

Nature and Science.

A strange conflict is going on just now between nature and science. The field of battle is in the chemical laboratory. Chemistry is making advances along new lines, and products are being obtained by artifice which hitherto have only been known as those of nature. This is the field of synthetic chemistry. Whereas, until recently, chemists have occupied themselves almost wholly with the processes of analysis—that is to say, the taking of things apart—now they are trying to put elements together so as to imitate natural compounds. Some speculative theorists go so far as to assert that in the future we shall be able to manufacture all kinds of foods, and even most prized delicacies, in the laboratory, so that there will be no further necessity for tilling the soil and raising crops.

There is no doubt whatever, remarks a writer in a contemporary, that wonders now undreamed of will be accomplished in the chemical laboratory of the future. Already some things are beginning to be made which hitherto have been products of nature exclusively. Madder, originally obtained from a plant, has been driven out of the market by Turkey red, a substitute obtained from coal tar. Indigo is now manufactured artificially, and the only reason why it has not driven out the original vegetable product is that the processes required are too costly. But it may happen any day that a means will be discovered for producing indigo more cheaply by chemical means. Then an important agricultural industry of India will be wiped out.

Attempts have been made to produce quinine by artifice, but without success. It is not unlikely, however, that this may be accomplished before very long. As a result, many people interested in the natural production and marketing of this alkaloid would be ruined, but the cheapening of the substance would be beneficial to mankind. Chemists have been experimenting for the purpose of obtaining many of the valuable alkaloids of plants—with opium, for example. They have tried to manufacture morphine, which is one of a considerable number of active principles contained in opium. At least fifteen alkaloids have been separated from opium. In this direction chemists have not been very successful. Success in the experiments is of no value practically so long as they cannot produce the alkaloids more cheaply than they can be got from the plants themselves. This remark applies

to atropin, an active principle of the deadly nightshade plant, which chemists have tried to reproduce.

Chemists have succeeded in making glucose or grape sugar in the laboratory. They have also produced other sugars hitherto unknown. But there is no profit in it, because the processes involved are too complicated and expensive. In manufacturing these sugars, some of which are not found in nature, they begin commonly with glycerine.

In the making of illuminating gas, coal tar is produced, and this coal tar contains a great variety of peculiar compounds termed "hydrocarbons." These hydrocarbons, as their name indicates, are composed of hydrogen and carbon, in varying atomical arrangements and molecular weights. They serve in the laboratory as convenient organic substances for the application of chemical processes. By various "monkeyings" of chemistry they are transformed in all sorts of ways. About one hundred of these hydrocarbons have been isolated up to date. Nearly all of them are transparent white fluids, some of which form crystals at ordinary temperatures. Among them may be mentioned benzole, naphthaline and toluene. Naphthaline is a large ingredient in the "moth balls" used for preserving clothing. From benzole is made aniline, and from the latter many of the most gorgeous colors used in the arts and industries are got. From the hydrocarbons of coal tar are manufactured many valuable medicines, particularly antipyretics—that is to say, anti-fever remedies.

Among the achievements of the newer chemical science is the artificial manufacture of quartz crystals. This discovery is of no practical value, because the crystals obtained are microscopic.—Boston Journal of Commerce.

The Nervous System—Its Course of Disease.

In the consideration of the problem of disease, sufficient importance, the Charlotte Medical Journal thinks, is not attached to the nervous system as an etiological factor.

It has been found by experimental analysis that the chemical composition of the perspiration varies greatly with the passions and emotions under which the individual labors. Reasoning by inference, may not the same be said of other secretions? Certainly we know that toxic changes occur in human milk as the result of great anger, and the depressing emotions entirely check gastric secretion and render the mouth

foul. The influence of fright in causing the hair to stand, the skin to assume the appearance of gooseflesh, and the muscular system to become generally paralyzed, is well known. It is also true that suspense and disappointment give rise frequently to excessive micturition and emotional diarrhea.

If, then, the emotions have such power to influence bodily functions and change the secretions, may not the development of toxins be traced to this source? It would be interesting, in this connection, to know whether the emotional temperament is more prone to disease than the phlegmatic individual.

Process for Imparting a Silky Appearance to Cotton and Other Yarns.

BY H. JACOB, ARGENTEUIL, FRANCE.

The cotton or other yarn is first prepared by passing through a liquid obtained by distilling together methyl alcohol and β naphthol disulphonate of sodium. The threads are then separated from each other by passing through thread guides and thread plates, and then through a first series of dressing boxes containing very fluid collodion, and dried by passage through a series of drying chests. The alcohol and ether given off from the collodion are suitably condensed and used for preparing further quantities of collodion. The dressing and drying is repeated a second time, using collodion of greater viscosity; and again a third time, the collodion being still thicker. The drying chests are connected by dressing boxes, which are formed of a central tube communicating with one of the collodion distributors. To the ends of this tube are connected by union joints other tubes of the same diameter, and opening into the interior of the drying chests. These tubes only communicate with each other by small orifices, which are of the same diameter as the threads to be dressed. The collodion is forced through the tube by a piston plate resting on the collodion in the receiver, and is weighted.

The capillary tube has inlet and outlet orifices provided for the passage of the thread at the same time the collodion is forced on to it, the excess of collodion being squeezed off previous to drying.

The threads finally pass through glazing rollers which have a rotary, also an alternating rectilinear movement, so that the whole of the thread surface is submitted to the glazing action. The collodion may or may not be colored by aniline dyes.

RECENTLY PATENTED INVENTIONS.

Railway Appliances.

SWITCH.—Frederick B. Kron, New Orleans, La. This invention provides a mechanism designed to be worked to throw the switch from a rapidly moving train or car without decreasing its speed, the mechanism being strong and inexpensive, applicable to all kinds of cars, and arranged to keep itself clear and unclogged. Combined with the switch point is a base plate with raised central portion and inclined sides and ends, one side merging into one of the main rails, the central portion being longitudinally slotted, a lever to be engaged by an arm in a bracket projecting down from the car being pivoted on the under side of the base, and extending across the slot, while a link connects the lever with the switch point, a spring being connected to the lever and to the base plate.

Electrical.

TROLLEY WIRE SUPPORT.—Marcus T. Murphy, New Orleans, La. This support comprises a post from which extends a lateral arm on which is a vertically movable rod, a spring supporting the rod elastically in position, and the rod carrying an insulated wire hanger. The device is very simple and inexpensive, and sustains the wire in such way that the trolley wheel may run firmly on it, but so that the wire will yield vertically in case of excessive pressure from beneath.

DENTAL ENGINE.—William E. Wheeler, Dayton, Tenn. This invention embodies an electric motor having field magnets and in which the armature runs vertically or in a perpendicular position, the shaft having a friction disk adapted to engage and drive the drill-operating devices. It has easily operated shifting devices whereby the speed of the drill-operating drive wheel can be increased or decreased as desired, and the motor stopped when the drill-holding cable is hung up at rest. With this improvement the operator can at all times stand on both feet and work from each side of the chair, thus facilitating the work and mitigating the pain of the patient.

Mechanical.

ENVELOPE THREADING MACHINE.—Sylvester P. Denison, Belleville, N. J. This is a machine to rapidly and accurately attach an opening thread to facilitate opening a sealed envelope, and the invention consists of a pair of oppositely arranged clamping devices with a reciprocating thread carrier adapted to carry and deliver a thread from one clamping device to the other, stretching the thread between the clamping devices. After the thread is cut and attached to the envelope blank the several flaps are folded to inclose the thread at the joint of the front and lower back flap, with the ends preferably projecting beyond the sides of the envelope, which may be readily opened by pulling on the projecting end of the thread to break the joint between the back flap and the front.

Agricultural.

CORN HARVESTER.—Christen J. Skeen, Viborg, South Dakota. A machine capable of harvesting at one time two rows of corn, shocking the corn in the

machine as the stalks are cut, has been designed by this inventor. As the machine is drawn forward the stalks are severed close to the ground by two sets of cutters, and fed rearwardly to simultaneously form two shocks, which are held in upright position until they have acquired a proper size, when the platforms upon which they stand are drawn from beneath them, the trip mechanism being operated from the driver's seat and the shocks guided to the ground. The binding cord is drawn from a cup or holder to partially surround the shock as it is being formed, the binding being completed when sufficient corn has accumulated to form the shock.

Miscellaneous.

SAND DRIER.—La Motte C. Atwood, St. Louis, Mo. According to this improvement a pipe leads from a hot air furnace to the open end of a revolvable cylinder having internal flanges, there being an exhaust fan at the opposite end of the cylinder and a bar extending through it on which deflectors are adjustably hung. The machine is easily operated and is adapted to rapidly dry a large quantity of sand, the furnace and fan causing a constant stream of hot air through the cylinder, while the sand is kept constantly in the air by means of the flanges and deflectors, its freed moisture passing away as vapor. The flow of sand through the machine is regulated according to its degree of wetness and the temperature of the air forced through it.

STAGE EFFECT.—Elmer E. Vance, New York City. This improvement is designed to facilitate the representation on the stage of a vessel at sea, imitating its rocking and swaying movement. It provides for the laying over the regular stage of a false stage, hinged at its forward edge to the main stage, and its rear portion being mechanically controlled to raise and lower it and give it more or less lateral movement. The false stage is preferably constructed of a series of sections, and is beveled with a feather edge where it meets the main stage, preventing the line of sight from the audience being obstructed, and thus producing a complete illusion.

PERMUTATION PADLOCK.—Hermann Wagner, Quinnesec, Mich. This is an improvement in locks for trunks and desks, the combination when set requiring considerable skill to discover it, and the construction being simple, durable, and inexpensive. The lock casing has slideways with openings in the ways and in the casing, the tongue of a keeper entering the openings in the casing and being engaged by locking slides, each of which has releasing openings for the tongue. A combination slide is adjustably carried by each locking slide.

FILTER.—Gaston Descamps, Havana, Cuba. This is an apparatus designed to filter a large quantity of liquid in a comparatively short time, and comprises a tank or vessel in which is suspended a basket or net containing the filtering material in the shape of a sponge. The liquid to be filtered is passed through several filtering compartments, and for very heavy tanks a special raising and swinging mechanism is provided for removing the covers when necessary.

FAUCET AND ATTACHMENTS.—Joseph E. Wright and Edwin A. Grover, San Antonio, Texas. For drawing beer or other liquids and preventing the contact of air within the keg, these inventors have provided

a sliding attachment for a faucet, comprising an inflatable air bag and a fixed and sliding tube for pushing the bag out of the faucet proper into the keg, afterward permitting injection of air, there being valves for regulating the discharge of the contents of the keg. The construction is adapted for use in place of the ordinary beer faucet, and is inexpensive and durable.

STOVE LIFTER.—Frederick E. Armstrong, Genoa, N. Y. This invention comprises a handled shank having a fixed jaw and a spring-pressed lever fulcrumed on the shank to form, with the fixed jaw, a pair of jaws, for conveniently lifting and holding a gridiron, no matter what its position may be on the stove.

AWNING SHUTTER OR BLIND.—Andrew Schmitt, Brooklyn, N. Y. This shutter is made in sections connected by link hinges, permitting one section to be passed over and beyond the other, there being lock nuts on the pivots of one or more of the hinges, enabling the lower shutter section to be held in any desired position relative to the upper section. This shutter may be used as an awning or a shield for a window or other opening, or for a sign or to display goods. It is readily adjusted to its various positions and may be locked to close the opening covered.

FURNITURE BRACE.—James E. Summers, Clifton Forge, Va. This is a tension device applicable to the legs of furniture, the frame of a bedstead, etc. It comprises a casing to be secured to the article to be braced, racks sliding at right angles to each other in the casing, near an opening in which is journaled a pinion engaging the racks, each rack at its outer end being adapted to receive a wire, and the several wires engaging opposite sides of the article to be braced.

TIP FOR CIGARS OR PIPES.—Joseph S. B. Hartsock, Washington, D. C. This is a cap or tip to be used on the end of a pipestem or the small end of a cigar to prevent the hot stream of smoke from coming directly against the tongue. It is a hollow cap with closed back end and a circumferential row of lateral outlets extended in the form of slots to the edge to form spring tongues and having also fixed centrally within it a penetrating pin. In smoking the smoke issues in radiating jets, instead of directly at one spot.

THREAD GUIDE AND CUTTER.—Joseph Walter, Brooklyn, N. Y. This is a simple device to be attached to a spool to permit the thread to be removed as desired without becoming tangled or the loosening of the thread upon the spool. It is held upon the spool by means of spring jaws, a slight pressure upon which permits the ready turning of the spool as thread is unwound, a knife being secured in position to conveniently cut the thread after the desired length has been drawn out.

DESIGN FOR CARPET.—Hugo Werner, New York City. This carpet is decorated with connected leaf scrolls, the members of which are made up of leaf figures distinct in themselves and overlapping, the main stem having a petal formation from which the bunchings of leaves appear to emanate.

NOTE.—Copies of any of the above patents will be furnished by Munn & Co., for 25 cents each. Please send name of the patentee, title of invention, and date of this paper.

NEW BOOKS AND PUBLICATIONS.

NOMENCLATOR COLEOPTEROLOGICUS. Eine etymologische Erklärung sämtlicher Gattungs- und Artnamen der Käfer des deutschen Faunengebietes. Von Sigm. Schenkl. Frankfurt a. M., Germany: H. Bechhold. Pp. 224. Price bound, 5 marks.

This little volume gives an entomological explanation of the order and species names of the German coleoptera and also of the terminological expressions used by scientists, to enable others to understand the words used and their origin.

STATE OF NEW YORK. Annual report of the Forest Commission for the year 1893. Vol. I and Vol. II. Albany: James B. Lyon, State printer. 1894. Pp. 358, 468.

The two volumes contain a report of the Forest Commission of the State of New York. It differs from the ordinary legislative report in having a really very large proportion of very readable matter about the primeval forests of the State. It is beautifully illustrated, moreover, with photogravures, and it is to be hoped that the elegant production will do its part in preserving from the destruction menacing them the woods so necessary to our well-being. The report, in every way, does all those concerned the highest honor, and now that forestry is coming to the front, it cannot but be believed that our woods will yet be saved. Some of the camping scenes and illustrations of Adirondack resorts are most attractive. The second volume is devoted to the laws pertaining to the forests, forest highways, railroads, etc., and is of special interest only.

THE DAILY NEWS ALMANAC AND POLITICAL REGISTER FOR 1895. Issued by the Chicago Daily News. Pp. 455. Price 25 cents.

The annual cyclopaedia of former days is to a great extent replaced by almanacs of this type issued by the leading newspapers of this country. The immense quantity of matter contained in this work renders it impossible to review it within the limits of our space. It contains two indexes, one for the present volume and one for the years 1885 to 1894 inclusive.

THE CHURCH OF SANCTA SOPHIA, CONSTANTINOPLE. A study of Byzantine building. By W. R. Lethaby. Harold Swanson. 1894. London and New York: Macmillan & Company. Pp. viii, 307. Price \$6.50.

The author of this interesting monograph opens it by quotations referring to the unsurpassed beauty of the famous church, now mosque, of Constantinople. In the making of the book every endeavor was made to produce a true edition de luxe. In the paper, with the natural rough edge, and the typography not only is nothing more to be desired, but in it one of the most elegant samples of book making that we have ever seen is found. The illustrations in black and white are satisfactory and to the point, and in the text a quantity of historical information is contained, which is of greater interest to many than

that of the purely technical portions. A list of the cuts would be an improvement. As far as we have gone, we find in it no illustration of the entire building except in the way of plans, something which certainly seems to be a very curious omission, the illustrations generally referring to details of construction.

JAHRBUCH FÜR PHOTOGRAPHIE UND REPRODUKTIONSTECHNIK FÜR DAS JAHR 1894. By Dr. Josef Maria Eder. 5th volume. Halle a. d. Saale, Germany: Wilhelm Knapp. 147 illustrations and 34 artistic plates. Pp. 551. Price \$3.

The eighth volume of yearly review for photography and reproductions is, like its predecessors, divided into 81 original articles by the most eminent writers and into statistical notes on the progress of photography during the years 1892 and 1893. The original articles cover all branches of the photographic art, and very noteworthy among the same are the progress of chromophotography, by Niewenglowski, Paris; compounded heliography, by Ives, Philadelphia; astrophotography in 1893, by Dr. R. Spitaler, observatory, Prague; progress in micrography, by Marktanner, Turnerscher-Graz, Austria. The plates represent all forms of photographs and reproductions in every branch of the art of reproducing pictures.

PROCEEDINGS OF THE INTERNATIONAL CONGRESS ON AERIAL NAVIGATION HELD IN CHICAGO, AUGUST 1, 2, 3, AND 4, 1893. The American Engineer and Railroad Journal. 1894. Pp. iv, 429. Price \$2.50.

Aerial navigation within the last few years has taken on a new aspect. It is now being studied by some of the best minds in the inventive and scientific field, and artificial flight, to a certain extent, has actually been accomplished. The present work is of deep interest, including a large number of papers on the subject giving scientific calculations applied to aeroplane and other movements. Professor Langley's classical paper on the internal work of the air, and any quantity of other valuable material, is embodied in the four hundred and odd pages of fine type in this book. The index, although of over fifteen pages fine type, might readily have been extended to two or three times this size.

METEOROLOGY, WEATHER, AND METHODS OF FORECASTING. With a description of meteorological instruments, and river flood predictions in the United States. By Thomas Russell, United States Assistant Engineer. New York: Macmillan & Company. 1895. Pp. 277 and a series of weather maps. Price \$4.

This is a very complete work, whose contents are based on the practice of the United States weather service in the prediction of coming changes, by the study of the weather maps of present and past atmospheric conditions. The flood conditions of rivers due to the varying rainfall of their drainage areas are also a most interesting feature.

ELECTRICAL BOATS AND NAVIGATION. By Thomas Commerford Martin and Joseph Sachs. New York: C. C. Shelly. 1894. Pp. vi, 224. Price \$2.50.

This very convenient manual treats of a subject in which there is a great deal of inquiry at the present time, and which inquiry would seem to predominate a large circulation. It treats of various motors and of the general disposition of parts in electric boats in general and of all kinds, of the propulsion of canal boats, as well as of smaller craft; the canal boats, of course, being operated by a trolley system. In the wording of the book we notice one inaccuracy in the reference to a "110 volt current," instead of a "110 volt circuit," an example of an error in expression which is suffering a lingering death. An interesting feature which is produced is the fact that, with ordinary launch hulls, the average battery load conveniently represents about one-third of the total actual displacement in tons, including the passenger load (p. 95).

LESSONS IN THE NEW GEOGRAPHY FOR STUDENT AND TEACHER. By Spencer Trotter. Boston: D. C. Heath & Company. 1895. Pp. v, 182. Price \$1.

There are so many new things now that the "new geography" reads naturally enough. It seems that the new science practically dispenses with maps, as exceedingly few, and those of altogether subordinate importance as regards political divisions, are contained in the book, which, in general, corresponds to what used to be called physical geography. It is written so as to make consecutive readings. That it is written by a biologist is evidenced by the treatment of the subject, even as outlined in the Table of Contents.

LENS WORK FOR AMATEURS. By Henry Orford. With 231 illustrations. London and New York: Whittaker & Company. Pp. xv, 225. Price 80 cents.

The manufacture of lenses is one of the most interesting kinds of work for an amateur. This book treats fully of the subject, and with numerous illustrations gives the manipulation in considerable detail. The author is not content with lens work proper, but writes also of the manufacture of prisms and the production of different angles thereon. Even if one does not intend to make lenses, the details of the practice will be found interesting reading.

GARDEN AND FOREST. A journal of horticulture, landscape art, and forestry. Conducted by Charles S. Sargent. Illustrated. Volume VII. January to December, 1894. New York: The Garden and Forest Publishing Company. 1894. Pp. ix, 520.

The bound volume of this journal for the year just passed forms an admirable manual for gardeners and others interested in plants. Its distinguished editor, Professor Sargent, of Harvard College, is a sufficient guarantee in himself for the excellence of the matter. Among the

articles we notice one series of especial interest, entitled "Notes for Mushroom Eaters," a series running through six numbers and which, with the numerous illustrations, forms an excellent manual for those fond of the edible fungi. These articles are signed by their author, Professor W. G. Farlow, of Harvard College, and it is to be wished that, with due enlargement, they might be put into book form, the subject being an almost inexhaustible one. The other illustrations in the work, some in half tones and some in engraving, are most interesting and practical.

THE PROBLEM OF CIVILIZATION SOLVED. By Mrs. Mary Elizabeth Lease. Chicago: Laird & Lee. Pp. 377. Price 50 cents.

SOMETHING ABOUT ELECTRIC BELLS. By J. A. de la Vergne, Jr. Clinton, Missouri. 1894. Illustrated. Pp. 23. Price 25 cents.

Goodnow & Wightman, No. 63 Sudbury Street, Boston, have issued a new edition of their catalogue which they will forward to any address on request. They have a large assortment of tools, materials and parts of models, brass castings for gears, etc., and their catalogue covers a great deal that few dealers carry in stock, and is particularly suited for machinists, pattern makers, model makers, amateurs, physical and mechanical departments of colleges, etc.

SCIENTIFIC AMERICAN BUILDING EDITION.

FEBRUARY, 1895.—(No. 112.)

TABLE OF CONTENTS.

1. Elegant plate in colors, showing an artist's home at Bronxwood Park, N. Y. Perspective elevation and floor plan. Cost complete \$3,300. Mr. A. F. Leicht, architect, New York City. A unique design.
2. A residence at East Orange, N. J., recently completed for Geo. R. Howe, Esq. Two perspective elevations and floor plans. A pleasing design. Mr. Jas. H. Lindsley, architect, Newark, N. J.
3. A cottage at Glen Summit, Pa., erected for H. H. Harvey, Esq. Two perspective elevations and floor plans. A handsome summer cottage with some novel architectural features. Messrs. Neuer & Darcy, architects, Wilkesbarre, Pa.
4. A residence at Forest Park, Springfield, Mass. Two perspective elevations and floor plans. A combination of the Colonial style with French chateau features. Mr. Louis F. Newman, architect, Springfield, Mass.
5. "Sunnyside." The residence of Robt. S. Walker, Esq., at Flatbush, L. I. Three perspective elevations and floor plans. An exquisite design. Mr. Frank Freeman, architect, New York City.
6. A picturesque and well appointed residence erected for the late E. E. Denniston, Esq., at School Lane, Pa. Cost complete \$22,000. Perspective elevation and floor plans. Mr. Geo. T. Pearson, architect, Philadelphia, Pa.
7. A residence at Nutley, N. J., recently erected at a cost of \$5,800. Perspective elevation and floor plans. Mr. E. R. Tilton, architect and designer, New York City.
8. A cottage in the Colonial style at Southampton, L. I. Two perspectives and floor plans. Mr. C. H. Skidmore, architect.
9. Hall and Library at Glen Ridge, N. J., erected at a cost of about \$12,000. Mr. Wilbur S. Knowles, architect, New York City. Perspective view and floor plans.
10. A dwelling in the Colonial style at South Orange, N. J. Cost complete \$6,500. Mr. P. C. Van Nuys, architect, Newark, N. J. Two perspective elevations and floor plans.
11. Two views showing a most successful alteration in the Colonial style of the Blinn homestead at Cambridge, N. Y. One view showing the original structure as built over one hundred years ago and the other showing the additions and changes recently made. Mr. H. Inman Furlong, architect, New York City. Perspective views and floor plans.
12. A cottage in the Colonial style at Cushing's Island, Me., erected for Francis Cushing, Esq. Two perspective elevations and floor plans. Cost complete \$2,000. Mr. John C. Stevens, architect, Portland, Me. A unique and picturesque design for a model summer home.
13. A Colonial house at Westogue, Conn., being erected for the summer residence of Arthur M. Dodge, New York City. Perspective view and floor plans. Messrs. Child & De Goll, architects, New York.
14. Miscellaneous contents.—Improved method of manufacturing hydraulic cement.—A complete Pompeian house.—Inventions reduce the cost of building.—Those dreaded draughts. How they are caused and avoided in window-tight rooms.—Fire proof buildings.—The great staircase in the Capitol Building at Albany, N. Y.—Porous glass for windows.—Mexican onyx.—The Manhattan Life Building, New York.—View showing the waterproofing of the walls by the Caffall process.—A traveling lawn sprinkler, illustrated.—Egyptian cement plaster.—Ornamenting glass.—A bridge of concrete.—A new model parlor door hanger, illustrated.

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Notes & Queries

HINTS TO CORRESPONDENTS.

Names and Address must accompany all letters, or no attention will be paid thereto. This is for our information and not for publication. References to former articles or answers should give date of paper and page or number of question. Inquiries not answered in reasonable time should be repeated; correspondents will bear in mind that some answers require not a little research, and, though we endeavor to reply to all either by letter or in this department, each must take his turn. Buyers wishing to purchase any article not advertised in our columns will be furnished with addresses of houses manufacturing or carrying the same. Special Written Information on matters of personal rather than general interest cannot be expected without remuneration. Scientific American Supplements referred to may be had at the office. Price 10 cents each. Books referred to promptly supplied on receipt of price. Minerals sent for examination should be distinctly marked or labeled.

(6433) F. B. says: 1. What toilet perfumes are partially protective against influenza and fever contagion? A. Try aromatic vinegar, made as follows: Dried leaves of rosemary, rue, wormwood, sage, mint, and lavender flowers, each ½ ounce; bruised nutmeg, cloves, angelica root, and camphor, each ¼ ounce; alcohol, rectified, 4 ounces; concentrated acetic acid, 16 ounces; macerate the materials for a day in the spirit; then add the acid and digest for a week longer at a temperature of 14° or 15° C. Finally press out the now aromatized acid and filter it. 2. What process in multiplying copies of tracings and details of machinery gives a black line on white ground? A. See the valuable article on heliography, or the actinic copying of drawings and engravings, 12 different methods, in SUPPLEMENT, No. 584.

(6434) F. L. says: Will you kindly tell how to make Lea & Perrin's Worcestershire sauce? A. This is quite a complex condiment. It is made of wine vinegar, 1½ gallon; walnut catsup, 1 gallon; mushroom catsup, 1 gallon; Madeira wine, ½ gallon; Canton soy, ½ gallon; moist sugar, 2½ pounds; salt, 19 ounces; powdered capsicum, 3 ounces; pimento, 1½ ounce; coriander, 1½ ounce; chetney, 1½ ounce; cloves, ¾ ounce; mace, ¾ ounce; cinnamon, ¾ ounce; asafoetida, 6½ drachms; dissolve in 1 pint brandy 20° above proof. Boil 2 pounds hog's liver for 12 hours in 1 gallon of water, add water continually so as to keep up the quantity of 1 gallon; mix the boiled liver thoroughly with the water, strain through a coarse sieve, and add this to the above mixture. It is self-evident that no chemical examination could ever detect the presence of half the above organic products.

(6435) J. M. asks: 1. What is the difference between a single view lens and a rapid rectilinear lens? A. A single view lens makes a picture distorted more or less toward the edges, and to secure good definition a small diaphragm is needed. In a rectilinear lens it is possible to make corrections which avoid the distortion and permit of the use of a larger diaphragm, thus allowing more light to pass. 2. What is single swing and double swing as applied to cameras? A. Swing backs are applied to cameras to permit of tilting the camera to bring the plate parallel with principal vertical plane of the picture, to obtain a view without distortion. The double swing is applied to permit of swinging the plate in two planes. 3. What size lens should I use to take an ordinary cabinet portrait? A. Use a 4¼×6½ lens. 4. How could I prepare dry plates? A. Buy your dry plates; they are very difficult to prepare. The process is described in SUPPLEMENT, No. 541. 5. Is perspiration weakening? A. Excessive perspiration is weakening.

(6436) G. R. R. asks: 1. I have three Mesco dry batteries that are partly exhausted. I have plenty of sheet zinc for cups. Will you please tell me what to fill with? A. For dry batteries we refer you to our SUPPLEMENT, Nos. 157, 767, 792. 2. Also two Gonda prism Leclanche batteries, and do nothing with them. Have worked prisms in warm water, used new solution and zincs, but get only a faint current. What can I do to improve them? I want to use them for a microphone. A. You need new prisms. By soaking the old ones in solution of potassium permanganate, you can get something out of them. 3. Will electric light carbon pencils do for a Hunning transmitter, if pulver-

ized? A. Yes; polish by shaking with best quality of plumbago. 4. I have 12 cells of plunge battery 1½×3. Can I get a current strong enough to magnetize steel for a compound telephone magnet with 1¼ pounds of No. 18 cotton-covered magnet wire? A. Yes. 5. How are the magnets made in the compound watch style receiver like the National, of Boston? A. German steel is often used for telephone magnets. We have no information concerning the special telephone you mention. 6. Could the core of an induction coil be used as a receiver with the secondary coil in the line, same as connected in the transmitter? A. It is very questionable if you would get working results. 7. What is the most practical for a Hunning transmitter, graphite or pulverized carbon? A. Try method of query 3.

(6437) M. A. asks: 1. Does it make any difference in the strength of an electro-magnet whether the form of the cross section is different, provided the area and the length is the same and both are wound with the same amount of wire for instance; the area of each cross section of two electro-magnets is 16 square inches; one is 2 inches by 8 inches and the other 4 inches by 4 inches. A. The shape of cross section will slightly affect the leakage, but not enough to amount to anything. The shape of the polar ends has a very great effect on the tractive power. 2. With what size wire should I wind the simple electric motor for 4 amperes and what voltage will it then require to develop ½ horse power? A. For 4 amperes use No. 17 wire; give it 8 volts. We advise you not to change the winding. You cannot get ½ horse power out of it. 3. How many watts should a highly efficient motor of the same power require? A. 100 watts.

(6438) J. E. D. asks: 1. What kind of gas is the most powerful for lifting purposes, and what weight will 1,000 cubic feet of such gas lift? A. Hydrogen; 70 pounds if pure. It is rarely in pure. 2. What is the lifting power of common illuminating gas per cubic foot? A. About 30 pounds per 1,000 cubic feet. 3. What is the average weight of a cubic foot of aluminum? A. 163 pounds.

(6439) H. A. B. writes: I have made a medical battery as follows: 2 layers of No. 18 cotton-covered copper wire for primary coil, 12 layers (1½ ounces) of No. 36 silk-covered copper wire for secondary coil and a bundle of No. 18 soft iron wire 7-16 inch in diameter for core, the whole being 2½ inches long. I do not get much of a shock with one cell of bichromate battery. Please state where I have made my mistake. Please give right proportion of all wire for a Faraday battery to obtain good results. A. We presume your secondary is too small. Our SUPPLEMENT, No. 569, describes a powerful medical induction coil.

(6440) J. B. asks: 1. How are dry plates for photographing made? A. See our SUPPLEMENT, Nos. 541, 647, 649 and 696. 2. What book do you recommend for beginner in electricity? A. For beginners in electricity we recommend and can supply Thompson's "Elementary Lessons in Electricity and Magnetism," price \$7.25; Ayrton's "Practical Electricity," price \$2.50; also Hopkins' "Experimental Science," price \$4 by mail. 3. Are magnetic lines of force of the same strength in all magnets or do they vary in strength with the size of the magnets? A. They are assumed to vary in number per given area. A line of force is a fixed unit. See SUPPLEMENT, Nos. 891, 895.

(6441) F. B. asks: 1. Could an electro magnet be made by taking two spools and putting on a turning lathe taking the wood off to within ¼ inch of the hole (going through the spool), and then wind with wire in the usual way, of course putting an iron core in the holes of the spools, having them joined together at one end? Would the ½ inch in thickness hinder the power of the magnet to any great extent? A. Yes; but the wood would be inferior to the same quantity of iron; otherwise it would be of no particular harm. 2. How many cells of Crowfoot gravity battery would it take to light a six candle power incandescent lamp? A. Twenty-four in series, eight in parallel—a total of nearly two hundred cells.

(6442) H. M. C. asks: 1. Is it necessary to use silk-covered wire in making induction coil in Blake transmitter? A. It is decidedly advisable to do so. 2. Will two layers of No. 24 on the primary and 10 layers of No. 36 on the secondary be right in making above? A. Wind the primary to ½ ohm resistance and the secondary to 80 ohms. 3. Will you give a good recipe for preparing the chalk as used on the chalk engraving plate? I have tried several processes and I fail in making it stick to the plate and prevent it from chipping. A. See our SUPPLEMENT, Nos. 720 and 790. Possibly the surface of your plate is too smooth or was greasy.

(6443) O. C. asks: Is there any heat produced by the pressure of a book lying on a table? A. No; the pressure of the book is force, not energy. In overcoming force no heat is produced; in overcoming energy, heat is often the result.

(6444) C. H. B. says: In compounding equal parts of pure distilled water and pure alcohol the original quantity is diminished, and the strength increases. Why is this? A. A very usual phenomenon of solution is represented in the above case. When liquids having an affinity for each other are mixed, there is generally a reduction of volume. It represents a change on the dividing line between physics and chemistry.

(6445) F. B. P. asks how to etch cutlery. A. For etching brands and marks on polished steel surfaces, such as saws, knife blades, and tools, where there are many pieces to be done alike, procure a rubber stamp with the required design made so that the letters and figures that are to be bitten by the acid shall be depressed in the stamp. Have a plain border around the design, large enough to allow a little border of common putty to be laid around the edge of the stamped design to receive the acid. For ink, use resin, lard oil, turpentine, and lampblack. To ¼ pound of resin put 1 teaspoonful lard oil; melt, and stir in a tablespoonful of lampblack; thoroughly mix, and add enough turpentine to make it of the consistency of printer's ink when cold. Use this on the stamp in the same manner as when