C. T. asks: How can I clarify beer? A. Take isinglass, finely shredded, 1 lb, sour beer, cider, or vineger 3 or 4 pints; macerate together till the isinglass swells. and add more of the sour liquid until a gallon has been used. Strain and further dilute. A pound of goodisinglass thould make 12 gallons finings, and 1% pints finings is enough to clear a barrel of beer.

W. N. J. says: A certain philosopher states that " the moon has either no atmosphere at all, or one exceedingly rare, and not extending more than a mile from its surface. Hence it must be destitute of water for any liquid on its surface would long since have been dissipated by the heat of the lunar days, there being no atmospheric pressure to check evaporation. If there were any water on the surface of the moon, clouds would certainly be observed at times dimming its face.' 1. I ask for information through the SCIENTIFIC AMER-ICAN. Supposing water in the shape of lakes to exist on the surface of the moon, how could evaporation take place, and clouds float, to dim the moon's surface, if there were not an atmosphere having a certain pressure through which varor could rise and form clouds? A. The elastic force of a vapor which saturates a space containing air or gas is the same as in a vacuum. 2. Does evaporation check by atmospheric pressure, or does this pressure assist evaporation? If the moon has no atmosphere, and wa'er exists to a considerable amount, it would certainly not be dissipated, but heaped up mountain high by the expansion of particles during a day of three hundred hours of intense solar heat, and then subside again during the following long night, and of course escape detection by the closest observers. A. The rapidity of evaporation is inversely as the pressure upon the surface of the evaporating liquid, that is, pressure diminishes evaporation.

P. R.-B.'s cheap telescope, described in No. i, vol. 300f the SCIENTIFIC AMERICAN, 18 an interesting experiment. You had better buy an achromatic objective, if you can afford it ; if not, save your eye sight and money.

F.asks: 1.0f what diameter ought a double acting force pump to be for a 2 inch supply pipe? A. Four inches 2. Should the discharge pipe be of the same diameter as the supply pipe? A. Yes. 3. Must the air champer of a pump stand upright if the pump be placed at an angle? A. Yes.

E. P. F. asks: 1. If a globe made of sheet metal, 10 feet in diameter, weighs when full of air 1.000 lbs, how much less would it weigh after exhausting the air so to form a perfect vacuum? A. About 40 lbs. 2. What outside pressure would it have to sustain after the air was exhausted? A. 14.7 lbs. per square inch of snrface, or about 650.000 lbs. in all.

L. D. says: 1. The balls we have been using in a ball mill are of cast iron, and weigh on an average 24 lbs. each, diameter being 5% inches. What should we the wright of a solid ball of cast iron of that size? A. About 24 lbs. 2. Is there any difference in the weights of steel and cast iron balls of the same dimensions? A. The steelball would be about 21bs, heavier, 8. Is a life of Robert Fulton published in the United States? A. There are several works on this subject. See our advertising columns for booksellers' addresses

S. R. asks: How car I cut window glass to an oval shape? I have a glass cutter, butfind is will not cut without several failures, breaking plenty of glass. A. Use a good diamond.

D. asks: What will be the volume of steam as a strong heric pressure, evolved in the conversion of any given volume of water, and what the volume of oxygen and bydrogen at same pressure, evolved in the decomposition of the same quantity of water? A.Supposingthat a cubic foot of distilled water at 212° Fah is converted into steam. and also decomposed into its constituent gases at the same temperature: The volume of the steam formed from this water will be 1,572 cubic feet; the volume of oxygen, 813 cubic feet; the volume of hydrogen, 1,621 feet.

J. E. asks: I saw in your journal a descrip-tion of a wonder camera; and I have been endeavoring to make one, using an opera glass objective of about 7 inches focus and 1% inches diameter for a lens, and an argand gas burner. It will throw upon the screen an ordinary card photograph of about 3 feet high pretty fairly, but the image is not distinct enough. What kind of lens and of what size and focus should I use to ob tain the bestresults with an argand gas burner? Will such a burner give light enough, with a proper lens, to makea clear, distinct picture on the screen 5 feet in high'? A. Lantern or jectives and condensing lenses are described in back numbers of the SCIENTIFIC ANER. ICAN. Place a number of burners in a straight line, one behind the other, as flame is nearly transparent.

S. N. M. asks: What astronomers have ob served any solar eruptions, having an upward velocity of 600 miles a second? When were such observations made? I suppose that 166 miles a second (Professor C. A. Young's statement) is the greatest observed voloci-ty. A. The observations of Professor C. A. Young September 7, 1871, indicate more than this velocity. At each explosion we see an eruption of hydrogen. Masses of other metals may precede or accompany it, in a semiliquid or gaseous condition. They are not seen in the spectroscope while we look at one of the hydogen lines with a wide slit.

A. F. C. says: I have a 3 inch achromatic telescope of 48 inches focus; and with the Huyghenian eyeolece I get a power of about 120. How high a power A. Probably 200. Then 48 inches + 200=0.24 inch=equivalent focus of eyeplece. Focus of field lens will be twice this, or 0.48 inch. Focus of eye lens will be one third of focus of field lens. or 0.16 inch, and the two plano-con vex lenses will be 0.48-0.16=0.32 inch apart.

A. P. W. asks: 1. Can the vapors of coal oil be condensed by cold water? A. The vapors of coal oil cau be condensed by passing them through a tube surrounded by cold water. 2. What kinds of gases are used in gas engines? A. Common illuminating gas mixed with air bas been used in gas engines. The mixgen formed by the ignition united with oxygen of the air, forming water; this produces heat, which expande the gases and drives a piston.

W. M. B. says: I want to paint a disk, 2 feet in diameter, with the seven prismatic colors, in such a manueras to make the surface appear white when Irevolveit fast. What proportion of each color must use? How shall I divide the disk in a proper manner A. Divide the circumference of your disk into 6 equal parts. Thendraw radial lines from the center to each of the 6 points. In the center of the disk, paint s round black spot about 3 or 4 inches in diameter; also paints narrow black rim on the edge of the disk. In each of the six spaces formed by theradial line, paint theseven prismaticcolors; you will thus have six spec tra. In a spectrum, the orange occupies the least ex tent; if, therefore, you make this the unit, the extent occupied by the colors will have the following relation: Violet 4'16, indigo 2'40, blue 2'50, green 2'87, yellow 1'08, orange 1.00, red 3.33.

D.I.F. asks: 1. What is best to kill the effects of altricacid on the teeth, so as not to burt the enamel? I havebeen using said acid on my tongue. A. When the enamel is gone, the dentine is rapidly affected by thesecretions of the mouth, especially when the system is not in a healthy condition. Soda is too powerful in its aikaline reaction. Repeated gentle rubhing with a soft brush and a harmless dentifrice like precipitatedchalk would be better. 2. How can I detect cider which is not made f. om apples? A. If you suspect that it is made from oil of vitriol, the latter may be detected, with proper precautions, by chloride of barium.

B. M. K. Jr. Says: 1. I constructed a tele-scope according to the plan given on p. 7, vol. 30, of the SCIENTIFIC AMERICAN. For the object glass I have a meniscus of elliptical form,1% by 1% inches in diam-eter and 3% feet in focus. The eye glass is a plano-convex lens of 1% inches in diameter and 1 inch in focus. So far I have failed 10 produce a perfect object. There is a great deal of prismatic color, and the raysof light seem to produce different foci. What do you think is the matter? A. An elliptical lens cannot be properly figured; besides, your objective is does it make any difference of what form the object lensis? A. A disphragm which cuts off any part of the aperture of an object glass reduces the amount of light aperture of an object gass reduces the amount of high passing through it. S. Can you tell me how to polish a lens that has become scratched? A. To polish a 'ens, turn awooden disk with broad bandle to the proper curvature; paint the disk with a mixture of pitch and rosin just dented by the thumb nail when cool. Cut grooves across the pitch, dividing it into one inch squares with diagonal grooves across the squares. Warm, and press quickly on the lens with a piece of paper between them. Wash off adhering paper if neces sary. Then coat with moist rouge and rub the lens with hypocycloidal polishing strokes while walking round it. Five minutes rubbing will suffice to destroy the figure of any object glass. Herr Steinheil showed us a scratch on a two inch lens which he said would take the workmau half an hour to polish out. 4. Will the socalled furniture polish spoil the varnish on a planoforte? A. No.

C. K. asks: 1. Of what could I make a box to keep matches on a sheet iron mantle from catching fre? A. Of some poor conductor, such as china, por-celain, glass, plaster of Paris, etc. 2. What is the spe clic gravity of a piece of elmwood weighing 2 ounces, with a piece of lead attached to it weighing 4 ounces, andhowcan I flod the specific gravity? A. The specific gravity of your pieceof elmwood can be found by the following equation: Specific gravity = $\frac{2}{6 + (x + 36)}$, where x equals the sum of the weights of the wood and lead in water. 3. Why is it that some lenses show objects upside down? A. Because their action on light is to bring its rays to a focal point where they cross each other, and for this reason the image appears inverted. 4. How can I make a good battery? A. See p. 379 vol. 30.

S. T. asks: How can I bore a journal box to ft a V-shaped journal, and have it quits true, so that it will be exactly the same angle in each half of the box, and one angle true with the other? Are there any special machines for such purposes? Having only a compound rest lathe, the box must be chucked twice. and cannot be set quite true. A. There are no special tools for such a purpose, but your lathe will answer the purpose by the following method: Set the head of the compound rest to the required angle and bore out the front end of the journal box. Then cross the belt of the lathe so that it will run backwards. Use a tool bent round to the right and bore the back balf of the box from the right handside of the box (that is, the oppo-siteside from which the front end was bored), by which method of procedure the box will only require one chucking and is certain to be quite true. Another method is to turn the tool upside down without cross ing the lathe belt, and turn the back end of the box from the right hand side as before, but this renders the

starch water. Very dilute oxalic acid may also be used-2. How are rubber hand stamps made? A. A number of manufacturers have been visited, and they all de cline to explain theirprocesses.

O. C. K. asks: Can you give me a recipe for awash, to be applied externally to the skin, to keep mosquitoes away? A. Make an extract of pennyroyal, by bolling in a limited quantity of water for a short time, and when cool add a small quantity of glycerin. Wedo notknow of anything that will remove tattoo marks without injuring the skin.

W. F. asks: How can I make the adhesive flypaper? A. A mixture of molasses and linseed oil willanswer.

R. K. asks: Can yougive me a good shape of furnace for heating locomotive springs to reset and temper them? A. Make a brick furnace somewhat longerthan the spring plates, with the blast entering with each end of the furnace. Make coke (for use in the furnace) by banking up coal on a blacksmith's fire and burning the gas out of it, which coke will give you a clear fire in your furnace. The top of the furnace ay be made to remove, so as to set thereon a tank of oil for tempering the plates.

J. S. H. asks: 1. What is a cheap, simple, and speedy method of utilizing bones on the farm as manure? A. The following plan has been suggested for utilizing bones: Place them in a large kettle filed with sahes, with about one peck of lime to a barrel of bones. Cover with water and boil. After twenty-four hours, nearly all the bones will be soft to be polyerized by hand. The rest may have to be holied ten or twelve hours longer. When pulverized they will be in the form of paste, and suitable to mix with other manure. 2. What is a good process for sonverting molasses into vinegar? A. Vinegar may be made by mixing 16 parts of pure water, 1 part of sirup of molasses, and 1 part of baker's yeast at a temperature of about 80° Fah., and keeping the compound in atmosphere from ten to thirty days. A little old vinegal added on the second or third day will aid the process.

C. J. M. asks: What will make and keep rain water sweet in a clean wooden cistern? I put on bushel of charcoal in each cistern, hut it does not sweet en the water. If charcoal is good, how much and how often should it he renewed? A.If your cistern is clean and the water also when it goes into the cistern, the impurity is due to the vegetable matter taken up from the wood of the cistern. If you use charcoal to purify it. the best way will be to filter the water shrough it lum is a more effectual agent for purifying the water A drachm of pounded alum to a gallon of water is suff clent. After twenty-four hours the water will be cleansed. All wooden vessels to hold water should be charred inside.

A correspondent says, in reply to W. C. L., who saked in our issue of June 13, how to procurea vacuum in a common bottle: "I would suggest the enclosed plan, a modification of which I have used. Let

950

4

₩Q-

ħ

a

a represent a cylinder, ba piston, cahollow piston rod, da sliding rod for holding stopper e a stopper, f a hottle, g a stir rup for withdrawing piston, h a discharge cock, *i* a cap which screws on to the cylinder. The moa operation is as follows: Remove the cap, i, and fill the cylinder with water, replace the cap (which should be packed with rubber) and, while in this position, withdraw the piston until water appears all around it on the opposite side; also open the cock, h, and allow all air to escape. The apparatus should then be reversed, and placedupon a bracket for conventence in operation, and the space over the piston should be filled to overflowing. The bot-tle may then be filled and the stopper dropped in and pressed tight enough to keep its place when reversed. The stopper should be ground, as also the

bottle, to fit their places. The 9 bottle is then inserted in the cylinder, expelling the surplus water as it enters : and when fimlyset, the stopper may be withdrawn by the sliding rod, d, which has a recess at the end to fit it. Now the

piston may be withdrawn as quickly as convenient, the cock, h, being opened until the water has all left the bottle, when the stonner may be inserted by the rod, d. and the bottle removed. Solids may be introduced during this operation, and fluids at any time. The success will depend upon the scientific and mechanical accur acyol the operator, as the airmust be expelled from the water, and care in manipulating must ;otherwise keep It out."

H. writes to corroborate I. F. B.'s statement concerning the water in the Humboldt and othe leys of Nevada being of a uniform level at various points in the valley, and that, if the streams were traightened and the level lowered by drainage, th frosts and damp and chilly nights would disappear, and farming bemuch more successful. "I have often observed the same fact in every portion of Nevada and in some parts of California; while here in Montana, we find that the water is never found lower than our streams, rising and falling with them, and in no month of the yearcan we be sure that we will not have frost. My experience, however, would lead me to differ from him very materially as to the cause and use of different means for the protection of vegetable life. I claim that the air is too dry. It allows the beat from the land to radiste into space with very little or no resistance. Ithink that I. F. B. will bear me out in this, that we are more liable to have severe frosts after a hot, dry day than after a cold and damp one, and more liable in a clear, still night than a cloudy or windy one. I bave suffered intensely from heat two bours before sundown in some of those Nevada valleys, while two hoursafter it I was suffering just asmuch from cold. The air was very dry, allowing the heat of the sun to pass through It without resistance, and making the earth very hot; and when the supply was cut off. it would return with equal rapidity over the same iree road. I think this is in accordance with Professor Tyudall's thorough and carefully conducted experiments on the subject (SeeLecture IX, p. S73, of his work, "Heat as a Mode of Motion "), and I think that he gives us the true theory of frosts in the same work, p. 418. I would say it is

J. N. H. asks: 1. Can you give a recipe for making white ink to write on colored paper with a steelpen? A. One part muriatic acid and twenty parts I have frequently saved my garden from frost when everything was cut down more or less around it. and that under circumstances that cannot all be accounted for in any other way than that the vapor rising forms a mantle or covering, preventing rapid radiation and thus saving the plants. There are many of your western readers that are deeply interested in this question. Agculture in the mountains is fast becoming an imporant industry, and our great banes are early and late frosts. Perhaps some other readers could throwaddi-tional light upon the subject."

S. P. says, in answer to S. C. H., who wishes to mount a drawing on a paper background, and then varnish the surface: Paste the drawing on the backgreund. Flourpaste is as good as any; and when it is dry, size the surface with a solution of gum arabic or white glue. When that is dry, use any varnish you please. For a delicate picture or drawing, dammar varnish is the best ; but it must be applied rapidly to secure an even surface.

M. R. H. asks: How can I render hard, and unaffected by heat, beechwood lasts which are daily subjected to 12 hours dry heat at a temperature of 290° Fah.? Common wooden lasts, undergoing this treatment, in a few months becomedry and almost charred the edges break off and they are unfit for use.-C. L asks: What is the best way to can green corn and green peas?-H. J asks: is animal life visible, by the use of the microscope, in the water from hot springs as wel asincold water ?- A. E. R asks: 1. How can I cover the glazing on potter's ware with silver or mercury, so as tomakeit a reflector of light? 2 Of what is the sah which remains after lead has been heated above melting point forabout twelve bours. composed ?-H. D. M. asks: How can I apply paratfin to make canvas waterproof? What shall I put in the paraffin to make it of a dark color 7-9. C. H. asks: How can I prepare mocking birds' food ?-J. A. J. asks: How can I make in squarium?-W. E. L. asks: How can I line iron water tanks, to prevent rust in the water ?- G. O. C. asks: How can I remove the blue color from polished steel ?- H. D. M. asks : How can I clean petroleum barrels, so asto make them fit for holding cider, etc. ?

COMMUNICATIONS RECEIVED.

The Editor of the SCIENTIFIC AMERICAN acknowledges, with much pleasure, the receipt of original papers and contributions upon the following subjects: On Feathered Arrow Heads. By F. E. M

On Aerial Navigation. By G. W. M.

Also enquiries and answers from the following:

O. D. O.-É. T.-M, P.-C. S.-G. J.-W. C.L. G.-J.M G. B.A.-E. P. W.-A. W. H.-O.S -J. B.

HINTS TO CORRESPONDENTS.

Correspondents whose inquiries fail to appear should repeat them. If not then published, they may conclude that, for good reasons, the Editor declines them. The address of the writer should always be given.

Enquiries relating to patents, or to the patentability of inventions, assignments, etc., will not be published here. All such questions, when initials only are given, are thrown into the waste basket, as it would fill half of our paper to print them all; but we generally take pleasure in answering briefly by mail if the writer's address is given.

Hundreds of enquiries analogous to the following are sent: "Please to inform me where I can buy sheet lead, and the price? Where can I purchase a good brick machine? Whose steam engine and boiler would you recommend? Which churn is considered the best? Who makes the best mucilage? Where can I buy the best style of windmills?" All such personal enquiries are printed, as will be observed, in the column of "Business and Personal," which is specially set apart for that purpose, subject to the charge men.ioned at the head of that column. A lmost any desired information can in this way be expeditiously obtained.

[OFFICIAL.]

Index of Inventions FOR WHICH

Letters Patent of the United States WERE GRANTED IN THE WEEK ENDING June 30, 1874,

I.G. W. asks: 1. I have an achromatic ob ject glass 2 inches in diameter and 36 inches focus. Of what focus and what distance apart should the eve enses be to obtain the strongest power compatible with distinct vision for a celestial eyepiece? A Field lens. of three fifths of an inch focus. Eye lens, one fifth of an inch focus. Distance apart, two fifths of an inch Equivalent focus, three tenths of an inch. Power, 120. What additional lenses, and what distance apart would it be necessary to add to make a terrestrial eve A. Two Huyghenian eyepieces make a good terrestrial one. The lowest poweris placed about twice the sum of the equivalent foci of the two eyepteces in front of the other. S. In your answer to N.B in your issue of May 9, you mention the two eye lenses as being respectively % and % inch focus, and the % in its own local distance within the focus of the other, and further say they will be % inch apart. Is this an error, or should the measuremest be from the glass instead of the focus? A. In ourrepty to N. B. May 9, we should have written "eye lens, 1% inch focus," as is evident from the context.

tool more liable to spring and jar; the first method is therefore preferable, but the rest requires in either case no alteration of its angle to perform the duty on both angles.

H. P. says: I have a cedar tank for rain water for washing purposes, and the water is foul, smelling principally of cedar, mixed with stale or stag nant smells. What shall I do to renovate #? A. We have seen the following recommended: Sprinkle a ta-blespoonful of powdered alum in a hogshead of water stirring the water at the same time, then let the water stand fors few bours. If, upon trial, this should not be satisfactory, let us know what results you do obtain, and a method suited to the requirements of this case will be recommended.

J. A. asks: Can you tell me of any preparation (except bismuth and rose water) that can be used for whitening a clown's face, and which will not be in jurious? A. We do not know of any that will answer as well.

C. P. says: I am a manufacturer of paper goods and use many different knives. Can you favor mewith a secipe for a mixture that I can apply to the interior of the knives that will cause the paperto leave themfreely, sud yet not soil the paper? A. We have applied to a number of paper houses but find that they use nothing for this purpose. You had better apply to some practical chemist,

AND BACH BEABING THAT DATE. (Those marked (r) are reissued patents.)

Adding machine, C. C. and J. B. Moore	152,670
Agricultural implement ferrule, W. H. Bowmau	152,454
Air compresser, W. S. Deeds	152,468
Atrin rooms, cooling, R. W. Sanborn	152,519
Alkalies, putting up caustic, Herman & Holman	152,684
Auger, earth, W. Sandlin	152 522
Bale tie, cotton, J. M. Goldsmith	152.480
Baling plastering hair, W. R. King	152,560
Barrel head, O. Jndge	152,495
Bedstead fastening, W. H. Elliott	152,621
Bilge water gage, J. D. Leach	152,557
Binder, temporary, H. A. Behn, Jr	152.590
Binder, temporary, J. Bennet	152,458
Boiler grate, steam, J. Sanders	152.692
Boot heels, burnishing, E. H. Downing	152,472
Boot seam, rubber, E. B. Stimpsou	152,704
Boot soles, burnishing, Weeman & Dunnells	152,584
Bridge, iron truss, E. Cemberle	152,483
Bridle, R. W. Sanborn	152,518
Buckle, G. W. Bradford	152,455
Buckwheat, cleaning, D. Pease	152,679
Bung for casks, R. Pentlarge (r)	5.937
Burner, gas, T. F. McGhann	152,568
Burner, lamp, S. W. Fowler (r)	5,946
Cages, mat for bird, I. A. Singer	152,526