

Varnish Trees.

The order Anacardiaceæ, or Terebinths, comprises trees or shrubs that yield a resinous, gummy, or milky juice, which, although usually acrid and highly poisonous, yields products of economic or commercial importance. Such is the case, for example, with the *Anacardium occidentale*, a large tree with the aspect of a walnut tree, which is cultivated in the West Indies and other warm countries for its fruits, which are known as cashew nuts. The stem of this tree furnishes a milky juice, which, as it dries, becomes black and hard and is used in India as a varnish. A gum is also secreted by this plant that has qualities like those of gum arabic. It is exported to Europe from South America under the name of *cajji* gum.

The varnish of Sylhet is chiefly procured from *Semecarpus Anacardium*, the marking nut tree of India. The juice of this tree, when dry, forms a black varnish much used in India, and, among other purposes, is employed, mixed with pitch and tar, in the calking of ships.

Melanorrhœa usitatissima, the theet-su of Tenasserim and the kheu of Manipur, produces wood that is so hard and heavy that anchors for native boats are made of it. The most valuable and extensively used product of the tree, however, is the black lacquer that it yields, and which is known as Martaban varnish. This is obtained by the process of tapping; short joints of bamboo closed at the bottom being thrust into holes bored in the trunk and left for two days, when they become full of a whitish thick juice which turns black when exposed to the air, and requires to be kept under water in order to preserve it. All kinds of domestic utensils and furniture are lacquered with this juice, which is laid on thin, and slowly dried, the change from black to white being, according to Sir D. Brewster, attributable to its losing its organized structure and becoming homogeneous, and then transmitting the sun's rays, which, in its previously organized state, it dispersed.

Such a secretion is probably the substance mentioned by Ainslie as the black lac of the Burma country, with which the natives lacquer various kinds of ware.

The valuable hard black varnish called Japan lacquer is obtained from *Stagmaria verniciflua* of the Indian Archipelago. This resin is extremely acrid and the people of Sumatra consider it dangerous even to sit or sleep beneath the shade of the tree that yields it. The manner of preparing the varnish is fully described in Jack's Malayan Miscellanies.

From the stem of *Holigarna longifolia*, a lofty Indian tree, the natives of Malacca extract an acrid juice which they use as a varnish. The stone of the fruit likewise contains an acrid resinous juice which is employed for the same purpose, while the investing pulp contains a glutinous fluid which is made use of by painters, and for fixing colors on linen.

Augia Chinensis produces a varnish which is used in China and Siam. *Odina Wodier*, *Buchanania latifolia* and many more Indian species, yield a juice having the same property.

The fresh juicy bark of *Schinus Arroeira* is used in Brazil for rubbing newly made ropes, which it covers with a very durable bright dark brown varnish.

Mastic, a resin used for varnishing pictures, is obtained by making incisions in the bark of *Pistacia Lentiscus*, a small tree indigenous to Southern Europe and Western Asia. The juice of many species of *Rhus* is milky, stains black, and is sometimes extremely venomous. *R. vernicifera*, a small Japanese tree, yields the famous lacquer so extensively employed by the inhabitants of that country for lacquering various articles of furniture and small ware. It exudes from wounds made in the tree, and is at first a milky juice, but becomes darker and ultimately black on being exposed to the air. There are about twenty different kinds of this lac in the Japanese market. The juice of *R. vernix* and *R. succedaneum* possesses similar properties.

The order Dipteraceæ includes gigantic trees abounding in resinous juice, and found in India and especially in the eastern islands of the Indian Archipelago.

One of these, *Vateria Indica*, furnishes the resin called copal in India (and gum anime in England), and very nearly approaching the true resin of that name. It is also called white dammar and gumanine. In its recent and fluid state it is used in the south of India as a varnish (called piney varnish) for carriages, pictures, etc., and, dissolved by heat in closed vessels, is employed for the same purpose in other parts of India. It is extremely tenacious and solid, but melts at a temperature of 97.5° Fah. The resin is procured by cutting a notch in the tree, so that the juice may flow out and become hardened by exposure to the air. The gum resin known as Brazilian copal is obtained from several species of *Hymenœa* and from *Trachylobium Martianum*; Madagascar copal from *Hymenœa verrucosa*; and Mexican copal from *Elæocarpus copallifera* and *Rhus copallinum*.

Callitris quadrivalvis, a coniferous tree of Barbary,

yields the whitish yellow brittle resin known as sandarac, which is used in varnish making.

Kauri resin is a product of *Dammara Australis*, a New Zealand conifer reaching a height of from 150 to 200 feet. The resin is hard and brittle like copal. It exudes chiefly from the lower portions of the trunk, either from natural fissures or from wounds purposely made with an ax. It is at first of about the consistency and color of cream, highly glutinous and flavored like turpentine, but gradually hardens by exposure to the air and changes to a dark color. The best resin is found by digging in the ground where old forests have been destroyed, and it is found from a few inches to as many feet in depth, and in localities now denuded of trees. It is also found in the soil at the base of living trees.

The fine transparent resin used in the manufacture of varnish under the name of damar or dammar is the product of the Amboyna pine, *Dammara Orientalis*, a native of the Moluccas.

Elæagia utilis, a lofty cinchonaceous tree of the Corallieras, is remarkable for the quantity of green resinous or waxy matter secreted by the stipules and which invests the unexpanded buds. The resin is collected by the natives and employed by them to varnish boxes and many other useful or ornamental objects. The natives call this tree by a name signifying wax or varnish tree.

Herz's Telegraph Invention.

In a recent interview Dr. Cornelius Herz, at present a fugitive from French justice at Bournemouth, England, and who is described as worn with anxiety and pain and clearly dying, declared in broken utterances that he would leave a great invention to be patented and developed. The gist of the invention is an enormous improvement in telegraphy, by which more than 1,000 words can be transmitted by long submarine cables in the same time that 20 words can be sent now. The invention, the doctor claimed, would allow of cabling 50 words at a cost of five cents. He dwelt upon the influence that the invention would have upon the newspaper of the future, and said that he intended, in granting royalties, to reserve all rights as far as they applied to news. The invention, he said, would render submarine telephony and multiplex telephony feasible. Among those engaged in his laboratories in France on the experiments which have resulted in the invention he mentioned Edison's nephew.

RECENTLY PATENTED INVENTIONS.**Electrical.**

COMMUTATOR BRUSH HOLDER.—George J. Junker, Mount Vernon, Ill. This invention provides for the construction of a commutator in which the different coils of the armature may be in series or in parallel, and the current taken off from each coil separately, permitting of supplying as many circuits as there are coils. The commutator is formed of a series of bisected rings mounted on the armature shaft, insulated from each other and from the shaft, with the halves of each ring insulated from each other, and with the terminals of each coil on the armature connected with the halves of one of the commutator rings. The terminals of the coils are all extended parallel with the shaft and insulated from all the commutator rings except the ones to which they properly belong.

Mechanical.

NUT LOCK.—William Woolcock, Shamokin, Pa. This is an improvement in nut locks in which the nut is secured on the bolt by means of a washer, or by a supplemental nut applied to a reduced portion of the bolt. Combined with a bolt having a reduced polygonal extension is a nut having a threaded boss on which a cap nut is adapted to screw, a ratchet being applied to the bolt extension, in connection with a pawl and spring.

Railway Appliances.

SAFETY CAR BRAKE.—Jefferson U. Elwood, McKeesport, Pa. This is a brake especially applicable to street cars, and for use in conjunction with the ordinary brakes. Secured to the car truck are vertically sliding transversely slotted brake shoe holders in brackets, there being wedge-shaped shoes adjustable in the holders. The brakes frictionally engage the track rails, and work on a curve as well as on a straight line. The handle mechanism for working the brake is applied to an ordinary brake shaft, not interfering with the working of the latter.

Agricultural.

CORN SHELLER.—Albert Peterson, Cambridge, Ill. A machine adapted to cut up fodder with corn ears thereon, and then separate the shelled corn from the fodder and cobs, is provided by this inventor. The driving shaft may be turned either by hand or power, and the shelling and separating mechanism are so arranged that it may be used in connection with an ordinary corn cutter, and made to shell corn very rapidly and clean it nicely.

Miscellaneous.

WINDMILL.—Saunders Saundersen, Northwood, North Dakota. This mill is designed to permit the paddles, when the wind blows strongly, to be forced perpendicularly edgewise to the wind, thus spilling sufficient wind to prevent the wheel being revolved

too fast. Should the wind blow very strong, the paddles will be forced edgewise to afford open passage through the wheel, as though the mill were out of gear. By means of a simple mechanism the wheel may be stopped from the ground or its speed slackened. An auxiliary wind wheel is provided at the tail of the mill which automatically acts to carry the main wheel into the wind, should the wind shift.

SURFACE CONDENSER.—Albert Hoberrecht, Ensenada, Mexico. A series of steam or fluid condensing tubes is arranged in tiers, according to this invention, air spaces surrounding each tier of tubes held independent of but communicating with each other, an air supply being connected with such spaces, while air tubes are passed through the steam tubes and independent air-supplying means connected with each tier of air tubes. The improvement is adapted for use with stationary, marine, or locomotive engines, and also for condensing spirits in all kinds of distilleries and breweries, operating without the use of water or other agency except air from a stack or artificial draught.

DRIER FOR COFFEE, GRAIN, ETC.—Emilio C. y Echeandia, Las Marias, Porto Rico. This apparatus provides for the ready insertion and removal of the material to be dried, the arrangement being such that all the grains will be thoroughly and similarly heated, the drier being designed to work thoroughly and with great rapidity. It comprises a revoluble cylinder having closed ends, a series of communicating circumferential compartments with perforated inner and outer walls, and a heater arranged within the cylinder.

PLUMB AND LEVEL.—William Moore, Long Island City, N. Y. This is a tool in which both the plumb and the level tubes may be adjusted simultaneously by the movement of a single screw, the glasses being so set that they will maintain their adjustment for a maximum of time. The plumb and level glasses are so located that the tool may be used conveniently either in plumbing work below or above the operator. The plumb and level glasses are virtually one, but partitions render the plumb and level compartments of the continuous glass independent.

SASH HOLDER.—Charles West, Englewood, N. J. This invention relates to sliding sashes such as used on carriage doors, and provides a sash which will not rattle, which will remain in any position to which it may have been adjusted, and which may be used with carriage doors having grooves or guideways of different shapes. The sash has at the sides of its upper portion opposing spring-pressed swiveled leaves, arranged to move yieldingly perpendicular to the plane of the sash, there being guides lower down in the same plane with the leaves.

GAME COUNTER.—Charles H. Isburgh, Melrose, Mass. This is a light, cheap and positive indicator for keeping account of the number of points played in games of cards, dominos, etc. It is a permanent attachment to or a portion of a table, and when the score is recorded it is immediately placed before each of the players, the change of score requiring but very simple and slight manipulation.

CABINET.—Peter Ulrich, Cedar Rapids, Iowa. This is a cabinet to receive checks, tickets and similar articles, and has a roll front moving in grooves adapted to close its open side, a brake device engaging the movable front and holding it in place wherever it may be fixed.

TIGHTENING DRUMHEADS, ETC.—Isaac H. Sapp, Bucyrus, Ohio. According to this improvement a tension band is passed around the head of the drum, banjo or similar instrument, inside the point of its attachment to the body, and a tension device is connected with the band, whereby it may be made to bind more or less firmly against the head. The tightening may thus be effected quickly and conveniently, and the instrument not be bound by the numerous tightening devices usually employed.

GAME APPARATUS.—Joel Northrup, Otisville, N. Y. For playing jackstones in a novel manner this inventor has devised a flanged playboard in which is held a removable causeway provided with a series of devices for the reception and passage of the jackstones. The places in the causeway to receive the jackstones are of different forms and the game may be varied by the obstructions, hazards and hindrances placed in the causeway or on the board.

TOILET PAPER HOLDER.—William L. Pattani, Alameda, Cal. This inventor provides a case in which the sheets may be held in position for convenient removal, the case when not in use being folded up compactly against any convenient support.

Designs.

HAND BAG.—Henry Bruning, Brooklyn, N. Y. The leading feature of this design consists in a bag body the whole lower end of which is surrounded by an annular band.

SPOON.—George P. Tilton, Newburyport, Mass. The bowl of this spoon is divided into a number of lengthwise ranging curved surfaces which follow the longitudinal curves of the bowl and are narrow both at the point and inner end of the bowl.

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.

A MANUAL OF MARINE ENGINEERING. By A. E. Seaton. London: Charles Griffin & Company, Limited. New York: D. Van Nostrand Company, 1895. Pp. 585. 8vo, 140 illustrations, plates. Price \$6.

This is the twelfth revised and enlarged edition of a standard work. The book was first prepared to supply the want of a treatise on the application of theoretical principles to the design and construction of marine machinery as determined by the experience of leading engineers and carried out in the most recent successful prac-

ture. The data on which the book is based was collected during many years of study and practical work on the part of the eminent author. In 1880, the triple compound engine was little more than a dream, the highest boiler pressure used by advanced engineers was 100 pounds per square inch, steel crank shafts and other heavy forgings were looked upon as luxuries to be indulged in only by governments and wealthy corporations. To-day all these conditions are changed. Most of these changes in engineering practice were gradually introduced, so that it was not difficult by slight emendations and additions to bring the book up to date at each new edition, but other changes have been so rapid as to require the entire remodeling of the book. On the whole, it is one of the most useful books ever written on the subject and has the advantage of being fully up to the best modern practice.

TRANSACTIONS OF THE AMERICAN INSTITUTE OF ELECTRICAL ENGINEERS. Vol. XI. New York: Published by the Institute, 1894. Pp. 938. 8vo, illustrations, plates.

This volume contains a large number of papers with discussion by prominent electricians including William A. Anthony, R. W. Pope, E. J. Houston, Joseph Wetzler, A. E. Kennelly, C. O. Mailloux, Carl Iering, C. P. Steinmetz and others. One of the most interesting and timely articles is that of Isaiah H. Farnham on "Destructive Effect of Electrical Currents on Subterranean Metal Pipes," showing the condition of affairs in Boston. We learn from it that the Omaha plumbers apply the name of "smallpox pipe" to those pipes which are pitted by electrolysis. "The Electric Brake in Practice," by Elmer A. Sperry, is another important paper, while that of Prof. George D. Shepardson on "Suggestions for an Index of Engineering Literature" offers many plans for indexing the vast amount of literature which has appeared on this subject. In the back is a diagram or table called "Diseases of Dynamos," compiled and arranged by Lieut. C. D. Parkhurst. This valuable table should find a place in every dynamo room, as it will tell the probable cause of the trouble from the symptoms shown and gives the remedy. The table is very elaborate and undoubtedly represents an immense amount of labor.

DER ZUSTAND DER ANTIKEN ATHENSISCHEN BAUWERKE AUF DER BURG UND IN DER STADT. By Professor Dr. Josef Durm. Berlin: Wilhelm Ernst & Sohn, 1895. Pp. 18. 4to, 18 illustrations.

In our SUPPLEMENT, No. 1021, there is an article on the same subject the present condition of the remains at Athens with special reference to their preservation. Dr. Durm's work, however, is not limited to the Parthenon, but includes other monuments. Dr. Durm is particularly fitted to write on the condition of these buildings by his researches on Renaissance buildings, notably the Cathedral of Florence and St. Peter's Church in Rome, which were embodied in his "Die Domkuppel in Florenz und die Kuppel der Peterskirche in Rom." The excellent sketches in Dr. Durm's work on Athens are calculated to give a clear idea of the present ruinous con-

dition of these important architectural remains. We are glad to be able to say that recent advices from Athens state that the work of preservation, if not of restoration, will not be delayed. As it takes a long time for white Pentelic marble to weather to the present shade of the remains, it is to be hoped that the restorations will be light.

ALGEBRA FOR BEGINNERS. By H. S. Hall and S. R. Knight. Revised and adapted to American schools by Frank L. Severn, A.M., M.D. New York and London: Macmillan & Company, 1895. Pp. 188. 16mo. Price 60 cents.

This excellent work will be found to meet the wants of all who do not require a knowledge of algebra beyond quadratic equations—that portion of the subject usually covered in the examination for admission to the classical course of American colleges.

MATRICULATION DIRECTORY, No. XVIII. June, 1895. London: University Correspondence College, 1894. Pp. 132. 16mo. Price 1s.

This pamphlet belongs to the University Tutorial Series and gives the general method of work by which specially prepared courses of lessons are given for the examinations of the University of London in Arts, Science, Laws, and Music. These courses "embrace all that is requisite for success, yet entirely relieve candidates from superfluous work, the special syllabus of each examination being always kept in view." We have several times called attention to this pernicious system of limiting education to those subjects required for degrees and certificates. The correspondence system of education might be introduced in the United States with advantage to a much larger extent than it has already been. The present Matriculation Directory is of course of little value to the American student, the text-books and methods of instruction being different.

DESIGNING AND PAINTING VITRIFIABLE COLORS ON GLASS MADE ACCESSIBLE TO ALL. By H. P. Saucere. Translated and adapted by Favor Ruhl & Company, New York City. Pp. 53. 16mo, illustrated. Price 60 cents.

This valuable little book is authorized by Lacroix, of Paris, the well known manufacturer of vitrifiable colors, and with the aid of the clear descriptions any one who can paint at all should be able to turn out excellent work. The newest methods of work are described.

THE CATHEDRALS OF ENGLAND AND WALES. "The Builder" Series. London: Published by "The Builder," 46 Catherine Street, London, W. C. 1894. Elephant folio. 62 plates and plans on plate and India paper. Detail cuts and descriptive letter-press. Library edition limited to 250 copies. Price, unbound in portfolio, £3 13s. 6d. Bound in whole buckram, £4 4s. American price, \$29.40 and \$33.60 respectively.

The cathedrals of England are the richest architectural heritage of the English people, and any work devoted to them is sure of attention. We already have many works devoted to them, treating them from the popular and historical side and occasionally from the side of the professional architect as well. They all, no doubt, fulfill a useful purpose, but the present work appears to have been designed on different lines, as at the same time it appeals to the practical architect, the amateur, and to the section of the general public who care for cathedral history and buildings. The views are all entirely new ones, and in many cases the stereotyped "view" which has come down from the time of Winkles' "Cathedral Churches" has been abandoned. Unlike most series of illustrations of this kind, the method of execution is various. The drawings are reproduced according to the modern methods of photo-mechanical work. To architects, the plans will form the most valuable part of the book, as they are drawn on a large scale; in some cases they occupy two pages of the portly volume. The plans are, of course, drawn to scale, and the dates of various portions of the edifices are distinguished by shading, etc. The plans are exceptionally clear, with the possible exception of the Canterbury plan, and give a splendid idea of the arrangement of the cathedral and conventual buildings. It is pleasing to note that many of the smaller cathedrals, which are usually omitted in works of this class, have been adequately treated, as St. David's, Bangor, and St. Asaph. The detail drawings are new, and will prove interesting to both the professional and the amateur. The letter-press is republished from "The Builder." On the whole, the work reflects great credit on those who have had in hand its production and publication, and the meritorious volume is deserving of a large sale.

AN ELEMENTARY TEXT BOOK OF MECHANICS. (The University Tutorial Series.) By William Briggs, M.A., and G. H. Bryan, M.A. London: University Correspondence College Press, 1895. 16mo. Pp. 336, 167 illustrations. Price \$1.40.

In preparing the present book it has been the aim of the authors to afford beginners a thorough grounding in those parts of dynamics and statics which can be treated without assuming a previous knowledge of trigonometry. The definitions are excellent and examples are fully worked out. The problems are numerous and the answers are given in the appendix. On the whole, it appears to be an admirable text book.

THE PRINCIPLES OF PHYSICS. By Alfred P. Gage, Ph.D. Boston: Ginn & Company, 1895. 12mo. Pp. 493, illustrations. Price \$1.55.

The author published a text book on physics some thirteen years ago entitled "Elements of Physics." The present volume is, however, an entirely new work. The author's views regarding the smallness of text books and the mutilation of the science of physics could be read with advantage by many English educators who are bound down to the syllabus limitation of studies. In

arrangement the book does not differ materially from the general run of books on the subject. The method of presentation is clear and logical and a large number of footnotes add to the interest of the work. The exercises, questions, problems and experiments are excellent. The illustrations are a striking feature of the book and it is satisfactory to note that at last a modern telescope (the Lick) and the transformer have got into a text book.

THE MANUFACTURE OF EXPLOSIVES. A Theoretical and Practical Treatise on the History, the Physical and Chemical Properties and the Manufacture of Explosives. By Oscar Guttman. London: Whittaker & Company, 2 White Hart Street, Paternoster Square. 1895. 2 vols. Pp. 782, xlix, 147 illustrations. Price \$9.

A really good book on explosives has been needed for a long time, and the present work seems to have been written by a person thoroughly conversant with his subject. The introduction of the dynamites for civil and of gun cotton and picrates for military engineering operations, and the general adoption of small bore magazine rifles and smokeless powders has completely revolutionized the subject of explosives, and rendered many of the old books useless. The present work is not a bare catalogue of modern explosives, but is a technical work, dealing with their manufacture on a commercial scale by the latest and most approved methods. An admirable feature of the book is that under nearly every engraving will be found the scale on which it is drawn, so that a correct idea may be obtained of the dimensions of various parts of the machine. This does not apply only to plans, but to the shaded drawings. The same idea could be carried out to advantage in most technical books. The work treats of powders of all kinds, gun cotton, nitroglycerine, fulminates, dynamite, sprenzel explosives, etc. The bibliography of explosives is very full, and is one of the most important features of the book, and even includes works published in 1895. On the whole, the work is an admirable addition to technical literature.

POSITION DIAGRAM OF CYLINDER WITH MEYER CUT-OFF AT ONE-EIGHTH, ONE-FOURTH, THREE-EIGHTHS AND ONE-HALF STROKE OF PISTON. New York: Spon & Chamberlain, 12 Cortlandt Street. 1895. Price 25 cents.

The valves may be adjusted by pulling the slips on the underside of the card. Such diagrams are of great assistance in comprehending a difficult subject.

Any of the above books may be purchased through this office. Send for new book catalogue just published. MUNN & Co., 361 Broadway, New York.

SCIENTIFIC AMERICAN BUILDING EDITION. AUGUST, 1895.—(No. 118.)

TABLE OF CONTENTS.

- 1. A Colonial house at Scranton, Pa. Perspective elevation and floor plans. Cost complete \$4,500. E. G. W. Dietrich, architect, New York City. A simple yet pleasing design.
2. A cottage at Residence Park, New Rochelle, N. Y. Two perspective elevations and floor plans. Architect, Mr. G. K. Thompson, New York City. A unique example for a cottage dwelling.
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5. A cottage in the suburbs of Brooklyn, N. Y., erected at a cost of \$7,500 complete. Perspective elevation and floor plans. Architects, Messrs. J. C. Cady & Co., New York City. An artistic design.
6. Two perspective elevations and floor plans of "Lover's Dell," a residence recently erected in New Jersey. A pleasing example for a modern Colonial dwelling. Architect, Oscar S. Teal, New York City.
7. A residence at Sea Side Park, Bridgeport, Conn. Two perspective elevations and floor plans. An exquisite design. Architect, Mr. W. R. Briggs, Bridgeport, Conn.
8. A residence in the Colonial style, recently erected at Chester Hill, Mt. Vernon, N. Y. Three perspective elevations and floor plans. A picturesque design. Lewis M. Lucas, architect, New York City.
9. Ground plan and perspective view of Holy Trinity Church, Harlem, N. Y. Architect, Mr. Wm. A. Potter, New York City.
10. A residence at Montclair, N. J., being an additional view to those of the same house published in the May issue.
11. Miscellaneous contents: Waterbury electric heat regulator, illustrated.—A sanitary bathtub, illustrated.—Finishing floors.—Pompeian bath room.—Seasoning of stone.—Improvement in warm air furnaces, illustrated.—An improved domestic water service system, illustrated.—An improved door check and spring, illustrated.—The wood of most uses.—The hollow handle glass cutter, illustrated.

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Notes & Queries

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, page and 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.
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Scientific American Supplements referred to may be had at the office. Price 10 cents each.
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Minerals sent for examination should be distinctly marked or labeled.

(6606) T. J. S. writes: Please give me a receipt for enamel for bicycles. A. Enamel black for cycles: Asphalt, 40 ounces; boiled linseed oil, 1/2 gallon; litharge, 6 ounces; powdered zinc sulphate, 4 ounces; red lead, 6 ounces; litharge, 6 ounces. Melt the asphalt, add the others; boil 2 hours, stir in 8 ounces fused dark amber gum and 1 pint hot linseed oil; boil 2 hours more. When mass has thickened remove from the fire and thin 1 gallon turpentine.

(6607) H. F. says: 1. Will you kindly inform me how I can crystallize flowers? A. Crystallized grasses and sprays are made as follows: The bunches are first arranged in a suitable manner, tied and secured; a solution of four ounces alum to 1 quart boiling water is made, and when this has cooled to about 90° or blood heat, the bunch of grass and leaves is suspended in it, in a deep jar, from a rod placed across the mouth of it; as the liquid cools, crystals of alum are deposited upon every spray, the finer and smaller, the weaker the solution is made. This deposit of crystals occurs in the cooling liquid, because hot water dissolves more alum than cold water, and as the water cools, the excess of alum forms crystals which attach themselves to any fibrous matter in contact with it more readily than to anything else. These crystals enlarge by accretion constantly, as long as there is an excess of alum in the solution. When the supply is exhausted, the solution is warmed and more alum is dissolved in it: it is returned to the jar and the bunch of grasses is replaced. When sufficiently covered with crystals it is taken out and dried and is finished. 2. How to prepare the solution for illuminating the face of a clock so the time can be seen at night? A. Use luminous paint, which you can buy ready prepared.

TO INVENTORS. An experience of nearly fifty 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

August 20, 1895, AND EACH BEARING THAT DATE.

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

- Air blast conveyer, J. M. Dodge..... 544,965
Air caureting apparatus, A. E. Aldrich..... 544,945
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