



(30) T. D. B. asks: 1. How to stain a sole leather bag somewhat abraded a dark mahogany color. A. Mix 15 grains alkane root, 30 grains aloes, 30 grains dragon's blood, all in powder, with 500 grains alcohol (95 per cent). Moisten the bag with dilute nitric acid (1 acid to 5 water by volume) and then apply above solution. Repeat until dark enough. 2. I wish to calculate the power of a flow of water which flows in a broad, thin stream over a dam. A. Determine the "head" measured from level of main body of water above the dam to the level of the top of the dam, then multiply length of dam by 3.33, and multiply this by the square root of the cube of the head expressed in feet and decimals. The result will be in cubic feet. See Trautwine's "Engineer's Pocket Book," page 265. 3. What is the resistance approximately of carbon in sectional area such as is used in arc lamps and how to calculate the resistance at different temperatures? A. Carre's circular carbons 1 millimeter (0.04 inch) diameter have 50 ohms resistance per meter (39.37 inches). The resistance diminishes as the temperature increases. Between 0° and 100° C the coefficient of reduction is 1-1912. This you can easily reduce to Fahrenheit's scale.

(31) T. A. R.—There is no way to bend wood better or cheaper than by steaming. Gun stocks, if bent at all, are steamed and bent in the rough. The trimmings are put on after the stock is finished.

(32) M. F. S. asks how to solve the following questions: No. 1. A clerk spends 20 per cent of 66 2/3 per cent more than 1/2 of his salary, and thereby saves \$533. What is his salary? No. 2. A cabinet maker directed his salesman to mark a set of furniture so that, by allowing 20 per cent on the marked price, he would realize a gain of 25 per cent. The salesman marked the set by mistake \$200, or at a loss to the dealer of 20 per cent of the sale. At how much less than the required marking price were the goods marked by mistake? A. Solve No. 1 by following equation: Let x = salary; then: x - (2/3 \* 100/3 \* 1/2) x = 533 x = \$1,453.63. Solve No. 2 by following equations: Let x = proper marking price, then y = cost. (1) y = x - 2/3 x - 200/5 = 533 (2) y = 200 - 200 - 200/5 = 192 x = 300.

Or by analysis they may thus be solved: 1. He spends 1/2 of his salary plus 66 2/3 of his salary, and what is left amounts to \$533. Taking it by percentages, what he spends reduces to 50 per cent + 13.33 + per cent = 63.33 + per cent. Subtracting this from 100 gives 36.66 + per cent of his salary left unspent, which is equal to \$533. His full salary, therefore, is equal to 533 / 36.66 \* 100 or 1,453.90 within limits of errors due to continued fractions. This is one solution, but the problem is worded so badly that several meanings may be drawn from it. 2. The suit marked at \$200 was sold at \$200 less 20 per cent, or \$160. This gave a loss of \$160 x 20 per cent or \$32. Thus the goods cost \$192. They were to be marked so that the selling price should give a profit of 25 per cent; \$192 x 25 per cent gives \$48. The selling price should have been, therefore, \$240. To this 25 per cent must be added for the marking price, or 240 x 25 per cent, giving \$60. The marking price should have been \$300.

(33) Benzene asks: 1. How can I color a solution of rubber in benzene, black and brown? A. Use asphalt or coal tar. 2. Does dragon's blood dissolve in benzene? A. Yes. 3. Would be glad to know through your valuable paper of a few colors that dissolve in benzene. A. Alkanet root extracts are peculiarly available for coloring benzene.

(34) L. M. R. writes: I have an incomplete Bunsen 6 by 8 inch battery, a zinc plate 2 1/2 in. wide being substituted for the zinc cylinder. Will you please inform me how much and what kind of acid I must use to complete the battery? A. For porous cup use following solution: Mix 1/2 part by weight of sulphuric acid with 3 parts water carefully and allow to cool. Dissolve six parts by weight bichromate of potash in 16 parts by weight of water by boiling, when cool mix two solutions and stir well. Use when cold. For glass jar use water.

(35) C. H. asks: How to transfer a printed illustration on paper to a glass magic lantern slide. A. Soak the print in soft water, varnish or float the glass plate with dammar varnish or Canada balsam. Allow to nearly dry; when still tacky carefully press the wet print upon it, and let all dry. Then with a wet finger you can rub off the paper, leaving the ink. A second coat of varnish will improve it.

(36) W. McP. asks: 1. Before a rain, the atmosphere contains moisture. The atmosphere and moisture weigh more than the atmosphere alone. Why then does the barometer not rise instead of falling? A. A falling barometer indicates the center of a storm disturbance, a rising one indicates its margin. These changes correspond with the rotary movements of the air, and not to the presence or absence of watery vapor in the air. 2. Can an electro-magnet be constructed in the form of a ring? If so, what parts correspond to the poles? A. It can be magnetized so that one end of a given diameter will be north and the other end south, or it may be magnetized so that it will exhibit no polarity until broken, when the ends will become magnetic poles. 3. Are street cars propelled by electricity a success? If so, why are they not more generally used? If not, where does the trouble lie? A. Yes; they are being rapidly introduced all over the country. 4. How fine a wire must be used in the secondary coil of an induction coil? A. No. 36. For induction coil construction we refer you to our SUPPLEMENT, No. 160, which we can send you for ten cents.

(37) J. C. K. asks the most economical and most effective point at which to set compound engines, where there is a coupling between them. to get best results. A. Set the cranks at right angles

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November 13, 1888,

AND EACH BEARING THAT DATE.

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