

P. T. R. says: In your article on chameleons (April 11) you are certainly in error when you say that these curious little lizards are never seen on this continent. I have often seen, in several of the Southern States, small lizards that answer your description of the chameleon in every respect. The people residing in these localities have no other name for them but chameleon, and I believe that they are right in so calling them. A. Sir Richard Owen, F.R.S., says: "This family, which includes only the single genus chameleo, contains about 18 known species, all inhabitants of the old world," etc. And again: "It occurs in all the northern parts of Africa and also in India; it has become naturalized in some parts of Europe." There are innumerable varieties of lizard closely allied to the chameleon indigenous to this country; especially iguanas and geckos, which have doubtless led to your impression.

G. C. T. asks: Are you acquainted with any paint, pigment, substance, or solution which can be applied to the weatherboarding of a frame building with the effect of rendering it wholly or partially incombustible, or at least capable of resisting the heat and flames of a burning building 25 feet distant from it without igniting? A. We do not think it is possible to render a wooden house perfectly fireproof. In regard to your other questions, it must be evident to you that it would be improper for us to recommend particular manufacturers in these columns.

C. C. asks: What is the best way to take the scale out of tubular or locomotive boilers? There are several about here that have been running in limestone or some other mineral water; they are thickly scaled inside, and therefore will not make steam well. A. There are numerous compounds in the market, which are said to be efficacious in such cases. By inserting a notice in our Business and Personal columns, you can doubtless open communication with the manufacturers.

E. M. B. says: I have a horizontal tubular boiler in which fire goes under the shell and then through the tubes. Would it save coal to put a brick floor within 9 inches of the shell's front end, and 6 inches from back end to keep the heat in the shell of boiler. A. We would not recommend the change if the boiler works well at present.

J. K. asks: How are artesian wells made, and what is the best way of fixing them, in order to water stock? A. The mere fact of inserting a pipe will not cause the water to flow. It is necessary to bore until water is reached that comes from a source higher than the place where the well is made.

H. J. I. asks: What is the rule to calculate the pressure on a hydraulic ram? A. The pressure on the ram is equal to the pressure per square inch produced by the pump, multiplied by the number of square inches in the cross section of the ram.

J. A. A. says: 1. We have a fire engine that will throw about 140 feet. The machine has no vacuum chamber. Will it help her to put one on? Will it be any advantage, and how much? The pumps are 6 inches bore by 7 inches stroke; suction is 8 1/2 inches by 18 feet long. A. We would not recommend it, if the pump works satisfactorily at present. 2. What is the pressure to the square foot of gas that will raise water 5 1/2 inches in a bent tube 3/4 inch in diameter? A. About 28 pounds.

O. J. P. says: We generally use here lift and force piston pumps for tanks in houses, bathing purposes, etc., but instead I would like to use two plunger pumps of 2 1/2 inches bore and 24 inches stroke, with air vessels, and connected together, with the same action. In this case, the pump will be about 200 feet from the river and 18 or 20 feet above the level of the water, the tank being 30 feet above the pumps. I fear that two plunger pumps could not be used as advantageously as a piston pump for lifting the water, but I understand that the plunger pumps would force up the water more advantageously than a piston one. Am I right? A. We think that the piston pumps will give better satisfaction in this case. Your other question is a professional one and should be referred to an engineer.

J. H. W. asks: 1. Is it possible to transmit a moderate degree of pressure through a half inch gas pipe, 15,000 to 20,000 feet long, by forcing compressed air into one end? Could the loss of power and the time required for transmission be calculated? A. Yes. You will find some facts in regard to the matter in reports of operations in the Mont Cenis Tunnel, published in Engineering a few years ago. 2. Is the process of lighting street lamps by electricity attended with such a degree of expense (in first cost and subsequent operation) as to preclude its employment on the score of economy? A. We think so. 3. What would be the probable approximate cost of erecting the apparatus necessary to light the 5,000 lamps of Boston, Mass., and what would probably be the annual working expense? A. We believe the attempt was made some time ago; and probably by writing to the authorities, you can obtain the information you desire.

W. P. S. asks: Can you give me the dimensions, focal distances, etc., of the lenses for a wonder camera, as described in your paper of June 8? A. The larger your objectives, the clearer will be your picture. The convexity of the glasses depends much upon the size of picture desired. 2. What light is best where gas cannot be obtained? A. A coal oil lamp has been used to advantage. 3. Would an extra lens between the light and the photograph be an advantage, and what should be its dimensions? A. Yes, a condenser, the larger the better. 4. What is the next step in the education of a mechanical engineer after a college course, and on what terms are learners taken into machine shops and other engineering establishments? A. The next step is to lay aside the idea that college education will give anything but a theoretical knowledge, and to learn to do any mental labor that a mechanic has to do with all the strength and ability he possesses. On these terms, if he is fortunate, he will be admitted into a machine shop.

J. C. K. asks: Is it injurious to the water in lead service pipes, or to the pipes, to lie in the same trench as gas pipes, the gas pipe and water pipe lying within three or four inches of each other, and passing through the same opening in a stone wall? If so, what is the effect? A. No; there is no reason why it should be injurious.

C. F. B. asks: What are the velocities of light and electricity? A. Wheatstone gives electricity (of high tension, such as atmospheric) a velocity of about 288,000 miles per second. Light has a speed of about 190,000 miles per second.

J. K. asks: Does the sun, by shining on one side of a saw every day for a length of time, injure it? A. Ordinarily, we should suppose not. We do not, however, know the circumstances of the case to which you refer.

S. M. L. asks: 1. Can I keep the air out of a tube 20 feet long, 8 feet wide, and 1 1/2 deep? Can I do it with an air pump? What sized valve would be necessary, and what power would be required to run it? A. Yes. The size of the valve is not the matter to be considered. A large air pump would answer. 2. If the air were taken from an airtight cylinder in which was placed a flywheel running at moderate speed, would the motion of the wheel create air again in the cylinder? A. No. 3. If a tube, open at one end, were placed with the open end in a cistern of water, could the air be taken out of it so as to create a perfect vacuum? Would air enter by the water at the lower end? A. Vapor of water and air transpiring through the water would prevent obtaining a perfect vacuum. 4. Please name some good work on air pumps. A. Consult a work on natural philosophy, Ganot's "Physics," for example.

T. J. K. asks: What is the best material to put on a carpet when sweeping it? A. Try spent tea leaves.

H. W. asks: 1. Will scrap zinc do to use in a Hill or blue vitriol battery? A. If melted and cast, yes. 2. What sized cylinder do I want to make a 1-6 horse power engine at 30 lbs. pressure? A. A cylinder 2 inches diameter by 6 inches stroke, making 60 revolutions per minute, will give just over 1-6 of a nominal horse power.

C. L. F. asks: How can I determine the azimuth angle, or the variation of the magnetic from the true meridian? A. By the declination compass.

E. B. W. asks: What is the rule for finding the light to which a stream of water will be thrown through a nozzle 3 inches diameter at varying pressures in the water main? A. We must refer you to some good treatise on hydraulics for an answer to your question, as its consideration would occupy too much space for these columns. We have discussed some of the points in our article on "Friction of Water on Pipes," p. 48, vol. 29.

H. I. W. asks: What is the best equilibrium slide valve? A. We do not recommend special articles of manufacture in these columns.

M. C. S. asks: What are the chief objections to an iron or steel rail whose under side is wrought into a series of arches or curves, designed to span the spaces between the ties? The top or tread of the rail is to be horizontal as now, but the underside curved, except where it rests upon the ties. A. We scarcely think that the change is very desirable.

C. R. asks: Will a spring made of the best spring steel be affected if placed in the steam chest of an engine? If so, is there any metal or alloy that will resist the most intense heat of steam and retain its original form? A. Springs exposed to high pressures and temperatures are apt to become weakened. We do not know of any better material than steel.

G. M. R. asks: Who compose the American Society of Civil Engineers, what is the object of the society, and what formalities are necessary to become a member of this society? What are the time and place of their meetings and are the meetings public or not? A. It numbers the principal engineers of the country among its members. By addressing the secretary (Mr. G. Leverich, 63 William street, New York city), you can obtain full information in regard to your other questions.

F. W. B. asks: 1. Would there be a demand for a double engine, having oscillating cylinders, and provided with a reversing attachment? A. There are such engines in the market. 2. Is an oscillating engine, with a given head of steam, inferior to an engine whose cylinders do not oscillate? A. Not necessarily.

A. asks: 1. How can gutta percha be fastened to ordinary sole leather? A. By using gutta percha dissolved in naphtha as a cement. 2. Will it wear as long as sole leather? A. No. 3. Will it melt with ordinary sun heat on the sidewalk? A. It will soften in summer weather.

P. P. W. asks: If the pressure is greatest on the bottom of a boiler, how does an injector work? A. We do not see the connection between the two. As to your other question: According to general usage, a corner building is on the street on which the main entrance opens.

G. W. M.—Your questions are too comprehensive to be answered in these columns. You will find the flight of birds fully explained in Pettigrew's "Animal Locomotion."

E. B. K. says: I have a small telescope constructed on the principle of the compound microscope, with achromatic object glass 1 1/2 inches in diameter and 18 inches focus. Eye-piece consists of 4 lenses. Can I obtain a higher power by using an achromatic object glass of 30 inches focus and 2 3/4 inches diameter? A. Yes.

J. S. asks: How can I cut moss agates and cornelians? A. By means of a blade of soft iron and diamond dust. Copper is sometimes used in place of the iron.

S. D. L. asks: 1. Is there any difference between a stereopticon and a magic lantern? A. No. 2. Can colored photographs be used in them? A. Yes. 3. Can photographic negatives be used? If so, how can they be colored? A. Read directions for coloring published on p. 397, vol. 26.

D. G. asks: 1. What is the process of polishing paint, as it is done on carriage work, where no brush marks are to be seen? A. Carriage painting and varnishing are processes much too complicated to be described in these columns. See M. Ariot's work, frequently advertised in our pages. 2. What causes paint to crack? Is it the use of too much or too little oil? A. Too little.

S. says: If spiritualism is a humbug, how can you account for such men as Crookes, Wallace and Edmonds believing in it? A. Spiritualism is no more a humbug than is hydrophobia. Both phenomena have certain points of resemblance. Both appear to be affections of the nervous system, resulting from some sort of action upon the nerve centers. How this action is induced is not positively known; but there is evidence to show that a mental impression, a whim, or the imagination of the individual, may be a sufficient exciting cause. These diseases, and their multitudinous allies, nervous disorders of all kinds, are not respecters of persons. They attack all classes, the learned and the ignorant; but the earliest and easiest victims are generally found among individuals of weak or bad physical conditions.

T. A. C. says: Tell D. S. H., whom you answer at head of first column, p. 27, to cover the face of his pulley with leather to keep his belt from slipping. He can put it on with tacks or very small nails. Flesh sides together I think, work best.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined with the results stated:

R. R. R.—No. 1 is finely laminated micaceous schist, containing, as far as can be determined from such small pieces, nodules of impure steatite. No. 2, heavy spar or barite. The specific gravity of the specimen enclosed is 4.4. No. 3, ilmenite, containing on an average from 80 to 85 per cent oxide of iron. No. 4, magnetite.—R. L. W.—No. 1, on analysis, was found to contain a little silica and insoluble matter, the remainder being carbonate of lime. It is not a hydraulic limestone. Properly burned it would be converted into quicklime. No. 2 is fibrous gypsum.—J. W. T.—We compared the powder, for polishing purposes, with rouge, the finest French emery paper, and Bath brick. It is a medium between rouge and French emery paper, being inferior to rouge, and much superior to the emery. It is just equal to Bath brick, which it closely resembles in color. An eminent optician observes that it might be used by nickel platers.—A. M. B.—No. 1 is iron pyrites. No. 2 is hepatic pyrites, in which the sulphuret has been converted into oxide of iron.

F. E. T. says: Piles driven in salt water on the southern coast are very soon destroyed by worms. They might be protected by metal sheathing, but that is too expensive. Is there any method known, both cheap and effective, of securing wood against the attacks of these worms?—J. C. G. asks: How can I burnish brass?—J. S. N. asks: How can I straighten a rifle barrel?—E. H. B. asks: How is raw wool prepared for dyeing with indigo blue?—T. H. R. asks: How can I wash a chamolis shirt without shrinking or injuring it?—H. L. K. asks: How are white rubber hand stamps made? What kind of molds are used, and what kind of rubber? How is the rubber melted?—E. K. M. asks: How are the rubber bands of different sizes sold by stationers joined together? The joint or seam is quite level, and as strong as any other part.—H. B. S. asks: What materials are used in the manufacture of firebricks, and what is the usual method of their manufacture?—H. E. K. asks: What is the best way to make putty of the colors of different woods (walnut, ash, etc.)?—L. H. asks: What will prevent pastel colors from being rubbed?—G. H. M. asks: What part of a horse power is an eight day clock spring? What is the weight of a four horse power engine?—W. C. L. says: The front wheels of a wagon are 3 feet 10 inches high, and the hind wheels 4 feet 4 inches high, or the front wheels are 4 feet and the hind wheels 4 feet 6 inches. What is the rule for setting the axle, and should the hind axle be any longer than the fore?—W. F. W. asks: 1. What is the rule for computing the horse power of an overshot water wheel, of 18 feet diameter, with 6 buckets 4 feet, depth 18 inches by average of 3 1/2 inches, with a 10 inch run, making 6 buckets to the wheel? 2. What is the meaning of the word "rages," used by machinists? 3. Will crawfish work in soft slate? Do they go any deeper than to the gravel? 4. Will tin-ure bolting cloth to wash it?

We shall be glad to receive replies to the above for publication.

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects:

- On Feathered Arrow Heads. By S. C. G., by T. L. W., and by A. H. I.
On a Balloon Device. By L. A.
On the Dress of Women. By F. M. S.
On Bursting and Explosion of Boilers. By J. M.
On the Boiler Explosion at Geddés, N. Y. By D. T.
On the International Rifle Match. By E. H. P.
On the Chances of War. By W. W. H.
On the Interior Angles of a Polygon. By C. E.
On a Small Steamer. By J. F. K.

Also enquiries and answers from the following:

- J. A. C.—C. M. C.—W. C.—H. L. M.—C. E. J.—J. E. Jr.—D. B. S.—T. M. C.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail, if the writer's address is given.

Hundreds of enquiries analogous to the following are sent: "Please to inform me where I can buy sheet lead, and the price? Where can I purchase a good brick machine? Whose steam engine and boiler would you recommend? Which churn is considered the best? Who makes the best mucilage? Where can I buy the best style of windmills?" All such personal enquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge mentioned at the head of that column. Almost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]
Index of Inventions
FOR WHICH
Letters Patent of the United States
WERE GRANTED IN THE WEEK ENDING
June 23, 1874,
AND EACH BEARING THAT DATE.
[Those marked (r) are reissued patents.]

Table listing various inventions and their patent numbers, including items like Acid, making carbonate of, H. Beins; Alarm, burglar, J. H. Whitelegge; Anvil, reversible, B. A. Ellison; Awl handle, S. Henry; Bag tie, A. Lodde; Bale tie, cotton, A. A. Goldsmith; Bale tie, cotton, G. W. Scott; Bassinet, folding, S. M. Hogan; Bayonet fastener, R. P. Beals; Bedstead, J. B. French; Bedstead, J. L. Haven; Bee hive, J. G. Gwalney; Belting, leather, C. Munson; Boat, aerial, D. L. Rhone; Boiler, steam, C. A. Clark; Boot soles, trimming, R. C. Lambert; Bottles, covering heads of, Becken et al.; Box, butter-preserving, etc., Gillett & Hartshorn; Brewers, mashing machine for, A. Neubecker; Bricks, enameling, D. W. Clark; Buckle for clothing, E. B. Schnabel; Building, fireproof, E. F. Cook; Burner, gas, J. W. Graham; Burner, vapor, F. A. Sawyer; Burner, electric lighting, A. T. Smith; Can for cooling milk, G. W. Fluke; Canister, tea, R. R. Lawrence; Car standard, A. Pennebacker; Car axle box, S. R. Hughes; Car braces, bending, S. Rigby, 3d; Car brake, railway, G. A. Beach; Car, freight, D. F. Van Liew; Carspring, A. Middleton, Jr.; Car, stock, H. Purdy; Cars, door for grain, H. Purdy; Carpets, screw for stair, M. Krickl; Carriage, child's, J. A. Crandall; Carriage, child's, G. Martenssen; Cartridge box, P. J. Quinsec; Cartridge, fire arm, W. S. Smoot; Cartridge-loading machine, C. H. Webb; Carts, end gate for dumping, J. Sweeney; Celluloids, etc., molding, I. S. & J. W. Hyatt; Chair seat needle, D. C. Mosher; Checks, etc., die for, R. B. Carsley; Churn, George & Stutzman; Cigar bunch machine, C. Windrath; Cigar case, J. H. Tuwing; Clock lockwork, F. Kroeber; Cloth-measuring machine, W. M. Keyes; Clothes dryer, A. F. Stowe; Clothes wringer, W. A. Sharpe; Coffee, extracting, R. B. Underhill; Coffee for transportation, T. H. Berry (r); Cooking apparatus, M. A. Scott; Copy holder, D. T. Hall; Cork cutting machines, E. O. Schartau; Corset, J. C. Cook; Cultivator, L. J. Davis; Cultivator and stalk cutter, K. P. Rogers; Cultivator, cotton, P. D. Robbins; Curry comb, T. J. Hutchins; Curtain fixture, L. Bradbury; Cutter, meat, S. Gable; Cutter, straw, J. A. Cornish; Dams, device for building, E. Bell; Derrick, portable, H. Donnelly; Desk, school, W. P. Goolman; Drawing board, C. Poor; Dray, C. M. Murch; Drill, seed, J. H. Arney; Drill teeth, Linnell & Parker; Dyeing with indigo, Oldroyd et al.; Egg carrier, W. O. Strong; Egg hatching apparatus, J. Stone; Elevator, hog, W. E. Kelly; Engine and pump valve, A. J. Loretz; Eye and lung protector, G. A. Crofut; Faucet, F. Messmer; Feather renovator, W. H. Elliot; Fence, barbed wire, J. Haish; Fertilizer, H. A. P. Lisagary; Fiber-separating machine, W. M. Hughes; Fire arm, breech loading, L. Guineuf; Fire arms, cartridge for, W. S. Smoot; Fuel from coal slack, I. McCormack; Furnace, hot air, E. H. Camp; Furniture fastening, Haven & Knight; Gage cock, H. A. Clinton; Game apparatus, H. L. Crist; Gas manufacture, I. Kendrick; Gas retort, portable, C. J. Fames; Gate, farm, G. Hoskins; Gear cutting machine, N. T. Mirapeix; Glove, gauntlet, E. V. Whitaker; Gloves, die for cutting, J. Haag; Grain binder, J. Garrard; Graining roller, J. Carr; Grate bar, gang, J. C. Kilgore; Grinding and polishing wheel, Walters et al.; Grinding carpenters' squares, C. S. Bement; Hame, Smith & Burr (r); Hammer, atmospheric, W. Manson; Hammer, atmospheric power, W. Manson; Harvester, E. L. Hutchinson; Harvester dropper, D. B. & J. J. Browning; Hatch, self-closing, G. C. Howard; Heater, feed water, R. Garstang; Heating apparatus, G. Stevens; Hinge, spring, A. Acker (r); Hog ringing and marking, P. Listeman; Hogs, watering tank for, G. A. Carter; Hoist, hydraulic, M. L. Bassett; Horse binder, J. W. Kennedy; Horse hay fork, W. R. Reed; Horse power, L. R. Faught; Horses, releasing, K. Bragg; Horshoeing harness, J. Clarridge; Horseshoes, making, J. Russell; Hose, hydraulic, E. A. Street (r); Ice machine, B. F. Teal; Indicator, station, J. F. Kettell; Iron and steel, making, W. Bushnell; Ironing board, Loper & Dyes; Joist seat, W. H. Drake; Journal bearing, D. C. Clough.

