treating, C. J. Reehr... 823,366  
Brick for chimneys, R. P. Weber... 823,011  
Brick machine, P. Therman... 823,232  
Bridle bit, H. Schlueter... 823,368  
Briquet press, J. J. Crawford... 823,263  
Brush, R. E. Williams... 823,312  
Brush, S. D. Purdy... 823,363  
Brush, fountain paint, C. H. Abbott... 823,458  
Brush with detachable handle, bath, B. D. Knickerbocker... 823,471  
Buffing pipe, soap, J. Blende... 823,388  
Bucket, clam shell, G. H. Williams... 823,015  
Bucket, clam shell, M. J. Purtle... 823,290  
Bucket, clam shell, Kaltenbach & Griess... 823,412  
Bung tin driver, E. J. Brooks... 822,918  
Burial casket, R. R. Cramer... 823,035  
Butter package, S. M. Brown... 823,030  
Button collar, H. T. Murphy... 823,135  
Button for gloves, etc., detachable, H. Kernad... 822,957  
Cabinet, commodity, J. H. Boye... 823,202  
Cables, fair lead for hoisting, Knex & Magie... 823,414  
Calculating machine, H. A. Hensley... 823,219  
Calculating machine, F. Trinks... 823,375  
Calculating machine, C. A. Mellicke... 823,426  
Can closure, J. J. Moser... 823,429  
Can heading machine, J. Brenzinger... 823,254  
Car bolster, J. B. Barnes... 822,908  
Car bolster, railway, S. Otis... 822,979  
Car brake, H. T. Brown... 823,255  
Car brake, Mead & Fullerton... 823,294  
Car coupling automatic, H. L. Blue... 823,154  
Car door safety guide bracket, E. J. Kates... 823,047  
Car fender, E. Tallaksen... 823,003  
Car seat, E. G. Budd... 823,256  
Car stake, C. F. Fleamming... 823,370  
Car step holder, J. Edwards... 823,325  
Cars, safety system for motor-propelled, J. A. Miller... 823,478  
Carburetor, A. Akeson... 823,382  
Carburetor for explosive engines, Steinbrenner & Mayer... 823,485  
Cardboard cutting machine, oval and round, B. T. McCall... 822,976  
Carrier. See Luggage carrier.  
Cash register, change-making, W. H. Collier... 823,104  
Caster attachment for adding machine stands, A. Hendricks... 823,468  
Caster, guarded, A. F. Hassy... 823,408  
Cement post mold, J. T. Wilson... 823,457  
Chain, C. W. Levalley... 823,420  
Chair, A. Wanner, Jr... 823,146  
Cheese cutter, A. E. Roach... 823,138  
Cheese cutter, Roach & Hedge... 823,227  
Chimney, C. Weber... 823,187  
Chimney top, J. F. Spatz... 823,194  
Chloroform dropper, F. Wachter... 823,233  
Chuck, E. A. Neill... 822,977  
Chuck, J. F. Buckley, et al... 823,031  
Chuck, scroll, A. E. Church... 823,033  
Cigar protector, F. H. Whomes... 823,014  
Cigarette roller, O. F. Hammar... 823,217  
Clasp, F. Hirsh... 823,277  
Clutch, Campbell & Johnson... 823,200  
Clutch, friction, H. S. & C. E. Glenn... 823,467  
Clutch operating mechanism, C. L. Taylor... 823,085  
Clutch release means, L. H. Hinde... 823,493  
Collar shape steam heated, Porter & Erwin... 823,360  
Column support, F. M. Sische... 823,995  
Comb, E. G. Macartney... 823,131  
Comb cleaner, E. Layton... 823,128  
Combs, making, W. M. Stone... 823,001  
Composite block and making same, F. W. Dummell... 823,038  
Concentrator, M. P. Bess... 822,912  
Container top, Williamson & O'Leary... 823,381  
Conveyor, F. F. Landis... 823,418  
Conveyor system, I. S. Merrell... 823,477  
Cooking utensil, R. A. W. Krampitz... 823,415  
Coker, A. P. S. & P. Wahlpart... 823,006  
Copying press, rotary, C. E. Adamson... 823,004  
Corks, attaching extractors to, W. H. Smith... 823,448  
Corn hulling, degerminating, and hennying machine, M. L. Mewrer... 823,186  
Cotton chopper, A. R. Maret... 823,132  
Couch or sofa and bed, combined, J. H. Hagedorn... 823,327  
Covers of receptacles, apparatus for applying liquid to, W. C. Buhles... 823,391  
Crank wheel balancing means, Westlake & Thomas... 823,012  
Crib, folding, L. Dejean, Jr... 823,321  
Crushing mill, M. P. Bess... 822,913  
Cultivator, J. E. Waterman... 823,238  
Cultivator, W. A. Gillentine... 823,407  
Cultivator beams, device for securing shovel standards to, A. Lindgren... 823,340  
Cultivator, beet, A. Larsen... 823,338  
Current motor, alternating, J. O. Heinze, Jr... 823,495  
Current translating device, alternating, L. H. Thullen... 823,086  
Curtain fixture, adjustable, A. L. Perra... 823,481  
Curtain pole, J. P. Burns... 823,259  
Cutting tubular bodies, machine for, E. J. Logan... 823,422  
Dental disk shield, W. F. Green... 823,167  
Dental handpiece, C. L. Alexander... 823,150  
Display frame, Leigh & Coleman... 823,339  
Ditching machine, F. R. Sammis... 823,191  
Dividers, H. C. Rieckheit... 823,364  
Door, Meyer & Satter... 823,065  
Door check and closer, G. T. Sheets... 822,992  
Door fastener, J. P. Snelgrove... 823,300  
Door hanger, D. D. Miller... 823,066  
Door opener, Stevens & Walcott... 823,372  
Dress suitizer, H. Humphreys... 823,172  
Drier, E. T. Johnson... 822,953  
Drier, A. T. Collins... 823,106  
Drying chamber, A. Schroeder... 822,990  
Dust collector, gravity, D. Deneen... 823,463  
Dye and making same, vat, K. Schimacher... 823,294  
Electric conductor union, F. W. Sorg... 823,484  
Electric indicator, G. S. Eble... 823,164  
Electric switch, O'Leary & Conan... 823,073  
Electrical circuit controlling device, E. O. Schwetzer... 823,296  
Elevator hatchway closure, J. W. McGhee... 823,479