W. S. will find a recipe for a black finish on brass on p. 208, vol. 26.—F. J. F. will find details of the effects of ammoniacal vapor on p. 266, vol. 31. We cannot tell you of a remedy for the eruptions.—S. A. F. will find full directions for skeletonizing leaves on p. 123, vol. 29.—J. L. will find a recipe for glue that dries rapidly on. p. 33, vol. 31.—D. H. M. will find that the directions on p. 353, vol. 24, are complete.—P. F. S. will find full particulars of the German offer of a premium for a railway coupling on p. 162, vol. 29.—J. S. & Co. should refer to p. 59, vol. 24, for directions for galvanizing iron.—C. F. B. and F. M. H. should see p. 250, vol. 31, for a description of the prismatic fountain.—J. G. can bend timber by the process described on p. 43, vol. 30. Totan buffalo hides with the hair on, see p. 59, vol. 28.—V. will find full descriptions of various forms of unsinkable boats on p. 195, vol. 31.—H. B. T. will find details of the process of making artificial butter on p. 119, vol. 30.—A. & Co. will find directions for putting a black finish on iron on p. 123, vol. 29.—H. T. S. will find a recipe for leathercement on p. 208, vol. 30.—P. H. W. will find directions for gilding on glass on pp. 90, 279, 283, vol. 31.—W. E. will find a description of the process of malleablizing iron on p. 138, vol. 29.

(1) F. D. asks: If a bell glass be inverted in a dish of water, and a piece of meat suspended inside, how will the air affect the meat, the vessel being airtight? A. It will supply oxygen to the tissues of the meat, which will slowly undergo decomposition. 2. What effect will the water have on the meat? A. It will supply the atmosphere around the meat with moisture, and retard the desiccation. 3. What chemical can be put into the vessel that will destroy the decomposing property of the air? A. None which is cheap and easily used. 4. If I place ice in the vessel, will it aid in keeping the meat? A. Yes.

(2) C. T. M. asks: What will counteract the effects of sulphur in my jewelry show case? I have had vulcanized rubber goods in it, and the effect is to be seen on my gold and silver goods. A. Try standing several trays of quicklime in the case.

(3) J. S. T. asks: What is the best method of preparing annatto for coloring butter? Is any other ingredient used with it? A. Annatto contains a coloring matter which is sparingly soluble in water, but freely so in alcohol and ether. Potassa dissolves producing a deep red color; and on neutralizing the solution with an acid, it falls as an orange precipitate. The fixed oils also dissolve the coloring matter of annatto.

(4) J. S. M. asks: What metal is best to use in the seat and face of a steam engine governor, to prevent cutting? A. Hard brass is the best material; but there is none that will not cut under some circumstances.

(5) J. H. asks: Which will give more power, a 9 feet overshot water wheel, or a breast wheel using the same amount of water? A. In ordinary cases, if both wheels were well designed, they would have about the same efficiency.

(6) C. W. G. says: On p. 220, vol. 31, I read that S. T. says: "To find the power of a spring, attach a pulley and cord, with weight, and find how many pounds your spring will raise one foot high in a minute." Would not a similar rule be good to determine the power of a steam engine? If I am obliged to run up the weight more than a foot, should not the final result be divided by said number? Should the pulley be of the same size as the crank circle and keyed directly on the engine shaft? A. The method you speak of will answer, but is not ordinarily very convenient. The pulley can be made of any size.

(7) M. G. says: I have set up 5 stoves which had 6 elbows in the pipe. Pipe from the stove to chimney was 7 inches in diameter with 6 inches entrance in chimney. They all draw well. I have now set up a stove with a similar pipe with a 7 inch entrance in chimney; this smokes the rooms. Can it be possible that there is a draft downwards in the chimney, so that the smoke from the stove pipe descends? A. If the draft of the chimney were good with the six inch pipe, there is no reason why it should not be so with the seven inch pipe, unless the latter is pushed so far into the chimney as to reach the back of the flue, in which case, of course, it would be effectually closed. The pocket formed by the closed fireplace is of course filled with air, and it is not likely that the suction upon this, caused by the ascending current in the flue, could materially affect the draft of the latter. The stove pipe itself, however, may be closed with soot.

(8) A. B. asks: Is it possible to form two numerical squares that shall be to each other as 5 is to 4? A. No.

(9) R. B. W. asks: 1. What are the right proportions of curvature for the concave and convex disks of flint and crown glass, to correct all chromatic and spherical aberration in a 3 inch achromatic object glass for a telescope, focal length being about 4 feet? A. Outside curve of crown lens, 32·25 inches radius. Ditto of flint lens, 67·16 inches. Inside curve proportional to the dispersive powers of the two lenses, varying with different glass. 2. Is there any book giving directions as to forms of lenses, and degrees of curvature, for making, of telescopes, etc.? A. "*Praktische Dioptrik*," J. J. Prechtl, Vienna, 1828, is a complete manual for making achromatic telescopes. The method of local correction, the use of a covered tunnel and artificial star, with tramway to carry the lens, and Faraday's method of clearing melted glass by sprinkling platinum sponge over it, are the chief improvements since.

(10) D. J. M. Y. asks: Does the force of gravity increase or decrease on approaching the center of the earth? A. It increases.

(11) W. H. Jr. asks: What are the comparative tensile strengths of cast and malleable iron? A. Wrought iron has from 2 to 3 times the tensile strength of cast iron.

(12) L. M. D. asks: How is the accuracy of a mercurial barometer tested? A. Usually by comparison with some standard instrument. Read T. A. Jenkins' pamphlet on "The Barometer," etc.

(13) S. N. M. says: Mädler, Mitchell, and other astronomers estimate the velocity of the sun in space at 21 miles a second. On p. 208, vol. 31, you state that velocity at 4 miles a second. Is this a typographical error, or have you later and more reliable observations as authority? A. Struve estimates the sun's velocity at 150 million miles a year, or about five miles a second. Airy thinks it is 27 miles a second. Maps of telescopic stars are now being made, to settle this question 100 years hence.

(14) W. B. F. asks: Is there any machine, device, or means by which one unskilled in mining can with certainty test a locality for gold or other metals? A. There is none.

(15) A. F. H. asks: How can I make a terrestrial telescope, 36 inches long? How long ought the focal length of the object glass to be? A. The focal length of an achromatic objective should be about fifteen times the aperture. A set of eyepieces usually consists of several powers between ten and fifty for each inch of linear aperture, and of one high power of one hundred for each inch of aperture. A terrestrial eyepiece should be of low power. Change all the dimensions of any one of those we have given, uniformly, by simple proportion, and construct your terrestrial ocular thereby.

(16) A. F. C. says: I have a 2½ inch achromatic telescope of 44 inches focus; and with the Huyghenian eyepiece, I get a power of about 80. How high a power will it stand, and how must I construct the eyepiece? A. Working powers run from ten to fifty per lineal inch of aperture. Powers occasionally used on fine nights may run from fifty to one hundred per inch of aperture.

(17) C. W. B. says: A beam is hung by two rods, one at each end, from and parallel to a similar beam. If I shorten one rod, will the suspended beam hang directly under the other as before? A. No. The suspended beam will be deflected towards the shorter rod, and the strain upon the shorter rod will be greater than that upon the longer rod in proportion to the disparity of their lengths.

(18) E. A. B. says: I have a well in a cellar, 42 feet deep and 17 inches in diameter. The ceiling or floor over cellar is 7 feet 6 inches; the kitchen adjoins the room over the cellar. I wish to provide a way to deliver water from the well, into the kitchen, above the floor if possible, at a point about 20 feet from the well, and to have the pump for this purpose at the point of delivery. The lift will not be less than 50 feet. How and with what description of pump can I do this? A. Perhaps the simplest plan would be for you to place a lift and force pump in the well at not more than twenty-five feet above the water, and arrange to work it by means of pulleys and belts operated by hand power in the kitchen. You would require two belts—one running vertically and one horizontally—and a crank at the pump handle and one in the kitchen.

(19) G. W. M. asks: 1. What is the proper size to make the cores of a telegraph magnet? A. About 2 inches long by ⅝ of an inch in diameter. 2. With what sized wire shall I coil it? A. Use No. 22 wire.

(20) J. Q. A. asks: Is there any possible way of controlling a watch so as to make it run exactly, or not to vary more than one hundredth part of a second in twenty-four hours? A. It never has been done. We are not prepared to assert that it cannot be.

(21) R. L. J. asks: What is black brimstone, and is there any other name for it? A. When sulphur or brimstone is moderately heated, it passes into a transparent and nearly colorless liquid; but when the temperature is raised to 482° Fah., this liquid becomes thick and of a dark brown color.

(22) J. S. N. asks: In a hard coal furnace, the acid or gas formed in burning Scranton or Lehigh coal condenses and rots out the pipe, especially when the smoke pipe crosses a cold hall. I have tried common stove pipe, Russian iron, and zinc coated iron, with about the same result. Is there any metal I can use? Will copper, coated with zinc or tin, resist the corrosive action? A. Zinc would hardly answer. Tin would do better; copper would probably stand some time, but its rusting would be accelerated by other causes. Sheet lead would resist the acid vapors, but might not answer so well in other respects. A silicate pipe would do.

(23) P. M. O'F. asks: Are a perspective view and photograph of the same object, from the same point of view, identically alike? To this you answer, no. Please state in what the difference consists. A. In a photograph, parts of an object which are much nearer than others are unduly magnified. 2. Are there any rules by which a draftsman may obtain, without copying from a photograph, the same general outline of an object as can be obtained by photography? A. It might be possible to make rules for the purpose mentioned, but we have never seen any, the ordinary methods for perspective drawing being generally considered better.

(24) F. C. M. says: I have been trying to make a galvanic battery as proposed by Mr. W. M. Symons on p. 209, vol. 31, but without success. Can you aid me? A. Your battery, if constructed as directed, could not possibly have been a failure; and although when in operation you could not feel the current, by applying the terminal wire to the tongue you might be able to detect its presence by taste or sensation. 2. How can I construct one of sufficient power to give a weak current or shocks? A. A small induction coil will best answer your purpose, full directions for the construction of which you will find on pp. 218, 315, 378, 379, vol. 30.

(25) J. B. H. asks: 1. Are coins molded or stamped? A. They are stamped. They could be molded. 2. Can molds or dies be made without the use of engraving, and how? A. The dies are struck from a master die, which is engraved. 3. What kind of metal is best to make the molds of? A. Soft steel is generally used.

(26) H. S. asks: What temperatures are required to volatilize, respectively, gold, silver, zinc, antimony, lead, and copper? A. The question whether certain metals volatilize during the roasting of the same, we cannot definitely answer, owing to very little data upon the subject. Gold melts at 2264° Fah., and Napier considers it to be volatile at a very high temperature; it also volatilizes when remelted in crucibles, especially when combined with copper. If the fused gold has been covered with a layer of bone ash, the ash will be covered with volatilized gold of a purple color. The microscope does not reveal globules of gold in this coating, but grains of gold may be obtained by smelting; so that the question of whether gold is volatile, in a finely divided state or in combination, is still unanswered. According to Deville, gold volatilizes when melting auriferous platinum, and may be collected by condensing the gold vapor. Silver melts at 1904° Fah., and can only be volatilized by electricity or the oxyhydrogen flame. Zinc melts at 770° Fah., and volatilizes at 2264° Fah., and burns at 932° Fah., forming ZnO, which is not volatile. Antimony melts at 806° Fah., and volatilizes at a bright white heat. Lead melts at 626° Fah., boils and volatilizes at a white heat, air being excluded. Copper melts at 2426° Fah.

(27) M. H. McK. asks: Which is best for deafening a floor, filling from the lining of the deafening up level with the joist or leaving a space under the floor? A. It is best to leave an air space above the deafening, for two reasons; it will both deafen better and be less liable to cause a dry rot in the floor plank.

(28) H. S. G. asks: Can I put one water wheel under another to use the water twice over, in a deep fall? A. There is no novelty in this plan. One wheel is better than two when it can be conveniently employed; but sometimes, on account of the great size that would have to be given to one wheel, two are used.

(29) N. S. J. asks: How can I analyze water? A. Apply to a chemist. The knowledge of the method would not aid you without the necessary skill.

(30) P. & B. ask: What is the proper shape for a piece of steel, so that when one end of it is bolted firmly to a solid piece of wood and the steel struck, the sweetest and most voluminous tone may be heard? A. A flat bar, supported on the ends on ropes of straw, is ordinarily used.

(31) W. P. asks: Why does not a pump raise water 26 feet perpendicularly in a mill which is more than 700 feet from the river? A pump in a mill near the bank raises water 27 feet. Is the friction too great for the 4 inch pump, or are we at too great a hight from the water? Shall we put in another or larger pump, or sink the pipe? A. The great length of your pipe causes so much friction that your pump runs away from the water. The remedy is to provide a tank or reservoir at the distant mill and a force pump at the mill on the bank; the water will then be driven through the pipe instead of drawn through it, and the friction can be easily overcome. The water, being discharged into the tank at the distant mill, can thus be taken up by the pump stationed there and supplied where required

(32) A. V. D. V. says: I hold that the following: $7\times3\times2\times5\times0\times5\times6=6{,}300$: is correct. My friend argues that $210\times0=0$ and so on, the answer being 0. Please give us your opinion. A. Your friend is right. You may get a clear idea of the matter by imagining 0 to be a fraction whose numerator is 1, and whose denominator is infinitely large.

(33) W. H. H.—The recipes for colored stars for rockets were from eminent authority, and are correct in every particular.

(34) C. M. C. says: Atmospheric pressure is estimated at 15 lbs. per square inch. If a boiler capable of bearing only 100 lbs. pressure in the open air could be placed in a vacuum, would it not burst at 85 lbs. pressure? In other words, should there be an increase of 15 lbs. made on the bursting pressure of a boiler on account of the resistance of the atmosphere? A. This allowance is always made in proportioning a boiler, by taking the pressure of the steam to be that shown by the steam gage, while the pressure, in reality, is on an average 15 lbs. greater than this.