

noted to the fungi of forage plants. Several pages are devoted to the bibliography of the subject, 175 cuts are contained in the text, while an adequate index terminates the work.

ECLECTIC PHYSICAL GEOGRAPHY. By Russell Hinman. Cincinnati and New York: Van Antwerp, Bragg & Co. Pp. vi, 382. Price \$1.

The general subjects of physical geography, the earth, the atmosphere, the sea, the land, weather and climate, the various forms of life and its distribution, are well treated in this little work. It is illustrated by maps, charts, and general illustrations, amounting to 149, and presents a very attractive appearance. It is designed largely for educational purposes, but can be read with benefit by many long out of school, as giving an abstract of the present treatment of this subject. It is supplied with an index.

STUDIES IN CRITICISM. By Florence Trail. New York: Worthington Company, 747 Broadway. Pp. 328.

Our limitations do not permit us to give any idea of this work. Literature, religion, genius, morality, and art are all treated in it. It displays great merit, and one of our objects in saying so little about it is that no adequate notice can be contained in anything like the space at our disposal.

ENTOMOLOGY FOR BEGINNERS, FOR THE USE OF YOUNG FOLKS, FRUIT GROWERS, FARMERS, AND GARDENERS. By A. S. Packard, M.D., Ph.D. New York: Henry Holt & Company. 1888. Pp. xvi, 367.

This work, although the title states it to be for "young folks, fruit growers," etc., is really, so far as the limits of its size permit, a full treatise on general entomology. The structure of insects, their actions, and the performance of the general functions of life are given elaborately, together with their growth and metamorphosis. Their classification follows, being preceded by a synopsis and tabular view of the orders. Insect architecture and the insects injurious and beneficial to agriculture are next spoken of. A large portion of the work, including about one hundred pages, is devoted to directions for collecting, preserving and rearing insects, their dissection, and to the cutting and mounting of sections. This represents a somewhat neglected subject, for a treatise on which a demand has long existed. The entomologist's library is systematically treated, the bibliography being divided into classes. A glossary and index close the work, which is illustrated by nearly 300 cuts.

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. 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.

(1) E. J. B.—Powers & Weightman, of Philadelphia, are the only makers of quinine in quantity in this country, and are probably the largest manufacturers in the world.

(2) M. L. W. asks: Whether a driven well (small iron tube), with a force pump, can be used where you have to go down 40 feet for water? A. As ordinarily constructed, it could not. By digging down at the surface so as to have your pump cylinder fifteen feet from the surface, water could be pumped from it.

(3) E. H. B.—To bleach ivory handles of steel tools, protect the steel with a coat of wax or paraffin, and set the handles in a solution of chloride of lime 1 part, water 4 parts, for a day, more or less, then wash the handles with clean warm water, wipe and dry. If satisfactory, warm the metal part and wipe off the wax or paraffin. Another way is to dip the handle in a saturated solution of alum in water for from 1 to 3 hours, wash, wipe, and dry. If the handles are not very dark, the latter way is preferable. For polishing the steel points, use putty powder (oxide of tin) on a buff wheel wet with alcohol. This will not stain the handles.

(4) A. S. M. asks how to restore daguerreotypes. A. Daguerreotypes do not fade, but become stained if much exposed to air and dampness. Probably yours are stained. To clean daguerreotypes according to P. C. Duchochois, take hold of the daguerreotype with pinchers by one corner, and, keeping the plate level, cover it with a solution of potassium cyanide (one part to twenty-five of water), and if the picture be much stained, heat it moderately with an alcohol lamp for fifteen or twenty seconds, when the solution is thrown off and the plate rinsed. This done, flow the plate with clear water, heat it as before, and holding it then almost vertically, dry it; in commencing, heat it at one of the upper corners and dry the water by blowing upon it toward the opposite corner. The whole operation should be quickly done, and the plate not too strongly heated, especially when covered with cyanide, otherwise the image might be obliterated. The daguerreotypes may be dusted with a fine camel's hair brush, but not touched with the fingers nor rubbed with any hard material. They are very easily scratched. They may be copied in the camera, but every precau-

tion should be made to have every object in front of the daguerreotype covered with black to avoid reflections. The camera box and tripod, as well as the lens tube, should be protected with a black cloth.

(5) M. H. F. asks for a formula of a hydrokinone developer:

- No. 1. Water..... 10 oz. Sulphite sodium crystals chem. pure... 2 oz. Hydrokinone..... 1 oz.

Dissolve in the order named, using, if possible, distilled water. This solution should be kept in a yellow bottle or in a dark place. It will retain its strength for a year or more.

- No. 2. Water..... 10 oz. Carbonate of potash..... 2 oz. Carbonate of soda..... 1 oz.

The weights are based on 437 grains to the ounce. Put in the graduate two drachms of No. 1 and one and a half drachms of No. 2, then fill up to three ounces with water. If the developer works too slowly, add one drachm additional of No. 2. This will develop several plates in succession. When through, pour the developer into a separate bottle, filtering it through cotton, and preserve for use on future plates, adding a little fresh developer to it.

(6) J. R.—For oxidizing silver. Dip the clean silver article in a solution of sulphide of potassium (liver of sulphur), 2 drachms to a pint of water. Heat this solution to a temperature of 175° Fah. Immerse for a few seconds only. When the article becomes blue black. For a velvet black, dip the article, previous to oxidizing, in a solution of mercurous nitrate and water and rinse. Then dip in the sulphide solution as above. For a brown shade, oxidize in the potassium sulphide as above, then dip in a liquid composed of 10 parts blue vitriol and 5 parts salamoniac to 100 parts vinegar. After oxidation brush with a scratch brush very lightly, to brighten and variegate the surface. For other methods and further details, see "Techno-Chemical Receipt Book," which we can furnish for \$2.

(7) A. C. W. asks: Whether there is or is not a theory explaining the elliptical orbits of the planets. A. You will find articles in SCIENTIFIC AMERICAN SUPPLEMENT, Nos. 228, 267, 573, on planets, their orbits, and theory of formation. Also see "Newcomb's Popular Astronomy," which we can mail for \$2.50.

(8) F. B. S. writes: I have made a small furnace for melting cast iron on the forge to blow with the bellows, and have had no trouble whatever in melting the iron. Can melt 20 lb. in 20 minutes, and it takes about 20 minutes to get the furnace hot. I have succeeded easily in making small, light castings, but cannot make a thick, chunky casting like a post maul or a dumb bell without leaving a sunk hole in the upper side. The mould fills up all right, but sinks down afterward. I use all scrap iron, and swing the furnace off by a crane, and pour directly from furnace into mould. Can you suggest a remedy? I am a long way from any foundry. A. Make what foundry men call a riser at the highest points in the flask, to carry off air quickly and allow a surplus of metal to flow up, and from which the shrinkage takes metal to fill. It is made like the gate or sprue that you pour into. For a dumb bell you should have two, about 1/4 in. diameter. Possibly you do not have the cope or top part of the flask deep enough to give pressure to the metal. The mouth of the gate should be 3 or 4 inches above the top of the pattern. You will gain much valuable information from "American Foundry Practice," by West, which we can mail for \$2.50.

(9) S. L. P.—You cannot anneal wire practically and satisfactorily by electricity. The cheap way is to anneal the whole bundle in an oven or muffle at a very low red heat, so as not to burn the outside layers, as is done at the wire works. If the wire is very small, passing it through a red hot muffle or iron pipe from the reel, or the flame of a series of flat wick lamps, would accomplish your purpose. The new lead plating is called kalamain. It is the tinning process, with a mixture of lead and tin, or solder; about 2 parts lead to 1 part tin.

(10) L. R. D.—Lightning rods well grounded are a protection. Ground bone is applied directly to the soil, being sown broadcast like grass seed. 500 to 1,000 lb. per acre may be used. Sometimes it is mixed with wood ashes, 15 to 30 bushels of the latter being applied per acre.

(11) E. M. C. asks: Is there any rule or table printed by which I can calculate the size of wire for the field magnets and armature of a dynamo to properly run a lamp or set of lamps 42 volts 13 amperes 16 C. P. A. We refer you for general points of dynamo construction to Silvanus Thompson's Dynamo-Electric Machinery, \$5. The subject of dynamo construction still has to be treated empirically, no final formula having been deduced.

(12) J. S. J. writes: I see in SCIENTIFIC AMERICAN of September 1 an article on vegetable wax. Can you state in your correspondence column what color the wax is, and the price in this country? A. Vegetable waxes resemble beeswax, but are rather lighter in color. There are many kinds. Japan wax sells for 25 cents a pound.

(13) G. L. asks (1) for a method of preparing cider, so it will remain sweet. A. Dip a stick in melted sulphur, set it on fire and hold in a half filled barrel; then agitate it and complete filling. 2. A furniture polish, suitable for hard oil finish. A. Melt beeswax and add turpentine until it possesses the consistency of honey on cooling. Apply with a rag, and plenty of rubbing.

(14) M. J. S. writes: Works on chemistry state that: It has been estimated that a liter of hydrogen or any other gas contains 10<sup>24</sup> molecules. Please tell me how the above is shown or where I can find the information. A. You will find the subject treated in the appendix to Thompson & Tait's Physics. Also in the article "Atoms," by J. Clerk-Maxwell, in the En-

cylopædia Britannica, 9th edition. The size is deduced from the electric relations of zinc and copper, from the thickness of soap bubble films, and from the variations from Boyle's law shown by gases.

(15) G. W. O. asks for the process of refining tin and lead, as he has to make a quantity of solder in his business. A. You probably melt your metals at too high a temperature. Keep the heat low and spread some powdered charcoal over the surface.

(16) L. S. asks: What is the most simple, economical and practical way of opaueing the backgrounds on negatives of furniture so as give prints showing only the object on the clear paper? A. We have successfully opaueed negatives with a brush, using Gihon's specially prepared opaue, which can be had from dealers in photographic materials. It dries quickly and flows readily from a very fine camel's hair brush. To get a white background when making the photograph, cover the wall and floor with white sheets, calcimined with lime, then use a magnesium flash light to illuminate the shadows. In this way the furniture will appear clear cut as desired, and it is much easier than using opaue. Also use plates with creamy thick films and of ordinary sensitiveness.

(17) J. S. asks for a corn plaster such as are sold in drug stores. A. Spread common adhesive plaster upon buckskin, cut into disks and punch circular holes in each. For plaster use 1 part isinglass, water 10 parts, tincture of benzoin 2 parts, apply in one or more coats, allowing it to dry between applications.

TO INVENTORS.

An experience of forty years, and the preparation of more than one hundred thousand applications for patents at home and abroad, enable us to understand the laws and practice on both continents, and to possess unequalled facilities for procuring patents everywhere. A synopsis of the patent laws of the United States and all foreign countries may be had on application, and persons contemplating the securing of patents, either at home or abroad, are invited to write to this office for prices, which are low, in accordance with the times and our extensive facilities for conducting the business. Address MUNN & CO., office SCIENTIFIC AMERICAN, 361 Broadway, New York.

INDEX OF INVENTIONS

For which Letters Patent of the United States were Granted

September 25, 1888,

AND EACH BEARING THAT DATE.

[See note at end of list about copies of these patents.]

Table listing inventions with patent numbers and dates, including items like Air feeder, Alarm, Alloys, Animal trap, Armature, Axle box, Axle lubricator, Axle skein, Bail spoon, Band cutter, Barber's chair, Barometers, Battery, Binding strap, Bleaching fiber, Bleaching wax, Block, Board, Boat, Boiler, Boiler tube cleaner, Book leveler, Book, receipt and record, Book rest, Books, binding clamp, Bottle, Bottles, capsule for, Box, Brake, Brick machine, Bridge, Broom or brush, Brush, Buggy top, Buoy, Burner, Button making machine, Can heading machine, Can opener, Cant hook, Car coupling, Car coupling, F. M. Rariden, Car coupling, J. T. Wilson, Car gate, Car heaters, Car spring, Car warmer, Cars, metallic platform for railway, Cars, safety brake for cable, Cars, stake and socket for flat, Carburetor, Card flats, Carding machines, Carriage warmer, Carriages, making body loops for, Carrier, Cartridge loading machine, Cartridge shell, Case, Catheter, Centerboard for vessels.

Table listing inventions with patent numbers and dates, including items like Chain links, Chair, Check or card case, Chopper, Churn, Cigar cutter, Cigar machine, Cigar making machine, Cigar wrappers, Cigar wrapping and finishing machine, Cigarette, Cigarettes with tobacco wrappers, Clamp, Cleaner, Clevis, plow, Clock key, Cloth cutting apparatus, Clothes drier, Clutch for working drills, Clutch, spiral friction, Coffee mill, Cork extractor, Cork extractor, C. & E. H. Morgan, Corn drill, Corset, Corset, J. E. Wood, Cotton chopper, Coupling, Crutch attachment, Cuff holder, Cultivator, Cultivator and harrow, Curtain attachment, Cutter, Date indicator, Digger, Door securer, Draught regulator, Drier, Drill, Drilling machine, Drum, heating, Dust collector, Dust pan, Dynamometrical governor, Eaves trough hanger, Electric current indicator, Electric currents, registering meter for, Electric energy, system for the distribution of, Electric machine, dynamo, Electric motor, Electric storage system, Electric wires and street railways, Electrical conductor and insulating conduit, Elevator, Elevator, C. R. Otis, Elevator safety device, Embossing machine, Engine, Engines, cross head for steam, Engines, igniting apparatus for gas or oil motor, Extractor, Fanning mill, Farm gate, Feed water heater, Felt goods, device for hardening, Fence, Fence tightener, Fender and andiron, Fifth wheel, File, bill and letter, File cutting machine, Filter, oil, Fire alarm, Fire extinguisher for the stoves of railway cars, Fire screen, Floor clamp, Folding table, Frame, Fruit box, Fruit gatherer, Fuel, apparatus for burning liquid, Furnace, Galvanometer, Garment stay, Garment supporter, Gas burner, atmospheric, Gas burner, incandescent, Gas governor or pressure regulator, Gas incandescents, manufacture of, Gate, Gate, W. P. Elliott, Gate, D. E. Heiton, Gearing, Grader, road, Grain separator, Grate, Guard, Gun, automatic machine, Gun, magazine, Hanger, Harness trimming, Harrow and pulverizer, Harrow, rotary, Harrow tooth, Harvester, W. Russell, Harvester platforms, carrier for, Hat conformator and stretcher, Hat, Lyons, Hat sweat band, Hay loader, Head rest, Heater, Heating apparatus, Heating device, Heel filing machine, Hinge, spring, Molder, Paper roll holder, Paper holder, Stovepipe and collar holder, Weather-board holder, Hot air and hot water heater, combined, Hot air and hot water heater, combined, Richardson.