salt. It is easier and cheaper to buy it ready coated than to do it yourself. The prepared paper is sensitized by floating on a nitrate of silver bath. 3. What is the best way to separate sulphuric acid and water, after they have been mixed together, so as to retain all of the acid? A. Boil off the water. 4. In what way is needed. the metal aluminum got from clay? A. We refer you to our SUPPLEMENT, Nos. 679, 554, 617, 706, and others.

(2482) O. T. D. writes: 1. Can you answer this question, what is electricity, just the same as if asked what is steam? A. It is not known what electricity is. Human knowledge has not yet gone far enough to define it with certainty. 2. What is the reason storms from the west seem to generally blow harder than from the east? A. Dry winds come from the west. Water is an equalizer of temperature, and the ocean should be expected to act as such an equalizer. At the same time it would take some examination of records to ascertain the relative violence of east and west winds.

(2483) C. E. A. asks how to make rubber stamps. A. Rubber stamps are made from rubber unvulcanized, but mixed with the vulcanizing material The letters, etc., are set up in metal and a mould in plaster of Paris is taken from them. This is brushed over with ground talc. The sheet of prepared rubber is placed on it and pressed down in a small screw press. The whole is then exposed to heat in a vulcanizer. For general manipulation of India rubber we refer you to our SUPPLEMENT, Nos. 249, 251, and 252. Even what is known as "pure gum," a kind of vulcanized rubber, may be made to work as above described without any addition of vulcanizing material. 2. What is the process of zinc etching, and is there any publication on the subject? A. There are many of our SUPPLEMENTS that treat of photo-zincography, Nos. 438, 584, 587, 656, etc. Plain etching may be done with sulphuric acid.

(2484) A. H. H. asks: 1. Where can I get a book on photo electrotyping? A. We have published a great many SUPPLEMENTS on this and related subjects, and refer you to our index for their titles. 2. Is there any good printer's ink eraser that will take print off paper? A. No. 3. Is Edison incandescent light suitable for photo-printing? If so, what candle power is required? A. No. Use Edison arc light on incandescent circuit with resistance lamps. Voltage must be reduced from 120 to 60. 4. Can you tell me what to put with nitrate of silver to make the prints black and imitate black print? A. Tone the prints with the borax and gold toning bath. See Scientific Ameri-CAN, April 3, 1889, page 225.

(2485) G. S. E. asks: 1. In speaking of alloys as so many parts, do you mean parts by weight? A. Yes. 2. Will alloys stand violent treatment, such as violent churuing, pumping, compression, etc., while in the liquid state, without breaking up into their constituent parts? A. Yes. 3. About what per cent of the current is used by the meters to measure the current flowing from the dynamo? A. It varies with different instruments, but is very small. 4. Will magnetic lines cross one another at right angles in a mass of soft iron ? A. No. 5. Will they in a mass of steel, e. g., if the poles of a permanent horseshoe magnet were to be placed at the center on each side of a straight permanent magnet, would magnetic lines cross the center of the straight magnet? A. No.

(2486) E. B. asks: 1. How many grains of carbonate of soda and how many of caustic soda will it take to soften one gallon of water of 15° hardness (carbonate of lime 15 grs.)? A. If the lime is present as bicarbonate, add 12 grains caustic soda. If common caustic soda is used, add about 20 grains to allow for impurity. If the lime is present as hydrate, add 15 grains of dry carbonate of soda. This cau be made by drying washing soda at a strong heat (short of red) or use 25 grains baking soda. The last is best. 2. Also is there any precipitate? A. Yes. Decant or filter, or pay no attention to the precipitate.

(2487) J. T. F. asks: What are the colors used in making solid black photogravure ink? A. The best lampblack is the basis of black printing inks. We can supply you with books containing formulæ, for printing inks, but successful inks are in the nature of trade secrets, and their composition is not disclosed.

(2488) F. L. W. asks (1) how to make a good leather cement, such as is used by cobblers on invisible patches. A. It is a solution of gutta percha in bisulphide of carbon. 2. Will oiliness of the leather affect the adhesion? A. The leather has its surface cut. or buffed off, so as to bring clean leather surfaces together.

(2489) C. B. asks: How can lantern slides, made on Carbutt's gelatino albumen plates, be colored? A. See Scientific American Supplement, No. 423, and Hepworth's "Book of the Lantern," price \$2.75. Aniline dyes slightly diluted, put on with a camel's hair brush, are largely used.

(2490) A. G. T. writes: I have an electric bell, and have been trying different things with it, and have found that the electricity after having gone through the magnets makes a brighter spark than it does before it goes through them, when connected and rubbed on iron (that is, the wire); could you inform me why that is? A. This is due to induction. The coil of the bell magnet with its iron cores acts as a "spark coil," and increases the potential or sparking power of the current.

(2491) G. L. S. asks: How can a meerschaum pipe be colcred rapidly? A. There is a process used by the makers to do this, but it is a secret. The only satisfactory way is to smoke the pipe and produce the color naturally. Queries No. 2364 and 2474 may be referred to in this connection.

(2492) A. S. B. asks for a recipe for fixing drawings made with carbon pencils, that the drawings will not rub out or be spoiled if touched. A. Immerse the drawing in skimmed milk. A special fixative is sold for the purpose by dealers in art materials.

(2493) S. M. H.-asks: Will a man of ordinary intelligence, but without a knowledge of chemfatry, be able to learn the art of assaying gold and silver

ores by studying a manual, such for instance as the one you sell by Walter Lee Brown, of Chicago? A. Practice is the great teacher for assaying; chemical knowledge is not absolutely essential for the ordinary work. In volumetric work considerable manipulative power is

(2494) E. E. writes: Wishing to preserve the color of the red bronze hinges of small white metal cases which get discolored (oxidized) by exposure. I would ask you kindly to inform me of any powder or solution answering the purpose. A. Varnish with linseed oil and japan if hronzed; if of real bronze, apply lacquer.

(2495) G. A. S. writes: I have had given me recently the following problem: Given the chord and rise of an arc, to find the radius. I have had also given me the following rule whereby to find the quantity desired, but my man tells me it is not accurate and practical. To four times the square of the rise add the square of the chord, and divide this sum by eight times the rise; the quotient will be the radius. Is this rule correct? A. The rule is correct.

(2496) T. J. W. asks (1) the cause of the blackening of the globes of incandescent lamps. A. No really good theory has been advanced. The successive dissociation and new formation of carbonic acid gas may have something to do with it, if there is any oxygen in the globe. 2. Has the minute quantity of oxygen that it is impossible to get out anything to do with it? A. Possibly, yet some lamps contain probably no oxygen whatever. 3. What is a good paste to cement the carbon filament to the platinum wire? A. Use a fine screwor electro soldering, viz., the deposition of copper about the joint by means of a battery.

(2497) J. S. W. asks whether there are any valves used in a calcium light burner. A. Not in mixed gas burners; sometimes there are cocks on blowthrough burners.

(2499) G. M. D. asks how to make the mixture which is put on the edge of pade of paper to keep the sheets together? A. For fifty parts dry glue take nine parts glycerine; dissolve in water, first soaking the glue alone; color to suit with cochineal.

(2499) E. R. asks (1) a receipt for something to kill fleas on a cat or dog without injuring the acimal. A. Use buhach or weak mercurial cintment. Essence of pennyroyal will drive them off. 2. The address of a technological school, not north of Baltimore. A. The Johns Hopkins University, Baltimore, Md.; the University of Virginia, Charlottesville, Va.

(2500) E. S. McG. asks for a receipt for sticking glass together so that it will hold water. A. Use Canada balsam or dammar varnish.

(2501) J. A. asks: Is there a liquid which will dissolve sulphur and keep it in solution after water is added? A. No. unless a solution of an alkali which combines with the sulphur be considered such a liquid.

(2502) G. M. asks: How can porcelain be cemented to wood? A. Sealing wax might answer, or Davy's cement, made by melting together equal parts of pitch and gutta percha, might be better. The following diamond cement might be tried: Soften eight parts isinglass in a very little water, add 1 part spirit of wine. Dissolve in 3 parts spirit of wine 1 part gum ammonia. cum and 1 part galbanum. Mix. Apply hot.

(2503) D. N. asks: 1. Give a short simple method for finding the area of circle. A. Onequarter of the diameter multiplied into the circumference gives the area. The circumference is found by multiplying the diameter by 3.1416. 2. A recipe for a good liquid shoe polish not injurious to leather. The following is said to be a good formula for liquid shoe blacking. Boil 1 part of extract of logwood, 30 of gall nuts coarsely powdered, with 25 of their combined weight of strong vinegar. Filter, add 8 parts of green vitriol. Allow it to settle for twenty-four hours; stir in 8 parts of gum, 100 of sugar, and 80 of sirup. Strain and add 50 parts of spirits of wine, 40 of shellac solution, and 40 of pulverized indigo. - Techno-Chemical Receipt Book.

(2504) Bristol asks: 1. How to make a good imitation or substitute for horn. A. Try a solution of glue mixed with one-tenth its weight of bi-chromate of potash, boiled down in the dark, and exposed to the sun. 2. How to dissolve aluminum palmitate. A. It dissolves slowly in benzine, kerosene, turpentine, etc. Heating facilitates solution, but a return condenser must be used. A 10 per cent solution in turpentive is quite thick.

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September 30, 1890.

AND EACH BEARING THAT DATE.

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