## Business and Personal.

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Samples of H. W. Johns' improved Asbestos Steam Packing will be sent free to inquirers. H. W. Johns M'f'g Co., 87 Maiden Lane, New York.

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Jas.F. Hotchkiss, 84 John St., N. Y .: Send me your free book entitled "How to Keep Boilers Clean," con- | for examination, should be careful to distinctly mark or taining useful information for steam users & engineers. label their specimens soas to avoid error in their identi- night glass. What should be the diameter and focal (Forward above by postal or letter; mention this paper.) fication.

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Combination Roll and Rubber Co., 27 Barclay St., N.Y. Wringer Rolls and Moulded Goods Specialties.

For Mill Macb'y & Mill Furnishing, see illus. adv. p.183. Send for Pamphlet of Compilation of Tests of Turbine Water Wheels. Barber, Keiser & Co., Allentown, Pa.

Presses & Dies (fruit cans) Ayar Mach.Wks., Salem, N.J.

Latest Improved Diamond Drills. Send for circular to M. C. Bullock, 80 to 88 Market St., Chicago, Ill.

Workmanship. Cordesman, Egan & Co., Cincinnati, O.

mation on any special engineering, mechanical, or scientific subject, can have catalogue of contents of the Sci-ENTIFIC AMERICAN SUPPLEMENT sent to them free. The SUPELEMENT contains lengthy articles embracing the whole range of engineering, mechanics, and physical science. Address Munn & Co., Publishers, New York.

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Presses & Dies. Ferracute Mach. Co., Bridgeton, N. J. List 27.-Description of 3,000 new and second-hand Machines, now ready for distribution. Send stamp for same. S.C.Forsaith & Co., Manchester, N.H., and N.Y.city.

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Machinery of every kind. See adv., page 206. Cope & Maxwell M'f'g Co.'s Pump adv., page 204.

The Sweetland Chuck. See illus. adv., p. 206. Machine Knives for Wood-working Machinery, Book

Binders, and Paper Mills. Also manufacturers of Solo-man's Parallel Vise, Taylor. Stiles & Co., Riegelsville.N.J. Electric Lights .- Thomson Houston System of the Arc

type. Estimatesgiven and contracts made. 631 Arch, Phil. Common Sense Dry Kiln. Adapted todrying of all material where kiln, etc., drving houses are used. See p.205.

Ball's Variable Cut-off Engine. See adv., page 221. Fire Brick, Tile, and Clay Retorts, all shapes. Borgner

& O'Brien, M'f'rs, 23d St., above Race, Phila., Pa. Peck's Patent Drop Press. See adv., page 220.

For best Portable Forges and Blacksmiths' Hand Blowers, address Buffalo Forge Co., Buffalo, N. Y. Paragon School Desk Extension Slides. See adv. p 222

for rubber and leather belts. Greene, Tweed & Co., N.Y. for gardening can be had near cheap land for the

The Chester Steel Castings Co., office 407 Library St.,



## HINTS.'TO CORRESPONDENTS

No attention will be paid to communications unless accompanied with the full name and address of the writer.

Names and addresses of correspondents will not be given to inquirers.

We renew our request that correspondents, in referring to former answers or articles, will be kind enough to name the date of the paper and the page, or the number of the question.

Correspondents whose inquiries do not appear after a reasonable time should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them.

Persons desiring special information which is purely of a personal character, and not of general interest should remit from \$1 to \$5, according to the subject, as we cannol be expected to spend time and labor to obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLE-MENT referred to in these columns may be had at this

office. Price 10 cents each.

(1) F. H. W. asks: What are the component parts of Belvedere metal? I indge it is a patent. A. It belongs to what is known as the sulphur sulphides rites marcasite) or chalcopyrite with a suitable quantity of sulphur. See Spence metal, in SCIENTIFIC AMERICAN SUPPLEMENT, No. 222.

mill, 66 inches bottom, 30 inches top saw, 26 feet fall, it under slight uniformly apportioned pressure for bath used in preparing the material for the gelatine copy-Can I, by using one pair of bevel wheels, couple di- and by means of a piece of soft rubber rub off the softwith belt? A. No; the velocity of the wheels would be will remain attached to the varnished glass surface. As rapidly.

(3) C. F. W. asks: 1. If the exhaust of a five horse power engine be turned into a tank about twothirds full of water, would it lessen the power of the engine? If so, how much? A. Yes, the increased resistance would be that due to the head of water above the pipe-one pound per square inch to every 26 inches head. 2. Would the steam arising from the surface of Wood Working Machinery of Improved Design and , the water, in tank, be as great and expensive as the exhaust, even though the water was as warm as steam can Supplement Catalogue .- Persons in pursuit of infor. heat it? A. The total quantity would be the same, if and trimmed in the usual way they are immersed in a you make no allowance for that required to keep up the warm filtered aqueous solution of gelatin of about the temperature of the water: but escaping from a much larger surface it would appear only as a vapor.

> (4) F. C. S. asks: Do you know of any thing that will produce a growth of hair on head or face of man? A. Subcutaneous injection of small quantities of the salts of pilocarpine has lately produced some remarkable results in stimulation of and altering the color of hair.

(5) L. M. L. writes: I was greatly interested by an article on "Silk Raising in the South," from the Louisville Courter Journal, that appeared in the allowed to remain overnight in a dry locality, when the SCIENTIFIC AMERICAN of the 11th instant. May I ask your advice on the following points? 1. Would you advise a woman with a small sum of money, say four hundred dollars, to buy a small piece of land, plant mulberry trees, and go into the business of silk culture? A. No. At present the business offers inducements only to such as have suitable waste land and spare time which they wish to make productive. 2. Could a person make a living by it? A. No. The silk harvest provides employment but for about six weeks, and the number of acid. 2. How does its hardness compare with the vorms that one person can care for is too small to diamond? On a scale of 10 the hardness of quartz is make the business largely remunerative. Even in 7, of the diamond 10. Do these stones always retain China, where labor is cheapest, the silk harvest is profit- their brilliancy, and are they still found? A. No. Quartz able mainly because it fills the space just preceding the crystals are of very common occurrence in some localitea harvest, when there would otherwise be nothing to do. 3. What latitude or what States are best adapted genuine stone? A. The chief distinguishing features to the business? A The mulberry thrives almost everywhere in the United States, and silk worms can be raised difference of specific gravity (that of quartz being 2.6 wherever the mulberry grows. The season is longest in the Southern States, and three broods of worms a Consult Dana's Mineralogy. year can be raised there against one brood in New England and two in Pennsylvania. 4. Could it be made profitable by combining with it the cultivation of small fruits and rearing of poultry? A. It might be, though poultry requires most attention about the time of the silk harvest. 5. What place would be suited to make these combined occupations profitable? A. Probably Blake's Belt Studs. The strongest and best fastening in proximity to city markets, especially where good soil Brass & Copper in sheets, wire & blanks. See ad. p. 221. poultry and the mulberry bushes. 6. How long does it take the mulberry to grow large enough to afford food for the silk worm? A Four or five years from three years, from good cuttings. 7. Could a place be found with the trees already growing on it? A. Probably not, though it would not be hard to find trees enough almost anywhere to experiment with. Women's Silk Culture Association of Philadelphia sell mulberry cuttings, and also eggs for experimental cultivation. The chief promise of silk culture in this country arises from the circumstance that many women have unoccupied time which might be pleasantly employed in this way. It is a home employment that requires but little outlay, and though the product of individual , effort may be small, say from \$25 to \$100 a season, it will be for the most part cleargain. (6) D. T. E. asks: 1. How is the fine finish put on gold and silver articles such as on the inside of watch cases, etc.? A. Usually by means of suitably shaped burnishing tools made of bloodstone and hard polished steel. 2. How is the cvanide of gold made, and how is gold solution prepared? A. See electro-gold deposits in SUPPLEMENT. No. 310. 3. What is meant by gold rolled plate, and how is it put on? A. A bar or strip of basealloyhas soldered to it a thin sheet or foil of gold. and the bar or strip thus covered is 'passed repeatedly | the columns of your valuable paper of a process for whit. position in a retort.

plating. During the rolling operation it is necessary to frequently soften the metal by annealing.

(7) G. L. F. asks: 1, Is water-glass known by any other name? I have asked for it, but the druggists don't know what it is. A. Water-glass is generally subulied to the trade under then a mesof soluble glass or silicate of soda. 2. In using the stereotype composition known as Jamin's cement, I find it adheres very firmly tomy claster of Paris moulds. How am I to avoid it? A. Try oiling the mould slightly.

(8) A. C. asks: Can you suggest some mode to remove from a large pane of glass a film or | says no. 2. Will not the steam in the flues have a tencloud, which I cannot account for. It is not in the glass, but on the surface. Have tried ammonia and whitening, also rottenstone, but failed to remove. A. Slightly moisten finest rouge with water, and apply with 'fronts, but the flame and gases naturally take the neara chamois leather cushion, rubbing it in every direction est course, and the bulk goes to the two middle boilers until the film has disappeared and the glass is glossy.

(9) F. C. writes I have made a cement of bisulphide of carbon and crude rubber, but cannot get it to stick. What is the matter? A. Gently warm the parts to be joined, smear them with the clear cement, and press the parts strongly together, continuing the pressure until the solvent has escaped. You will then find the pieces firmly cemented. See Supplement, No. Correspondents sending samples of minerals, etc., 158, for receipts for better cements. 2. Please give directions for making a good Galilean telescope and length of object glass and eye piece? A. You will find a good paper on telescopes in SUPPLEMENT, Nos. 1 and 252

(10) J. C. H. asks: What is the best method prepared by fusing certain metallic sulphides (as py-Try the following method: Flow the glass plate with good photographer's negative varnish thinned down somewhat, and when this has partly dried (so that the varnish will not run into the paper) lay the smoothly

(2) G. M. S. writes: I have a standard saw printed sidedown upon the varnished surface, and put rectly to saw mandrel, and run as well as from drum ened paper. If this is done with care the inked lines so great that they would be very noisy and wear out the thin varnish is quite transparent, this is equivalent to transferring the engraving to the glass surface. The quantity of soap. transfer is frequently improved in appearance by giving the plate (and transfer) a second coat of the varnish. For lantern purposes it is better to cover the surface bearing the transfer with a second plate of glass, and bind the edges with thin cloth or stout paper.

> (11) S. M. S. asks: Could you give me a good formula for producing a fine gloss on photographs? A. The beautiful gloss called enameling is produced as follows: After the prints have been toned, washed, consistence of collodion, to which is after added a small quantity of sugar candy. When the paper has become well impregnated with the liquid the pieces are removed and placed, smooth face downward, upon a plate of glass previously coated with a four per cent normal collodion, and air dried. In placing the print care must be taken to quickly press out all air bubbles. Afterwards a sheet of stout white paper, cut somewhat larger than the prints, is cemented to the back of each photograph to protect the pictures in the event of their spontaneously leaving the glass on drying. The plates are portraits may be separated from the glass by making an incision of the film all around the paper

the chemical composition of the stone called the quantity of steam. So I think this speaks for itself. "Lake George diamond?" A. So called "Lake George (22) P. J. M. asks: What heating surf diamonds" are commonly small, well formed, clear quartz crystals, backed with or mounted over bits of silver foil. Quartz crystals are native crystallized silicic ties. 4. What are its distinguishing qualities from the are the difference in hardness, as above noted, the and of the diamond 3.48), and the crystalline structure.

(13) G. K. T. writes: While experimenting with electric batteries, I had occasion to use a common flower pot for a porous cup. To fill up the hole in the bottom of the pot, I poured in a small quantity of melted tar. When nearly hard I pressed the tar firmly on the inside and outside of the bottom of the pot, thereby pressing the tar firmly into the hole. After or in the dark for use. To sensitize the paper moisten using it in the bichromate of potash battery three it uniformly with this liquid by means of a soft clean weeks, I removed the pot and found the tar drawn into sponge, and suspend it in a dark room to dry. When the pot to the extent of balf an inch. What caused it? dry it is ready for use. To preserve it for use it must Did not the heat and resistance of the current draw it be kept from the light.

between heavy rollers until it is spread out into thin ening scorched larch? A. It will be necessary to sand sheets or rods, every part of which retains a gold surface paper the wood to remove the film of carbonaceous matter. The stain cannot be otherwise remove

> (16) V. D. G. asks. What is the best facing for heavy castings like plow beams, etc.? A. We believe powdered charcoal is considered the best facing.

> (17) W. W. writes 1. A battery of four boilers, two 15-inch flues in each, have a small steam jet in each flue at the back end to increase the draught. The boilers are 28 feet long and 42 inches diameter; smoke stack 50 inches diameter, and 60 feet high. Would it not bemore economical to place a jet in the smokestack equal in size to the eight in the flues? A. Experience dency to cool the gases entering the flues? A. No such effect as to be appreciable in practice. 3. The furnace is continuous, or extending the whole width of the four flues. Would not a thin partition wall between each boiler, extending from the firebridge to the back end, remedy this evil, and by distributing the heat better, generate more steam with the same amount of fuely A. Ves. 4. The steam from these boilers is used by a rollingmill engine, and although the engine is unusually large, still it seems under its work even with steam at 80 to 90 pounds. The steam course from the boilers to the engine is very crooked, there being no less than six sharp bends and three valves between steam drum and cylinder. Will not the friction on these valves and bends greatly diminisb the steam pressure by the time it gets to the cylinder? A. It will: how much will depend upon the size of the pipe in proportion to the demand for steam.

> (18) J. J. C. asks: What will take nitrate of silver from woolen cloth? A. Try moistening the part first with a drop of iodine solution, and after a few minutes with an aqueous solution of cyanide of potassium, finally rinsing with plenty of warm water.

> (19) N. S. C. asks: 1. Why is a salt water ing pad? A. Salt water boils at a higher temperature than pure water. 2. Sometimes the material of my pad peels off and adheres to the paper while I am printing. How can this be prevented? A. Use a larger proportion of glue in the composition, or add to it a small

> (20) L. M. C. writes: Please give me best process for determining the  $CO_2$  in baking powders, also alum<sup>9</sup> A For best methods of determining carbonic acid and alum in such preparations consult Thorp's Quantitative Chemical Analysis." See also Mott's Chemist's Manual.'

(21) J. X. N. writes: In looking over my paper I see a question asked by F. M. L: "Has there been any means devised of using as fuel the siftings or dust of coal mines? A. Yes, they are burned successfully on the Pennsylvania Railroad by a patent process." Now, I do not know whether the Pennsylvania Railroad has any dirt-burning locomotives or not, but I hardly think they have. I do know, however, that the Reading Railroad has in the neighborhood of sixty locomotives in daily use in passenger and freight and heavy coal trains, and they are a complete success. I speak from experience, being an engineer, and having one under my control every day. This furnace is the patent of our general manager, Mr. John E Wooten, and is, in my estimation, one of the greatest things extant A Mogul locomotive, built by the Baldwin Locomotive Works with Wooten's patent furnace, can leave Richmond with 150 empty coalcars, run 93 miles without cleaning the fire; come down from Palo-Alto, 93 miles, (12) J. B. asks: 1. Can you inform me of 145 loaded cars, without cleaning the fire, and have any

> (22) P. J. M. asks: What heating surface should there be in a feed water heater for a high pressure steam engine, working with 75 pounds steam pressure, and making 100 revolutions per minute-that is to say, the heating surface per actual horse power; and to what degree of heat will such heating surface heat the water? A. There is no established rule for the surface offeed heaters, nor can there be, so long as the difference is so great in quantity of water used in different boilers, varying from 18 to 35 pounds per horse power. The usual proportion is three-quarters to one square foot per horse power; but a larger proportion would be better.

> (23) A. C. S. asks: Will you be so kind as to give the preparation of the blue process paper that is used for copying tracings? A. Dissolve in 8 ounces of distilled or pure rain water 1% ounces of pure ammoniocitrate of iron, and in a separate vessel 11/4 ounces of pure ferricyanide of iron (red prussiate) in a similar quantity of water. Mix these solutions and keep in a yellow bottle

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Tight and Slack Barrel machinery a specialty. John Greenwood & Co., Rochester, N. Y. See illus. adv. p 222 Gould & Eberhardt's Machinists' Tools. See adv., p. 238.

Granville Hydraulic Elevator Co., 1193 B'way, N. Y. Heavy Trimmed Walrus Leather, by the Hide or in Wheels for Polishing Metal. Greene, Tweed & Co., N.Y. For Shafts, Pulleys. or Hangers. call and see stock kept at 79 Liberty St., N. Y. Wm, Sellers & Co.

Combined Concentric and Eccentric Universal and Independent Jaw Chucks. The Pratt & Whitney Co., Hart ford. Conn.

Saw Mill Machinery. Stearus Mfg. Co. See p. 221.

Wm. Sellers & Co., Phila., have introduced a new injector, worked by a single motion of a lever.

Supplee Steam Engine. See adv. p. 221. Patent Key Seat Cutter. See last or next issue.

in? A. The reaction of acid and water is very frequentlysufficient to warm a liquid so as to soften tar. When the column of liquid in the outer jar is greater than in the porous cup the pressure is naturally inward. It is very improbable that electricity had anything to do with softening or displacing the tar.

a company manufacturing wagon, carriage, and sleigh pale blue; while the blue crayon appeared to afford no material, etc., running from fifty to sixty wood work- obstacle to the passage of the actinic rays, the proof ing machines (saws, planers, stickers, mortisers, etc.). coming out full deep blue the same as the portions When the machines are all running, the engine will lag | under the clear white cloth. What is the explanation with 80 pounds of steam. The engine is 18x28 inches, runs 85 revolutions per minute; common slide valve, upper (blue or violet) end of the spectrum, and as yellow cuts off at 22 inches; band wheel 10 feet diameter, weight and red transparent (or translucent) media intercept the 3 tons; fly-wheel 14 feet dismeter, weight 6 tons. 1. How much power will it take to run such a fly-wheel 85 revolutions perminute? A. All the power required is that necessary to overcome the friction; the wheel consumes no power. 2. Is the fly-wheel a benefit or a damage in this case? A. A benefit. You could not run your machines without it.

(24) A. M. writes: A short time ago I drew some plans on tracing cloth, and colored portions of them on the back with Faber's wax crayons, red, dark blue, light blue, and light yellow. I afterward had occasion to strike off some copies by the "blue process." They gave clear impressions, but where I had used yel-(14) C. B. T. H. writes: There is in this city low, the copy showed white; where red was used, very of this? A. As the actinic rays reside mostly in the greater portion of the blue or violet rays the cause of the non-printing (or weak printing) is obvious.

(25) C. M. K. asks: Will you please inform me of what the "vitalized air" is composed which dentists use to deaden pain? A. Probably you refer to the anæsthetic laughing gas or nitrous oxide. This gas is an oxide of nitrogen, usually obtained by (15) A. S. asks: Can you inform us through heating pure ammonium nitrate to the point of decom-