The apparatus will be useful in many connections where work has been erected and it is desired to further operate upon it.

Medical Appliances.

STERILIZER.—H. W. C. Thomas, Valatie, N. Y. This inventor's improvement relates to apparatus for sterilizing various articles, and more particularly such instruments or tools as are used by surgeons, dentists, and barbers. The principal objects are to provide a convenient apparatus in which a circulation of the sterilizing fluid may be secured by the introduction and the withdrawal of the instruments.

HYPODERMIC SYRINGE.—J. De Lisle, New York, N. Y. This syringe is more especially designed for making hypodermic injections of antitoxic serum and arranged to maintain its parts during the time the implement is stored or in transit in an absolutely aseptic condition, to prevent contamination of the serum, and to insure free unobstructed flow of the serum through the needle when the syringe is used.

DENTAL SEPARATOR AND TOOTH-HOLDER.—E. D. Barnes, Enfield, N. C. This instrument invented by Dr. Barnes is to be used by dentists for getting space between the natural teeth for facilitating access to cavities between the teeth when filling the same and to give access for polishing or making examinations and which device is also designed to be so held upon the teeth as to prevent the separator-claws from pressing on the gums and which device also serves as a prop between the upper and lower teeth to hold the mouth open.

TRUSS.—F. King, New York, N. Y. One purpose of this invention is to provide a device that effectually prevents the scrotum escaping backward when the attitude of the wearer is changed, as in athletic exercises, the mounting of a horse, etc. Another is to provide a waist-belt and straps to prevent the apron from slipping upward or downward, and the waistband is provided with an attached broad stiffened pad at the rear, which engages with the small of the back, renders the waistband comfortable in use, and sustains the muscles at such point.

Prime Movers and Their Accessories.

ROTARY VALVE.—T. G. Van Sant, Paragould, Ark. This invention relates to a valve mechanism for steam and other elastic-fluid engines; and resides particularly in an improved rotary valve, by means of which steam may be admitted to and exhausted from the engine-cylinder. It is especially intended for use with the rotary cut-off forming the subject of Mr. Van Sant's former patent, of the application on which said patent issued his present application is a division.

CARBURETER FOR HYDROCARBON-ENGINES.—N. Leinau, Ashbourne, Pa. The most prominent feature in this case resides in a peculiarly-arranged mobile member driven by the air-current through the carbureter and connected with a means for forcing the liquid fuel into the air-passage of the carbureter, where by aid of the mobile member it is thoroughly commingled with the air on its way to the engine or other apparatus in connection with which the carbureter may be used. This member is in form of a fan rotated by the air currents and having connection with a pump placed in the fuel passage and acting to force the liquid fuel through the discharge-nozzle into the air-passage in close association with the fan.

VALVE-GEAR FOR ENGINES.—J. L. Wheeler, San Francisco, Cal. Mr. Wheeler's invention relates to improvements in devices for automatically cutting off the steam supplied to engines, particularly engines employed for heavy work, such as in sawmills. In sawmill work fuel is not a consideration, and in such cases the slide valve of the engine should be set to cut off at the lowest part of the stroke, which will enable it to run all machinery except "circulars" and "band saws," and the cut-off attachment may be adjusted so as to give the valve full travel when the log comes to the saw.

Pertaining to Vehicles.

UNICYCLE.—C. G. Crosse, Sun Prairie, Wis. In this device the pedal is pressed by the foot, which depresses one side of a bar and pulls down the cranks. This gives corresponding oscillatory motion to two rods which in turn operate two others, one of the latter operating a member which represents the human foot. This simulates the motion of the human leg and foot and exerts a pushing force in a forward direction, thus urging the wheel forward. When one pedal is depressed the other is elevated, thus giving the reverse movements to the parts, and by operating the opposite pedal the same action takes place with respect to the leg on the opposite side.

OIL OR GASOLENE ATTACHMENT FOR GAS-ENGINES.—J. E. Green, Belmont, W. Va. One aim of the inventor is to provide an attachment for a gas-engine to allow of running the engine with gas from an oil-well or with gasolene in case the gas-supply gives out, or in case the supply is low and not sufficient to run the engine then oil or gasolene-vapor is supplied through the attachment in any degree to form an explosive mixture with the gas, the arrangement being such that the necessary changes can be made while the engine is running.

NOTE.—Copies of any of these patents will be furnished by Munn & Co. for ten cents each. Please state the name of the patentee, title of the invention, and date of the paper.

Business and Personal Wants.

READ THIS COLUMN CAREFULLY.—You will find inquiries for certain classes of articles numbered in consecutive order. If you manufacture these goods write us at once and we will send you the name and address of the party desiring the information. **In every case it is necessary to give the number of the inquiry.**

MUNN & CO.

Marine Iron Works. Chicago. Catalogue free.

Inquiry No. 7003.—For manufacturers of furnishing fixtures for a toy shop.

For logging engines. J. S. Mundy, Newark, N. J.

Inquiry No. 7004.—For manufacturers of peroxide of iron, venetian red, corcus mortis, powdered pipe clay, chalk, oxalic acid.

"U. S." Metal Polish. Indianapolis. Samples free.

Inquiry No. 7005.—Wanted, address of firms who underwrite stocks and bonds.

2d-hand machinery. Walsh's Sons & Co., Newark, N.J.

Inquiry No. 7006.—For the names of firms that make perfectly puncture-proof bicycle tires.

Perforated Metals, Harrington & King Perforating Co., Chicago.

Inquiry No. 7007.—For manufacturers of machinery used in making bricks.

Adding, multiplying and dividing machine, all in one. Felt & Tarrant Mfg. Co., Chicago.

Inquiry No. 7008.—For manufacturers of plants for distilling turpentine, wood alcohol, creosote, etc., from rich pine stumps.

Sawmill machinery and outfits manufactured by the Lane Mfg. Co., Box 13, Montpelier, Vt.

Inquiry No. 7009.—For manufacturers of the "Peerless Combination Sharpener."

I sell patents. To buy them on anything, or having one to sell, write Chas. A. Scott, 719 Mutual Life Building, Buffalo, N. Y.

Inquiry No. 7010.—For manufacturer of an article called "Flat Lap."

The celebrated "Hornsby-Akroyd" Patent Safety Oil Engine is built by the De La Vergne Machine Company, Foot of East 138th Street, New York.

Inquiry No. 7011.—For machinery for making drop chalk and precipitated chalk.

Gut strings for Lawn Tennis, Musical Instruments, and other purposes made by P. F. Turner, 46th Street and Packers Avenue, Chicago, Ill.

Inquiry No. 7012.—For manufacturers of perforated patterns for stamping linen, leather, wood and plush.

For sale or exchange for well-boring outfits patent No. 583,760. Riveting mandrel for riveting well casing and other work. For more information or particulars address J. F. Mantey, Patterson, Texas.

Inquiry No. 7013.—For manufacturers of china and glassware.

Manufacturers of patent articles, dies, metal stamping, screw machine work, hardware specialties, wood fiber machinery and tools. Quadriga Manufacturing Company, 18 South Canal Street, Chicago.

Inquiry No. 7014.—For manufacturers machinery for making soft drinks.

Space with power, heat, light and machinery, if desired, in a large New England manufacturing concern, having more room than is necessary for their business. Address Box No. 407, Providence, R. I.

Inquiry No. 7015.—Wanted, party to make woven wire rat traps.

Absolute privacy for inventors and experimenting. A well-equipped private laboratory can be rented on moderate terms from the Electrical Testing Laboratories, 548 East 80th St., New York. Write to-day.

Inquiry No. 7016.—For inventors and manufacturers of safety explosives.

Advertiser, having ample facilities for manufacturing, desires to meet party who thoroughly understands the manufacture of small dynamos, motors and electric fans, who is already engaged in or desires to enter into manufacturing. Address Dynamos, 794 Broad Street, Newark, N. J.

Inquiry No. 7017.—For manufacturers of cement poles.

WANTED.—Formula of a composition with which to cover the caulked decks of pontoons. It must set hard and tough, so that handling a cargo will not break, crack or indent it, adhesive and elastic so as to stick to wood and yet give to heat and cold, and homogeneous and waterproof so as to keep all liquids out all over.

Shanghai & Hongkew Wharf Company, Limited, Shanghai, China.

Inquiry No. 7018.—For manufacturers of the latest, up-to-date smoking tobacco machinery.

A GOOD LOVE STORY.

"A Paper Proposal" is the title of a clever piece of fiction contained in "Mountain and Lake Resorts," a book just issued by the LACKAWANNA RAILROAD, in which some of the most delightful summer resorts in the east are illustrated and described. The story is well worth reading, and the other information may help you in selecting your vacation place.

The book will be mailed on receipt of ten cents in stamps addressed to T. W. LEE, General Passenger Agent, New York City.

Inquiry No. 7019.—For manufacturers of Sparklet bottles and capsules for making soda water.

Sheet metal, any kind, cut, formed any shape. Die-making, wire forming, embossing, lettering, stamping, punching. Metal Stamping Co., Niagara Falls, N. Y.

Inquiry No. 7020.—For manufacturers of machinery for making kerosene lamp burners.

Inquiry No. 7021.—For manufacturers of milling machines.

Inquiry No. 7022.—For manufacturers of luminous paint.

Inquiry No. 7023.—For manufacturers of refrigerating machinery.

Inquiry No. 7024.—For manufacturers of machinery to bend steel plates of ⅜ inch thickness, and also to cut such plates.

Inquiry No. 7025.—For manufacturers of apparatus for drying blood and egg albumen.

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.

(9671) E. L. M. asks: 1. Does hammering of iron increase or decrease its strength? For example: Suppose a rod of round iron ⅝ inch in diameter were swelled by hammering to ¾ inch in diameter; would it be as strong as originally? Suppose this rod is then turned on a lathe back to the original ⅝ inch in diameter; would it be as strong as the original rod? A. As a general rule, hammering iron in the right way and at the right temperature, improves its quality and increases its strength. But upsetting a ⅝-inch rod until it was ¾ of an inch in diameter in the way an ordinary blacksmith would be likely to do it would probably injure the material, and it would be weaker after than it was before the operation was performed. It, however, would be perfectly possible to conduct this operation in such a way that it would be stronger, but it would have to be very carefully and skillfully done. Metal cannot be abused without injury to it. 2. Has there been invented a process for treating tool steel so that if worked at the right temperature it will temper itself on cooling? A. Some of the so-called hardening steels will do what you suggest. Mild steel may be case-hardened in the same way that you would case-harden wrought iron. You may also weld a thin piece of high-carbon steel to the end of your rods.

(9672) E. Z. says: Kindly let me know what the water pressure in an ordinary household faucet is, if you possibly can tell. A. The water pressure at the faucet in an ordinary house varies with the location of the house. A house on a hill or at a distance from the standpipe or pumping station will have less water pressure than one situated lower down or near the standpipe or pumping station. A general average might be taken as somewhere between 25 and 70 pounds per square inch, depending on the city and the location as above noted; but in some instances it will be outside of the limits above mentioned.

(9673) F. H. writes: For a red varnish to be used on electrical articles, allow me to submit the following recipe: Melt together 2 parts of Venetian turpentine (Terebinth Venet.) and 1 part pale shellac (orange shellac will do as well); when temperature reaches 60 deg. C. add 10 parts alcohol. Rub up 3 parts pulverized cinnabar (vermilion) with sufficient alcohol to form a paste, and add to the melted mixture. The operations should be carried on in a water bath, to avoid undue heating. Stir until a smooth liquid is obtained. This should be allowed to cool, continually stirring, and when required should be heated over water bath until it can be applied with a brush. Articles to be coated should be warmed. This paint dries somewhat slowly, but gives beautiful rich permanent color. Needless to say, the necessary precautions as regards fire have to be taken when preparing the paint, as same is inflammable.

(9674) E. R. says: In that sort of mirage termed looming, does not one see the object by direct ray, and not by reflection? Do you not really see an object (ordinarily obstructed from view) just as much as though there was no obstruction intervening? A. The looming of an object is supposed to be produced when the upper air is warmer than the lower air, so that the rays are totally reflected above the eye and come down to the eye. Thus the object is seen above its own real position. Since the light has been reflected, the thing seen is an image as really as in any other case of reflection by a mirror.

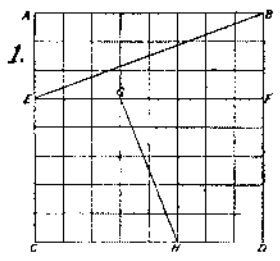
(9675) F. M. asks: Please explain to me the method of lining up a simple engine and oblige a reader of your paper. A. The best way to line up a simple engine is to stretch very tight a fine piano wire through the exact center of the cylinder of the engine, and make all measurements from this. Another wire may be stretched at right angles to it, parallel with the shaft. This right angle can be determined by a large machinist's square or by an engineer's transit. The cylinder and guides can be lined up directly from the first wire, and the bearings for the main shaft can be adjusted until they are parallel with the second wire.

(9676) W. K. asks: 1. What action (chemical) does zinc chloride furnish in a dry cell? Sal-ammoniac? Does manganese furnish any action besides its depolarizing effect? A. The zinc chloride does not exert any chemical action in a dry cell directly; that is, the action of the zinc and ammoniac chloride (sal-ammoniac) is to form zinc chloride. The zinc salts put into a dry cell serve principally to keep the paste porous and moist, since these have a strong affinity for water. Manganese dioxide serves simply as a depolarizer in a dry cell, as it does in a wet cell. 2. Does high initial amperage increase life of a battery, or does it mean that it will be short-lived? A. The amperes of a cell depend upon the external resistance, and there is no propriety in giving amperes, unless it is stated also against what resistance the amperes are flowing. If a large number of amperes are drawn from a cell at first, the cell will be shorter lived than if a low amperage is drawn. A cell will have a certain number of ampere-hours of life. If 100 ampere-hours, the cell will last approximately 100 hours if 1 ampere is the rate of current, but only 10 hours if 10 amperes be drawn. This law is as true of dry as of wet cells. 3. What do you consider best type of wet and dry cells on market to-day for telephone service? A. We have no judgment to give as to the best dry or wet cell. We presume there is no cell which deserves such a distinction. There are many reliable houses offering cells. We presume your local dealers are reliable, and that you are safe in taking their advice. We do not advertise in Notes and Queries. Our advertising columns may be consulted, and we think our advertisers are unusually reliable. We doubt if there is any such thing as a superlatively best thing of any kind. We are not willing to say that there is. 4 In gas and gasoline engines, what affects the life or service of the batteries? A. There is nothing very peculiar in the service a battery performs on a gas engine, except the regularity of its action. It wears out as any other battery does by the work it does, and rather sooner because of the constancy with which it is called upon for current. It is a popular impression that a battery should last indefinitely, but really it is like any other source of power. It can only give back the power which is given to it, and when that is done the battery stops work. No one is ever ready to have the battery stop. Few understand that a battery uses up materials as an engine uses up coal. So much zinc and chemicals, so much electricity. It is a simple matter.

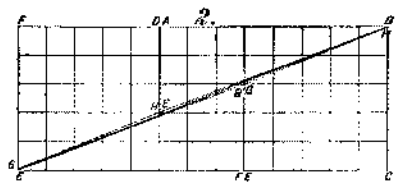
(9677) G. F. says: 1. Is there any sound when there is no ear to hear it? For instance, if a tree were to fall and there were no living thing within hearing, would there be any sound? Please explain fully. A. There may be *sound* when there is no ear to hear it, and the fall of a tree would produce exactly the same noise, whether or not there be any one near at hand. What we call "sound" consists in reality of pulsations or wave vibrations in the air or whatever medium the sound traverses. If a stone fell into a smooth body of water, it would produce waves on the surface of the water, whether or not there be any person present to see them. In the same way, it would produce waves or pulsations of sound in the air. 2. Give a rule for figuring the drawbar pull of a traction engine. As an example, figure the pull of the following engine: Cylinder, 10 x 10¼; 225 revolutions, cutting off at two-thirds stroke; pressure, 120 pounds; traction wheels, 64 inches diameter, geared 1 to 17. A. The engine which you describe ought to be able to produce a drawbar pull of from ten to fifteen thousand pounds for each cylinder, provided the driving wheels do not slip. If this force is more than eight or ten per cent of the weight on the driving wheels, they are likely to slip.

(9678) G. L. P. writes: In the June 10 issue of the Scientific American, in Notes and Queries, No. 9656, H. J. F. asks if a piece of paper 8 by 8 inches square can be cut so as to make 65 square inches. You say: "No, by no conceivable means." Now you will find inclosed a piece of paper 8 by 8 inches, which you are to cut on the lines and put together as lines shown on the smaller piece, and then measure. I think you will find it to be 5 by 13 inches, which equals 65 square inches. I am unable to explain where the square inch comes from, but it is there. A. No, friend, it is not there. We exceedingly regret that any of our correspondents should think us capable of believing that a square of eight inches on a side can be cut into pieces and put together in another way so that its area shall be increased 1 square inch. We are having a deluge of letters on this point, of which we print one, many criticising us more or less severely for saying that this cannot be done. But of course it cannot be done. We repeat it—No, by no conceivable means. It transcends common sense to ask it. Try it with pennies, or kernels of corn, or any convenient similar pieces. Lay out 64 in a square of eight on a side. Then change them to a figure of 5 rows of 13 on a side. There will be a missing kernel or coin. You cannot complete the second figure. It is the same if you cut a piece of paper of the same dimensions; 8 x 8 cannot be anything but 64, and can never be 65. Why not settle one's self first upon simple foundations? Then one will not say, as our confident correspondent does, "But it is there." That begs the question. It is not there, and cannot be there. There is evidently a fallacy here somewhere. Now, this is no new trick.

It has been traveling around for an unknown period of time, and has been shown up as often as it appears. The SCIENTIFIC AMERICAN had it a generation ago. Still, apparently, there are a host of intelligent people who have never seen the exposure. Hence we will give it, not following the usual mode of treatment, but giving our own explanation of the falsity of the proposition. This is not a puzzle, for a puzzle should have a rational solution, and this thing has no such solution. It is a trick, to make the false seem true. The proper attitude of mind toward it is to seek for the reason of its falsity, since it cannot be true. Only one of our correspondents even suggests that it cannot be true. When you see a juggler perform an impossible thing, such as cutting a man's head off, pulling a great quantity of dry goods out of a hat, or doing the curious box trick, you do not immediately demand that all these shall be accepted as realities; on the contrary you seek the method of the deception. That is the right attitude of mind toward a physical impossibility, and is applicable here. Perhaps the easiest way to show the falsity of the question under discussion, is to draw a figure 5x13, divide it into squares and draw a diagonal line across the figure as in Fig. 2.



Our Fig. 1 shows the square of 8 inches divided for the purpose of the puzzle. Draw the perpendiculars as shown and the points *HE* and *BG* do not fall at the corners of squares. They cannot. Yet the so-called solution which all our correspondents send us, shows the same thing—that the lines *EG, BF, AE, BF,* which should be 3 inches long, are more than 3 inches long. In every figure



this is so. You should be sharper than to draw a figure like that and send it to us if you are to convict us of error. There is an error, but *you* are in error. The diagonal of your long figure, 5 x 13, must be a straight line, if you are correct, but the four pieces of paper when put together do not give a long straight diagonal, as any one can see who will put the pieces together, then use his eyes and look for himself. If your eyes will not show it to you, take a straight ruler and it will disclose the truth for you. The long, sloping line of the pieces of paper is not straight. The four pieces of paper do not cover the area which they seem to cover. There is a long, narrow strip in the center which is not covered. The area of this strip is just one square inch, the square inch which you careless ones think you gain. If you do not make money with any more reality than you gain area of paper in this trick you will never be rich. You put your rulers on and draw a long straight line sweeping from one corner of the 5 x 13 figure quite across to the other corner, and say "There it is, I have made 64 square inches into 65 square inches." Great act! But you have not. Now turn to the square of 8 inches on a side, our Fig. 1. The line *BE* slopes 3 inches in 8, or ⅜ of an inch in 1 inch. The line *GH* slopes 2 inches in 5 inches, or 2-5 of an inch in 1 inch. And you ask us to believe that a line whose slope is ⅜ should form a straight line with one whose slope is 2-5. We cannot do it. The reason anyone is deceived is that the pieces are rarely cut with a high degree of accuracy. They are often cut out of thin paper, and will not lie flat. When they are put together they seem to cover the space as well as could be expected and so the deception takes effect. If the trick were approached from the other side, that is, cut the pieces from the piece which is 5 x 13, and put upon a square carefully drawn to be 8 x 8, the pieces would then more than cover the square figure and deception would not be so easy.

(9679) B. B. asks: Which part of a wagon wheel, when traveling on the road, goes the fastest, the top or the bottom? A. All parts of a wagon wheel go along the road with the same speed, the same as the horse moves. So too all parts of the wheel turn around the axle with the same angular speed, that is, every point which is at the same distance from the center moves with the same speed, but each point moves with a speed which is proportional to its distance from the center of the axle. The center line of the wheel does not rotate at all. There are other motions of the parts of a wheel which are discussed in Queries 9622 and 9635; also in the correspondence column of Vol. 92, No. 25, to which we would refer you. We can send you these numbers for thirty cents.

NEW BOOKS, ETC.

SPANISH-ENGLISH DICTIONARY OF MINING TERMS. By Frederick Lucas. London: The Technological Institute, 1904. 12mo.; pp. 78. Price, $2.

This little dictionary will be found a handy companion by all mining men operating in South America. It has been compiled by a well-known technical translator of London—a man who has had a great deal of experience in translating mining literature—and it will be found very complete and serviceable as a handy pocket dictionary of mining terms.

NATURE STUDY WITH COMMON THINGS. By M. H. Carter. New York: American Book Company, 1904. 12mo.; pp. 150. Price, 60 cents.

This book, by an instructor in the Department of Elementary Science of the New York Training School for Teachers, is intended to serve as an elementary laboratory manual and guide for young pupils, the object being to introduce them to, and give them practice in, the method of procedure in laboratory investigations. All the principal fruits and vegetables are illustrated as a whole and in section, and a lesson is devoted to each. These lessons are suitable for children of from four to six years of age. It is believed that they will successfully solve the problem of an adequate training in elementary laboratory methods. Only the simplest apparatus is necessary in pursuing this laboratory course.

THE EYE, MIND, ENERGY, AND MATTER. By Chalmers Prentice, M.D. Chicago: Published by the Author. 1905. 12mo.; pp. 131. Price, $1.50.

Our author regards the human body as a power-house, and disease as perverted function due to too much or too little energy. He gives five good reasons why the eyes are, of all organs of the body, most capable of making an excessive draft on the general fund of nerve-energy. Hence, in scientifically resting the eyes, using "repression" or strain-reserving glasses, we may often conserve energy and re-establish natural functioning. Other interesting theories are advanced, and strong evidence adduced in their support.

AMERICAN TELEPHONE PRACTICE. By Kempster B. Miller. New York: McGraw Publishing Company, 1905. 4vo.; pp. 888. Price, $4.

The fourth edition of this standard work has been greatly enlarged and brought up to date, so that it now covers the telephone practice of to-day completely and accurately. Obsolete methods and equipment are not described, except where they are of exceptional educational or historic value. Complete information is now given regarding the common battery or central energy system, and such objects as trunking between common battery offices, private branch exchange service, measured service, toll switchboard systems, and power plants are here described in detail. Besides numerous cuts of telephone apparatus, the book contains a considerable number of diagrams of complicated circuits, which are more complete than those usually found in such books. As a guide to the student of practical telephony whose experience has been insufficient to make him conversant with all branches of the subject, and also as a reference book for the experienced telephone engineer and operator, this volume will be found invaluable.

ELEMENTS OF MECHANICS. Forty Lessons for Beginners in Engineering. By Mansfield Merriman. New York: John Wiley & Sons, 1905. 12mo.; pp. 172. Price, $1.

Though great advances have been made in the methods of instruction in all branches of applied mechanics during the past forty years, little change has taken place in the manner of presenting the subject of rational mechanics. The field is so great that but a part of it can be introduced in one volume, and the object of this elementary volume is to apply the best methods of applied mechanics to the development of the fundamental principles and methods of rational mechanics. The limited course usually given in engineering colleges is so difficult, and appeals so little to the student's experience, that few fully master it. This book presents the fundamental elements without employing advanced mathematics, the knowledge of plane geometry, elementary algebra, and plane trigonometry only being necessary to read the work with interest and profit. Numerous numerical illustrations are given, queries and problems are stated as exercises for the student, and a system of units is employed with which every boy is acquainted.

SUCCESSFUL FRUIT CULTURE. By Samuel T. Maynard, B.Sc. New York: Orange Judd Company, 1905. 12mo.; pp. 274. Price, $1.

This book forms a practical guide for anyone engaged in the cultivation and propagation of fruits. It contains a summary of the scientific progress made in fruit culture up to the present time, together with the practice of the most successful fruit growers throughout the country. This information is expressed in condensed form and simple language, so that the book is especially of value to a person starting in the business of fruit growing, or to the dweller in the country who wishes to grow a small quantity of fruit for family consumption. The book covers the entire practice of fruit growing, from the starting of the seed to the cutting and marketing of the fruit. The author endeavors to show how to grow the best possible fruit at the least cost. All our common fruits and berries are described, and the best manner of growing them is given. The book is illustrated with numerous half-tones reproduced from photographs of orchards and growing trees, as well as by a considerable number of diagrams interspersed throughout the text.

FERRIC AND HELIOGRAPHIC PROCESSES. By George E. Brown, F.I.C. New York: Tennant & Ward, 1905. 12mo.; pp. 149. Price, $1.

The second edition of this work, which has just been issued, contains much information of value especially to draftsmen, engineers, architects, and others who find the reproduction of tracings and drawings an everyday necessity. The book will also be found interesting by amateur photographers who have a taste for experimenting. The processes described are all simple and practical. Among there are the ferro-prussiate, the kallitype, the obernetter, and the uranotype processes. The various heliographic processes are compared in Chapter IX., and other chapters are devoted to the "Preparation of Heliographic Papers" and "An Outfit for Heliographic Printing." Several minor heliographic processes are described, as well as the pellet, or blue line on white ground; the ferro-gallic, or black line on white ground; and the brown line on white ground processes. The chapter on "Printing on Fabrics and in Dyes" will perhaps be found most interesting to the amateur photographer. The book also has useful chapters on Manipulation; Paper and Sizing; Chemicals; and Chemistry.

SCIENCE AND HYPOTHESIS. By H. Poincaré. London and New York: Walter Scott Publishing Company, 1905. 12mo.; pp. 244. Price, $1.50.

This work by an eminent French scientist has been well translated, and thus made available for English readers. It is divided into four parts, which treat of Number and Magnitude; Space; Force; and Nature. The chapters of Part I. are devoted to Mathematical Magnitude and Experiment, and the Nature of Mathematical Reasoning. Those of Part II. deal largely with Space and Geometry. Energy and Thermo-Dynamics, Relative and Absolute Motion, and the Classical Mechanics, are discussed in Part III.; and, finally, Part IV. deals with the Hypothesis and Theories of Modern Physics, the Calculus of Probabilities, Optics and Electricity, and Electro-Dynamics. This book will be found worth reading by all lovers of pure science.

INDEX OF INVENTIONS

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Amusement apparatus, revolving, M. L. Schlueter	793,236
Amusement device, Thomas & Kirkpatrick, Jr.	793,471
Anchoring device, tractor, A. Castelin	793,504
Animal trap, W. T. Hambrook	793,190
Animal trap, R. Cbasse	793,349
Animal trap attachment, C. Baer	793,170
Annealing furnace, C. Bechstein	793,501
Annealing furnace, metal, Bates & Peard	793,268
Annunciator, electrical, L. F. Rose	793,541
Auger, earth, P. Gampher	793,185
Autographic register, E. J. Barker	793,265
Automatic lubricator, E. W. Baird	793,264
Automatic sprinkler, G. Diederici	793,357
Automobile, F. E. Grout	793,437
Autovehicle, H. Austin	793,409
Axle, vehicle, C. Heilrath	793,372
Bale confiner, A. M. Clay	793,505
Bar indicator for preventing fraud in dispensing beverages, H. A. Rueter	793,232
Barrel, metal, R. H. Hackney	793,579
Barrel, swill, W. J. Frederick	793,366
Batteries, anode plate for, H. C. Hubbell	793,076
Batteries, cathode plate for, H. C. Hubbell, 793,077	793,078
Battery grid, H. C. Porter	793,093
Battery jar, storage, T. S. Witherbee	793,117
Bed bottom, spring, C. Vallone	793,251
Bed, Davenport, R. Coopersmith	793,180
Bed frame, H. Eckerson	793,361
Bench. See Work bench.	
Bending or shaping machine, G. L. Buzek	793,564
Bicycle frame brace or strut, A. L. Girard	793,294
Binder, temporary, L. R. Dickerson	793,356
Binder, temporary, G. H. Gresham	793,370
Binding pads or tablets, machine for, C. F. Taylor	793,108
Blank feeding apparatus, automatic, J. H. McElroy	793,212
Blowing engine, A. T. Keller	793,380
Boat, portable, J. Rosenberg	793,230
Boat supporting tackle attachment, W. T. Oliver	793,147
Bolster, body, J. V. McAdam	793,388
Bolster roll, S. Van Duzer	793,476, 793,477
Bolt clipper, H. K. Porter	793,394
Bonnet, M. Hancock	793,191
Book and paper rack, I. Fisher	793,364
Book or pad holder, sales, W. F. Beck	793,560
Bookcase or display rack, Lindsay & Burch	793,451
Bottle carrier, milkman's, O. Ziegengeist	793,119
Bottle closure, C. E. Buck	793,426
Bottle closure, Coale & Greensfelder	793,566
Bottle packing box or crate, H. R. Myers	793,535
Bottle stopper, W. L. Bedman	793,173
Bottle stopper, J. Renner	793,321
Bottles or other receptacles, apparatus for filling, H. L. Hornung	793,586