voted 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 precaution 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 salammoniac 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. 226, 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 ¾ 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 cheapest 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 kalamein. 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 1·3 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^{24} 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 Encyclopædia 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 opaqueing the backgrounds on negatives of furniture so as give prints showing only the object on the clear paper? A. We have successfully opaqued negatives with a brush, using Gihon's specially prepared opaque, 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 opaque. 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.

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.]

Air feeder, C. A. Klotz 390,129
Alarm. See Fire alarm. Railway alarm.
Alloys, obtaining manganese, O. M. Thowless 389,910
Animal trap, W. C. Hooker 390,021
Armature, dynamo, Meyers & Coward 389,894
Axle box for carriages, M. Guiet 389,963
Axle lubricator, W. C. Joslin 389,929
Axle skein, Fulton & Viele 390,121
Bait spoon, H. Loftie 390,028
Band cutter and feeder, combined, J. N. Schmeltzer 389,981
Barber's chair, adjustable, E. Berninghaus 390,059
Barometers or other instruments, indicating mechanism for, I. Joseph 389,967
Battery. See Secondary battery.
Binding strap, J. W. Mansfield 389,933
Bleaching fiber, Smith & Nicolle 389,944
Bleaching wax, R. M. Perrine 389,898
Block. See Building block.
Board. See Center board. Ironing board.
Boat. See Life boat.
Boiler. See Steam boiler. Tubular boiler.
Boiler, J. Leightham 389,969
Boiler tube cleaner, N. Blanchard 390,060
Book leveler, W. M. Kinnard 389,891
Book, receipt and record, H. Loewenbach 390,087
Book rest, A. R. Byrkit 389,952
Books, binding clamp for receipt, Noel & Maurer 389,896
Bottle, J. Canan 389,953
Bottles, capsule for, C. Cheswright 389,954
Box. See Axle box. Fruit box. Letter box. Watch movement box.
Brake. See Vehicle brake.
Brick machine, R. A. Willett 390,110
Bridge, S. A. Buchanan 389,951
Bridge, draw, R. A. Sawyier 389,980
Broom or brush bridle, R. E. Copson 390,005
Brush, flesh, E. M. Ryan 390,142
Buckle or clasp for suspenders, etc., P. Frantzen 389,960
Building block or brick, hollow, J. Lee 390,175
Buildings, waterproof structure in, F. T. Whalen 389,914
Buggy top, L. E. Duvall 389,957
Buoy, W. C. Whittle 390,050
Burner. See Gas burner. Lamp burner.
Button making machine, Ellery & Veazie 390,118
Can heading machine, F. M. Leavitt 390,086
Can opener, D. H. King 390,025
Cant hook, toe ring for, A. Sanford 389,941
Car coupling, W. Bunch 390,156
Car coupling, F. M. Rariden 390,095
Car coupling, J. T. Wilson 390,195
Car gate, folding, G. E. Adams 389,887
Car heaters, protector for, J. A. Miller 390,182
Car spring, N. H. Davis 390,069
Car warmer, street, G. A. Beach 390,154
Cars, metallic platform for railway, B. J. La Mothe 390,026
Cars, safety brake for cable, A. Neuburger 389,895
Cars, stake and socket for flat, T. J. Vaughan 389,991
Carburetor, Ruckle & Wolters 390,037
Card flats, electric testing device for, E. Tweedale 390,101
Carding machines, electric testing device for, J. Bullough 390,113
Carriage warmer and ventilator, G. A. Beach 390,153
Carriages, making body loops for, S. E. Brown 390,112
Carrier. See Trace carrier.
Cartridge loading machine, J. Morts 389,936
Cartridge shell, G. W. Jackson 390,082
Case. See Check or card case. Piano case. Toilet case.
Catheter, J. E. Lee 390,177
Centerboard for vessels, E. J. Davy 390,070
Chain links, manufacture of tubular coverings for, J. G. Ward 389,992
Chair. See Barber's chair. Reclining chair.
Check or card case, A. M. Clark 389,873
Chopper. See Cotton chopper.
Churn, J. M. & O. A. Crandell 389,874
Cigar cutter, F. C. Miller 390,134
Cigar machine, C. L. Driefer 390,160
Cigar making machine, C. L. Driefer 389,956
Cigar wrappers, machine for cutting, O. Hammerstein 390,167
Cigar wrapping and finishing machine, C. L. Driefer 389,955
Cigarette, H. F. Riedel 389,976
Cigarettes with tobacco wrappers, manufacturing, H. F. Riedel 389,975
Clamp. See Floor clamp.
Cleaner. See Boiler tube cleaner.
Clevis, plow, J. D. Binford 389,999
Clock key, A. M. Lane 389,931
Cloth cutting apparatus, A. Warth 390,105
Clothes drier, J. H. Evans 390,120
Clutch for working drills, automatic friction, G. D. Anderson 389,997
Clutch, spiral friction, L. W. Lombard 390,029
Coffee mill, E. H. & C. Morgan 390,184, 390,185
Cork extractor, L. M. Devore 390,159
Cork extractor, C. & E. H. Morgan 390,183
Corn drill, M. D. Rude 389,907
Corset, E. Glass 390,162
Corset, J. E. Wood 389,948
Cotton chopper, E. J. Schuman 389,942
Coupling. See Car coupling. Thill coupling.
Crutch attachment, W. J. Donald 390,011
Cuff holder, C. F. Perry 389,973
Cultivator, S. B. Cunningham 390,007
Cultivator and harrow, combined, J. P. Howe 390,126
Curtain attachment, window, Searles & Caldwell 389,982
Cutter. See Band cutter. Cigar cutter. Paper cutter. Tobacco cutter. Wall paper cutter.
Date indicator, H. J. Meixell 389,972
Digger. See Potato digger.
Door securer, A. J. Longenecker 390,130
Draught regulator, E. T. Van Hecke 389,913
Drier. See Clothes drier.
Drill. See Corn drill. Ratchet drill.
Drilling machine, center, A. Whitney 390,108
Drum, heating, C. J. & J. P. Evans 390,119
Dust collector, C. N. Smith 390,100
Dust pan, G. A. W. Cage 389,921
Dynamometrical governor, Hurdle & Steiger 389,908
Eaves trough hanger, G. A. Green 390,122
Electric current indicator, P. B. Delany 390,115
Electric currents, registering meter for, J. D. Bishop 389,870
Electric energy, system for the distribution of, G. & A. Pfannkuche 389,974
Electric machine, dynamo, Mather & Hopkinson 390,180
Electric motor, P. Diehl 389,876
Electric storage system, W. H. McDonald 389,935
Electric wires and street railways, elevated framework and support for, L. W. Brown 390,001
Electrical conductor and insulating conduit, R. F. Silliman 389,943
Elevator, C. W. Baldwin 390,053
Elevator, C. R. Otis 390,033
Elevator safety device, C. W. Baldwin 390,052
Elevator safety device, C. R. Otis 390,032
Embossing machine, J. M. Baker 389,949
Engine. See Motor engine. Rotary engine.
Engines, cross head for steam, F. Robb 389,978
Engines, igniting apparatus for gas or oil motor, N. A. Otto 390,092
Extractor. See Cork extractor.
Fanning mill, J. C. Risser 389,977
Farm gate, J. P. Irwin 390,127
Feed water heater, coil, Pratt & Wainwright 389,900
Felt goods, device for hardening, J. & D. Pendergast 390,094
Fence, B. F. Newcomb 390,186
Fence tightener, wire, E. Warner 390,046
Fender and andiron, T. Hipwell 390,020
Fifth wheel, E. Storm 390,042
File, bill and letter, P. Meyer 390,135
File cutting machine, J. F. French 390,075
Filter, oil, L. C. Atwood 390,149
Fire alarm, C. H. Shaffer 390,192
Fire extinguisher for the stoves of railway cars, D. R. Galeher 389,924
Fireplace and damper, S. Shaw 390,040
Fire screen, F. Rudolph 390,140
Floor clamp, C. W. Boettner 389,919
Folding table, A. B. Jones 390,173
Frame. See Window frame.
Fruit box, R. E. Morey 390,135
Fruit gatherer, F. A. Hall 390,165
Fruit gatherer, W. Watson 390,106
Fuel, apparatus for burning liquid, C. Qvarnstrom 390,096
Furnace. See Hot air furnace.
Galvanometer, I. W. Chisholm 390,067
Garment stay, E. K. Warren 389,993
Garment supporter, J. H. Bennett 389,918
Gas burner, atmospheric, H. J. Bell 390,055
Gas burner, incandescent, H. J. Bell 390,056
Gas governor or pressure regulator, W. H. Bradley 390,064
Gas incandescents, manufacture of, H. J. Bell 390,057
Gate. See Car gate. Farm gate.
Gate, W. P. Elliott 390,074
Gate, D. E. Helton 390,124
Gearing, F. H. Richards 390,097
Grader, road, F. Baldwin 390,150
Grain separator, A. C. Newton 389,937
Grate, C. Sahler 390,191
Guard. See Keyhole guard. Snow guard.
Gun, automatic machine, B. Burton 390,114
Gun, magazine, J. Schulhof 390,099
Hanger. See Eaves trough hanger.
Harness trimming, D. J. Regan 390,096
Harrow and pulverizer, Spitler & Pingle 389,985
Harrow, rotary, T. C. Cook 390,004
Harrow tooth, J. Brinkerhoff 390,065
Harvester, W. Russell 390,141
Harvester platforms, carrier for, M. Dew 390,010
Harvester, self-binding, Pitkin & Steward 389,939
Hat conformator and stretcher, combined, H. Lyons 390,178
Hat sweat band, J. W. Gosling 389,962
Hay loader, G. L. McNutt 390,090
Head rest, H. H. Parkhill 389,938
Heater. See Feed water heater. Hot air and hot water heater.
Heating apparatus, C. T. Johns *et al* 390,172
Heating device, W. Vogel 390,194
Heel filing machine, A. K. Washburn 389,994
Hinge, spring, W. H. Beath 390,540
Holder. See Cuff holder. Napkin holder. Paper holder. Paper roll holder. Rein holder. Sash holder. Stovepipe and collar holder. Weatherboard holder.
Hot air and hot water heater, combined, D. S. Richardson 390,098