- (26) J. De L. T. writes: Given two vesselsfor milk setting, of same diameter, A being four inches deep, B being forty inches deep, is it a fact that cream will rise quicker in B than in A? Or, in other words, is it a fact that cream in B will not take ten times (or about) more time to rise than in A? A. The cream in B will rise quicker on account of its containing a greater amount of milk, but not quicker in proporciple.
- (27) A Reader asks (1) if there is any solvent for vulcanized rubber. A. Chloroform, carbon bisulphide, and naphtha are among the solvents for rubber. 2. How are old rubbers made over into new ones? A. Old rubbers are chopped fine, cut with naphtha, and then worked over with a certain proportion of new or original rubber. 3. Is solid rubber type vul-AMERICAN SUPPLEMENT, No. 251, for information concerning rubber type.
- (28) B. & Co. write: We wish to place tin foil on japan tin with a mucilage or cement so that it will dry and cleave to the japan so firmly that water or weather will not remove it. A. Try the following: Make a dilute solution of white gelatine or isinglass; the proper proportions are one to twenty; add a little potassium bichromate, and apply it by means of a pencil or sponge. It does not adhere at once, but will do so in a short while.
- (29) W. S. N.—The imitation grapes are made of thin blown glass subsequently coated with a varnish of the coloring material. They can only be made by an experienced glass blower.
- (30) W. G. writes: In describing on page 20 how to make balloons and soap bubbles of be made; will you state how a collodion solution must lodion is prepared by mixing 21 fluid ounces of stronger ether with 6 fluid ounces stronger alcohol in a suitable bottle, add the quantity of gun cotton, and shake until dissolved. It can be purchased directly from any dealers in photographic supplies.
- (31) P. R. writes: What is the greatest steam pressure a boiler 4 feet long, 15 inches diameter, 22 one-inch flues will stand? The shell one-eighth inch radius. As in your question: steel, heads three-sixteenths inch steel, with a strength of 65,000 pounds. What is the horse power of such a boiler, a plain cylinder, with fire under it, to go to one end and return through the flues? What is the power of an oscillating engine 21/2 inches by 41/2 inches stroke, running at 300 revolutions a minute at the pressure the boiler will safely stand? A. Your boiler should bear a working pressure of 50 pounds per square inch, and rates a little less than 2 horse power. Your engines rate 11/4 horse power at speed of 300 with 30 pounds mean
- (32) F. H. R. writes: Photographers usually save the clippings of the sensitive albumen paper, filter papers, etc., which are subsequently reduced to ashes and sent to the assaver to be reduced to the metallic state, to be afterward converted into nitrate of silver again. Can you suggest any plan by which the ashes can be converted into nitrate of silver without first being brought to the metallic state? A. It is best to prepare the nitrate from metallic silver. You can, however, reduce the silver yourself by fusing it with a little borax in a sand crucible in an ordinary coal fire. See Scientific American Supplement, No. 307.
- (33) W. D. F. and H. B. S. ask: Is it a fact that the upper part of a wheel of a vehicle driven over the ground revolves faster than the lower part? If so, please explain the cause? A. The top does not revolvearound the axle any faster than the bottom. The top moves along the road twice as fast as the axle. The bottom stands still in relation to the road, but move backward in relation to the vehicle. The misapplication of a word gives rise to much disputation. A wheel revolves on its own center, and every portion of its periphery has the same relation to its center in regard to
- (34) E. K. G. asks: What is the process of preparing and sensitizing paper for solar camera printing? A. The following method of preparing paper for solar printing is given by Libois: Take thin Saxe paper, and float it for a minute on the following salting

Chloride of ammonia..... 4 drms. Citric acid...... 4 Rain water..... 25 oz.

The citric acid is first dissolved in two and a half ounces of water and completely neutralized by bicarbonate of soda, five drachms of which are required to neutralize three drachms of the acid. The solution of citrate of soda thus formed is added to the solution of chloride of ammonium. The solution must have a slight acid reaction, which is attained by the addition of a few drops of a solution of citric acid. A small quantity of boiled arrowroot is also mixed with this bath, which is said to improve the final tones. The paper is next hung up to dry, after which it is sensitized by floating on the following bath for half a minute:

Nitrate of silver..... 1 oz. Water.....18

The bath is acidified with a few drops of a solution of citric acid. The first few drops produce a slight precipitate of citrate of silver, which is at once dissolved by the succeeding drops. When this is effected, the bath is sufficiently acid. It is important that the paper be thoroughly dried before it is pinned on the focusing screen in the camera. For exposure and directions regarding development, see Notes and Queries. No. 6, page 90, of Scientific American, vol. lii.

(35) J. C. W. asks whether brass will do for an enginecylinder 4x5. How thick should the casting be? What sized ports and bridges should be used? What kind of material for packing rings; if brass will do? A. Ordinary yellow brass is not fit for a cylinder. If you make a composition of 1 pound copper to 3 ounces tin, you have a good metal. Make the cylinder 1/2 inch thick except where needed thicker around steam ports. Ports 16 x21/2. Exhaust 1/2 x21/2. Bridge 1/2 wide.

Make the packing rings of above composition. See SCIENTIFIC AMERICAN SUPPLEMENT, No. 34, for propor-

- (36) E. B. asks for a receipt for a gold paint such as is used on steam heating racks put on with a brush. A. Steam heating racks are generally coated with bronze powder, but you can use a golden varnish such as the following: Pulverize 1 drachm of saffron tion to whole amount. It is more a matter of practical and 1/2 drachm of dragon's blood, and put them into 1 experiment than any demonstration of a scientific prinpint spirits of wine. Add two ounces of gum shellac and 2 drachms of Socotrine aloes. Dissolve the whole by gentle heat. Yellow painted work varnished with this mixture will appear almost equal to gold.
- (37) F. L. asks: 1. What is the receipt for the fluid in a barometer, which seems to be made of a test tube filled with water and gum camphor? A. A simple weather glass is thus made: Take a glass tube about ten inches in length and one inch in diameter, and canized in metal or plaster moulds? A. See Scientific fill it nearly to the top with the following liquid: Two parts camphor, one part nitrate of potash, and one part sal ammoniac, dissolved in strong spirit of wine, then add water until the camphor is partially precipitated. The extremity of the tube can be left open or hermetically closed, but is fixed in a vertical position against the wall or a board. This kind of a weather glass is very uncertain in its operation, but it is claimed that if the weather is to be fine the substances will remain entirely at the bottom of the tube, and the liquid will be clear, but that before rain crystals will form. 2. Is the wire on an electromagnet wound in the same direction on both coils? A. Yes.
- (38) J. P. asks the formula to find the diameter of the following: In the curve of a railway I stretched a line 80 feet in length, and the distance from the line to the curve was 9 inches. Required the diameter of the circle. A. When the chord and versed sine are given, to compute the diameter, divide the square collodion, you do not say how such a solution should of the chord of half the arc by the versed sine. For the be made, will you state how a collodion solution must chord of half the arc, take the square root of the sum be made, to answer the above named purposes? A. Col- of the squares of half the chord of the arcand the versed sine. Half chord=40 feet, or 480 inches; $480^2 + 9^2 = 230,481$, which is the square of the chord of half the arc. Then

 $\frac{25,009 \text{ inches}}{25,009} -2,134' 1'' = \text{diame}$ 230,481 e = - 12" to 1 foot versed sine

ter of the circle. Another and convenient rule: Divide the square of 14 the chord by 15 the versed sine, and add to the quotient 1/2 the versed sine; the sum equals the

 20^{2} -=1,066⁻666 + 375=1,067⁻0416=radius. 0.375

2,134.0832=diameter.

- (39) H. C. W. writes: I have a telescope with a 23% inch object glass, but I mistrust the effective aperture is much diminished by the internal structure of the instrument. Is there any way I can test whether it gives as large a field as it ought? A. Look inside of the tube with the eye piece taken out, and find if the diaphraeminterferes with the sight of the edge of the object glass. If the whole surface of the object glass cannot be seen, the diaphragms have been put in to cover defects in the definition of the glass.
- (40) S. T. C. asks: How are small iron castings made a bright copper color? A. Make a solution in water of the ordinary blue vitriol of commerce, and use it as a bath. Its strengthmay differ according to the time the articles are immersed.
- (41) F. P. W. asks: How is the dead white surface produced on the dials of aneroid barometers? A cyanide solution would dissolve the black letters and figures, which are made of shellac, and the surface is not like that produced by "cold silvering." A. The shellac letters are not made until after the matte surfacing is done, and they are not affected by the cyanide solution. The dead surface is produced on metal by the electrical battery bath or by a "silver powder" of precipitated silver, cyanide of potassium, whiting and ammonia. rubbed on by a chamois skin pad. If the material is paper or wood, the surface is made by painting with silicate of soda and dry zinc paint. These articles can be procured mixed in proper proportions at a druggist's or paint shop.
- (42) C. N. V.—The following is used for the transferring of engravings on wood. Take a saturated alcoholic solution of potash, pour the solution on the engraving, and immediately remove all the superfluous liquid by means of blotting paper. Lay the engraving while damp upon the wood or other material to which it is to be transferred, and place it in a press (a copper plate press is the best). The transfer will be obtained immediately. The engraving must be immersed in clear cold water after removal from the potash bath and before putting it into the press. Good wood engraving commands excellent prices. In regard to selecting a profession, we cannot advise you. Competent men will succeed in any profession.
- (43) J. C. T. asks: What is the greatest pressure ever used in the largest ordnance or produced with the largest charges used by artillerists in the world? A. About 40,000 pounds to the square inch.
- (44) R. B.—The finish on copper goods is made with a burnisher to harden the surface, when a rouge polish gives it a luster. The copper is toned previous to burnishing, by boiling in a sulphuric acid and water pickle, about 1 part acid to 6 of water.

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	Stopper. See Rope stopper.	
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	Stove, D. Lindahl	
	Stove door knob, W. J. Irwin	
	Submarine tunnels and tubes, apparatus for lay- ing, H. H. Hall	211 656
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	Switch, E. H. Allcutt	311,461
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	Telegraph cables, hanging, W. R. Patterson Telegraph cables, repairing, W. R. Patterson	311,5 22
	Telegraph, combined audible stock quotation sys- tem and fire, F. B. Herzog	211 756
	Thill coupling, G. W. Blair	
	Thill coupling, J. L. Downing	311,819
ļ	Thill coupling, J. I. H. Mosier	
	Tile kiln, G. Jennings	
	Tobacco pipe, W. R. Chadsey	
	Trace holder, J. Strong	
	Traction engine, F. W. Robinson	3 <b>11,</b> 530
	Trap. See Animal trap. Steam trap.	
	Trunk catch, T. F. Conklin	311,721
:	Truss, J. Cronin	
	Truss pad, I. N. Foote	
	Tube making machine, Fisher & Herrick Tug and trace fastening, hame, W. H. Tyler	311,477 311.798
:	Unwinding attachment for spools and bobbins,	011,100
į	C. E. Wilkinson	
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	Valve, throttle, E. Lunkenheimer (r)	10,557
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	Mark	3 <b>1</b> 1,593
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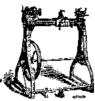
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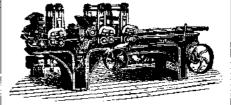
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