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T. A. B. and others, who ask as to books on
locomotive engine, should read Forney's the locomotive engine, should. read Forney's
"Catechism of the Locomotive." -D. W. P. will find formule on the strength of boilers on p. 186 .
vol 32 . . C. W. will find full instructions for pol ishing lenses on p. 363, vol. 31. Consult Preehtrl's
"Dioptrik", if you can read German. ishing lenses on p. 363, vol. 3L. Consult Precht's
"Dioptrik", if you canread German-, J. H. R.
should use the Lélanché battery. See p. 362 , vol. 31.-P. H. G. will Ind directions for polishing shirt bosoms on p. .203, vol. 31.--H. H. T. Will find partir
culars as to the invention of the screw propelle-
on pp. 151, 241, , vol. $30-$ - E. R. J. will find a description of the method of preparing bone charcoal on
p.55, vol. 23.-J. L. H. will find a recipe for cement for glass and brass on p. 117, vol. 32.-F. B. S. will find adeseription of an electric engine on $p$. 241 ,
vol. $33 .-A$. K. will find full directions for mounting maps, etc., on p. 91, vol. 31.-R. W. Will find
that painting on zine is deseribed on p. 116 , Scienco Record for 1874.-W. N. C. will find directions for bluing steel work on p. 123, yol. 31.-W. A. will
 Great Eastern steamship on p. 346, vol. 31.-J. C.,
of Moscow, Russia, will find a description of wood-splitting machine on p. 79 , vol 28.
(1) S. L. S. asks: Please to inform me how
I can ditsolve ankiline green, or how to prepare it I can dissolve aniline green, or how to prepare it
for coloring purposes. A. We are acquainted with two varieties of this color, namely, aldehyde green and iodine green. The former 1 s soluble in
parts of sulphuric acid, and from 50 to 70 part of alcohol. The latter dissolves readily in equal parts of alcohol and water.
${ }^{(2)}$ W. M. J. asks : 1. Why would it not ansaer as well. to place the coils of a magnet $\frac{1}{1}$ of
an inch apart instead of putting them the tiokan inch apart instead of putting them the thick-
ness of a fine silk thread apart?
What would be the result provided the same length of wire be
used ? A. It would not answer so well, because used? A. It would not answer so well, because
the same number of convolutions could not be contained in the space occupiuiod by the wire when the latter is covered with a thin layer of silk only. 2. What is the theorry of a current of electricity,
passing around a piece of gof tiron, magnetizing the passing around a piece of goft iron,magnetizing the
same? A. Ampere's theory assumes that each in dividual molecule of a magnetic substance is traversed by a closed electric current. It is further
assumed that these molecular asseded that theire center of gravity. The coercive
move about
foree howere, tends to teen them in foree, however, tends to keep them in any position
in which they may happen to be. When a current of electricity is passed around the substance, it tendency is to place all of the molecular currents
in a parallel direction; by this means the action of in a parallel direction; by this means the action or
the latter on external matter becomes apparent. 3. Is the magnetic influence derived from the passage of a current of electricity? A. Yes.
Would Would it not do as well, if practicable, to replace
eleetricity with heat? $A$. Yes. It is not practica be, however, until the heat is first transformed (3) J. R. C.
(3) J. R. C. asks: If the two disks of an achromatic objectglassare $5 \frac{3}{5}$ inches in diameter,
the bi-convex and the contact side of fint glass bethe bi-convex and the contact side of fint glass be-
ing ground to 031 inchese radius, what should be the If the disks be 414 inches in diameter, gad the three curves (as above) are ground to 24 inches radius, what should be the posterior or correction curve? The lenses are of French glass. A. As-
suming the glass to be of medium quality, in the suming the glass to be of medium quality, in ton-
first instance, the posterior curve should be conirst instance, the posterior curve should be con
cave, of 146 inches radius. The latter should also
(4) J. E asks: How can I make glycerin
oap? A. It is made by incorporating, with any soap ? A. It is made by incorporating, with any
mild toilet soap, 1 or mild toilet soap, $\frac{1}{25}$ or ${ }^{2} \frac{1}{2}$ by weight of pure glycer-
in, while in the melted state. It is generally tinged of a red or rose color with a little tincture of or chin or of fragon's shood, or orange yellow with a
little annatto. It is variously scented ; but oil of little annatto. It is variously scented ; but oil of
bergamot or rose geranium (ginger grass) supportbergamot or rose geranium (ginger grass) support-
ed with a little oil of cassia, or oill of cassia supported with essential oil of almonds, appears to be
the favorite perfume so-called glycerin soaps contain not a particle of glycerin.
(5) J. F. P. says: I propose to build a fruit house with iee house overhead. I propose a triple
brick wall, with two air spaces of two inches each with cut-off at every two feet in hight. Would it be better to fill one or both spaces with non-con-
ducting material, 1 ike saxyuast, on suffice.
(6) J. O. P. asks: How can I make vinegar
10 hours , from pure cider? in 10 hours, from pure cider? A. The best fermentis vinegar. An old cask in which vinegar
has been kept is the best to ferment in. Other ferments are used, such as bread soaked in yeast,sour
dough, dough of wheat, or rye bread soaked in dough, dough, of wheat, or rye bread soaked in
deream of tartar and vinegar. All these are used cream of tartar and vinegar. All these are used
in small quantities, a few ozs. to the barrel. Vinin small quantities, a few ozs. to the barrel. Vin-
egar made with them is more apt to spoil. The more ferment there is present, the quicker will be
the proeess. The cider is put tint the casks. whiet is best painted black outside to absorb the sun's rays when the weather is cool ; the bung is left out, the bung hole is is overed with a pieceo of slate,
and in about four weeks the rectification is comand in about four weeks the rectification is com-
plete. The lower the temperature is, the slower piete. The lower
will be the change
(7) G. J. asks: In what position is the compass placed on board iron steamers, so as not to be
affected by the metal of which the ship is constructed? A. It istrounted on an elevated standara, sufficiently hig
the ship's attraction.
(8) J. C. R. asks: Where is native sulphur found, outsde of Sicily? A. The great de-
positories of sulphur are either beds of gypsum and the associate rockss, or the region of of active or
axtinet voleanoes. In the valleys of Noto and Mozzaro, in Siciily, at Couil, near Cadiz in Spain, at Bexin Switzerland, at Cracow in Poland, it occurs in the former situation. Near Bologna.Italy,
it is found in fine crystals, imbedded in bitumen. Sicily and the neighboring volcanic isles, SolfaSicily and the neighboring volcanic isles, Solfa-
tara near Naples, and the volcanoes of the Pacific Ocean, etc., are localities of the latter kind. It is
also deposited from the hot springs of Iceland; and in Savoy, Switzerland, Hanover, and other countries, it is met with in certain metallic veins. Near
Cracow and in Upper Egypt there are large deposits. A fiberous variety is found near Slenna intus its. A aberous variety is found near slenna, inT
cany, and is abundant in the Cbilian Andes.
(9) G. M. says: I wish to know something
of the nature and properties of phosphorus. A. of the nature and properties of phosphorus.
Consultsome elementary work on chemistry.
1 sleser L. Does lodestone possess the same properties, in
every respect, as an artificial mannet?
 nets are much the more powerful. 3. Where i odestone found ? A. Lodestone occurs in larg
cuantities in Guantities in the northern parts of New Yor steel 8 inches in length, how far apart should the ends be to secure the greatest power? A. About孚inch apart.
(10) W. T. G. asks: 1 . What are the quali cations necessary to becomea midshipman in th
United States navy? A.A fair Eng lish education ood physical development, and age between 11 and 18 ears. 2. Who would be the proper person
to apply to for a position in the lake squadron? . There is no lake squadron. To become a mid shipman requires recommendation to the Secretary of the Navy by the member of Congress of
your district. ${ }^{\text {3. Which offers the best chance for }}$ study and advancement, the United States navy stuay and advancement, the United states navy
or the merchant marine? A. In the navy, you are sure to be advanced if you live long enough. In
the merchant service, the case is the same as in ny private pursuit ; individual merit and ability
(11) S. H. L. says : I have an ornamental pieee of white ivory, in the shape of a cylinder,
which has lately eracked. Do you know of any Which has lately eracked. Do you know of any
plastic material with which I could fill the crack, o conceal the defect, and not in any way attec atin in a strong solution of alumina. When entirely penetratede by thealumina, remove from the solution, and use immediately. When dry, it may e readily polished.
(12) J. R. says: I am interested in a quartz mine, which assays from $\$ 40$ to $\$ 80$ per tun of gold; but the sulphuret of iron is so abundant that the
quartz mill men claim that they cannot amalgamate the gold. Can you inform me of some cheap nethod of destroying the sulphuret of iron? $A$
Pulverize the ore, and roast tit at a a igh temperaphur in a current of air. This will expe he sul aind as an oxide.
(13) O. C. says: You say that the earth re-
ceived its motion at the creation, and that motion seeps up from the fact that there is no resistance. As the moon draws after it a great tidal wave, ex-
tending nearly from pole to pole, the land must tending nearly from pole to pole, the land must
feel this draft; is not this an enormous resistances, feel this draft; is not this an enormous resistances,
and would it not of itself bring the earth and moon to a standstill, if there ewere not some great Mayer has demonstrated that the tidal wave due to the moon exerts a retarding influence on the rotation of the earth, but that, at the present pe-
riod of its existence, the retardation is exactly sounterbalanced by the acceleration due to its contraction in size by cooling. He holds that there
will come a time when the cooling has proceeded will come a t time when the cooling has proceeded
so far that no more contraction will take place, and that then the retardation by the moon's action wiin commence, and go on until, in the course of
ages, the earth will always turn the same side to the moon. He holds also that the moon has gone through this process.
(14) J.C. R. asks: 1. Are there any sulphur mines in the United States? A.Sulphur is found in Virginia, etc., sparingly, in many coal deposits and elsewhere, where sulphide of iron is undergoing decomposition,and in microscopic erystals at some
of the gold mines of Virginia and North Carolina; of the gold mines of Virginia and North Carolina;
as a powder and in crystals in the western lead regions: in cavitiesin the limestone, in minute ergetals on cleavage surfaces of galena; and the beds of California a t ord large quantities of sulphur for
commerce. 2. Excepting for $\mathrm{SO}_{3}$, gunpowder, and friction matches, is there any considerable use or
demand for sulphur ? A. Yes, it is used in large quantities for sulphurizing hops and vines;
as a preventive apainst plants, the quantity of sulphur used annually for this purpose in France, Spain, and Italy amounts to about 45,000 tuns. It is furtheremployed in the production of sulphites and hydrosulphites, sul-
phide of carbon, cinnabar, mosaic pold or bisul phide of carbon, cinnabar, mossiic gold or bisul-
phide of tin and other metallic sulphurets, ultramarine, various cements, and for vulcanizing and
(15) O. C. says: Suppose the continent ied east and west, and the oceans extended around the globe in the same direction, with no land to check the tidal wave, what would be the resuntly
Would not the tidal motion of the sea constantly ordinary hight ind a cataract othing before it? A. Undoubtedly some straits have been made, or at least their formation largely assisted, by the tidal waves. If there were no land to check the
tidal wave, it would go round from east to west, tidal wave, it would go round from east to west,
and not be deviated in variousdirections,as is now and not be deviated in variousdirections,as is is ow
the case. In some narrow straits it might rush, as carry everything before it, the hight of the tides being due to the balanced attractions of earth, sun, and moon.
How far are the seven stars of the Pleiades supposed to be from each other? A. The mutual astance of the starsis on an average equal to their
distance from us; there are, however, spota in the
hearens tance is greater: and inversely, there are some star groups where the distance is much smaller ; such a group is the Pleiades, their material distance va-
rying from one fiftieth to a five hundredth part of the distances from us. The telescope reveals clusters where the stars are still closer together, hun-
dreds of them throwing a glow around like that
(16) J. J. asks: Do you know of any means
whereby the law of gravitation can be suspended? Whereby the law of gravitation can be suspended?
A. This law is so universal and inherent in mat(17) W. H. says: We have a reservoir on a hill which we wish to make use of for fre pur-
poses in our mill, situated at the foot. It would be costly and inconvenient to tunnel through the side of the hill in order to lay pipe from the bottom of the reservoir to the mill, the top of which is 60
feet below the bottom of the reservir Could a feet below the bottom of the reservoir. Could a
siphon be used with advantage and certainty, so siphon be used with advantage and certainty, so
as to give us command of all the water in the reas to give us command of all the water in the re-
servoir in case of fire? The siphon could be sunk in the bank a few feet below the level of the water surface. If a siphon be practicable, how deep below the surface ought it be laid? The re-
servoir is 20 feet deep. A. The reservoir being 20 feet deep, and the highest part of the bend being a few feet below the surface of the water in the
reservoir, there can be no doubt of reservoir, there can be no doubt of a siphon's
working well. The shortest leg of a siphon ought not to be more than 30 feet lorg, as the weight of the atmosphere counterbalances only from 32 to 36 feet of a column of water; but in this case your shortest leg will be not more than, say, 18 feet. The
pipe should be so laid as to prevent freezing ; for pipe should be so laid as to prevent freezing; for
this purpose four feet below the surface will be
 down the side of the reservoir to guard against the same difficulty in case of low water. Take sibility of boring through the side of the hill to the bottom of the reservoir? A. In boring through the eids of the hill, there would be danger of leak:
age to your reservoir, through which you migl: age to your reservorr,
lose all of the water.
(18) C.G. W. asks: Is there any chemicathat will assist a diamond in drilling hardened
teel? A. Moisten the steel with a little turnentine or benzole. The latter is the better of the
(19) R. H. B. says: I have a tin roof put in wind it rumbles a good deal. Is that an ill omen? A. Tin plates for roofing are sometimes put to-
gether in the shop in rolls, taken to the building and laid upon the roof, extending from the ridge to the eaves; the edges of the rolls are brought to-
gether, secured to the roof by nailing a cleat of sether, secured ane toof by nailing a cleat of made into a standing joint bent over at the top one within the other, into what is called a double lock. By this style of roofng, the tin has quite a edges become toose at any place to admit the enrance of the wind, iteould very easily be stripped rolls are wide more than compensates for any adorls are wide, more tan compese to its yielding,
vantake itmay possess in respect without injury, to expansion and contraction.
The usual mode of laying the tin, plate by plate upon theroof, where every plate is securely $\mathbf{y}$ ailed, has generally, we think, met every reasonable expectation in regard to durability, an
nuch preferred to the former method.
(20) S. L. T. asks: I am about building a 36 inch buzz saw. There are two engines in ne has a cylinder 5 x $x$ nech balance wheel, the other has a cylinder $x 8$ a
inches with an 8 inch balance wheel. Which in your opinion is the best for me? $A$. The $6 \times 8$ en-
(21) W. O. P. asks: Is it practicable tomelt cast iron on an ordinary blackemith's forge, in
sufficient quantity to make a casting of 15 or 20 bs. weight? A. No.
(22) L. L. H. asks: The wild cane growing
troughout many parts of our country can be utilized for making pipesfor conveying water and other liquids. Some of them attain a diameter
of several inches. With an iron rod heated to of several inches. With an iron rod heated to
redness, the joints may be entirely cleaned out; and by means of large corks bored with emooth holes, they can be united in any length. By
coating them with coal tar they will remain serviceable for years. Is there a way by which thay may be curved or bent (and remain so) so as to
suit a change of direction? A. Try steaming them, as is done for wood bending.
(23) J. A. G., of Manchester, England,asks: Can brightsteel goods be hardened and tempered
without affecting the polish on them? A. No.
(24) $O$. F. says: 1 . We have a 10 by 16
nehes single valve engine, of which the valve is inches single valve engine, of which the valve is
104 inches long and $5 \%$ inches wide, with a recess in it for steam exhaust 9 inches long by $25 \%$ inches and the width between outside margins of steam ports is $43 / 4$ inches, and between inside edges, $23 / 4$ inches, the ports being consequently each 1 inch
wide. The exhaust port is 13 g inches wide and all are 9 inches long. The throw of the valve is 23/ inches, the eccentric being set so as to begin
to admit steam as the piston reverses its motion. Thefeed pipe is $27 /$ inches and the exhaust pipe 3 inches diameter. The engine runs at 120 revolutions per minute. Are the ports, valves, and ther portions rightly proportioned? A. The cy-
linder exhaust port is a liftle too narrow, and the valve travels too little. 2. The piston does not
come to within an inch of the cylinder heads. Can anything be done to economize steam and improve the worsing capacity of the engine? A .
There is too much clearnce at stroke, to remedy which increase the thick ness oe the piston head or the cylinder heads. 3. The
present boiler is 10 feet long and 3 feet in dia m ter, with 26 three inch tubes, supplemented by heater. How much boiler room would be $r^{\text {e }}$
quired to run the engine at 200 revolutions pe minute, and maintain 60 lbs. pressure in boile. A. Your boiler pressure, if increased by nearly on
(25) C. G. asks: What is the proper way of
packing the stuffing box around a sleam engine packing the stuffing box around a steam engine
piston rod? A. Use the ordinary small sized prepared packing, and a small packing tool.
126) Y. L. a akss: 1 . When my engine is running very light, I fida that, before it is necessary
to replenish the furnace with fuel, it is so far burnt down that part of the fuel falls through the
grates, and is thus lost. What should be done to grates, and is thus lost. What should be done to prevent this? A. To prevent the waste of fuel
referred to, puta damper to the ash pit and in the chimney. 2. Is it right, in such a case, to open the flue doors? A. Sudden drafts of cold air are in jurious to the boiler. 3. Do you not think that all boilers should have a damper in the stack to
regulate the draft with? A. Yes, or over the mouth oftheash pit. 4. Isitinjurious to a boiler to open the fre doors in case of too much steam
A. Yes, slightly. 5 . How are leaky engine cocks, such as cylinder and blow-off cocks, ground? A. The unground shoulder should be eased off with and Recipes", 6 Are hand force pumps everused for cleaning boilers? A Yes, but a boiler cannot be thoroughly cleaned by a force pump. 7.Doesit in jure a boiler to blow it out, and immediately wash it out by means of a pump with cold or luke-warm bra A. Yes. 8 . When twin boilers are connected by a mud drum laid under them, into which the pipes be large? A. Yes, the larger the better. (27) J. E. W. says: I wish to build a foo size should the drive pulley and the small pulles be, to get the fastest metion with the least power A. Make the treadle pulley about 30 inches, an the lathe pulley about 6 inches. 2. What should be the stro
(28) A. M. H. asks: What will be the dif dulums of the same length, locks having penaulums of the same length, one vibrating in a
are of $10^{\circ}$, the other in $11^{\circ}$ ? Both are supposed cua for 24 hours. Is there a rule cor ares of any uaber of degrees? A. If the vibration is les no work to do, the difference in time for differen vibrations is so small that it need not be take into account. Itis advisable to have the vibration small as possible, then the
(29) F D and ible m.D. and others ask as to the best pos nethod which arranging saw mill gearing: Th with the least number of gears, shafts, bearings, or pulleys, is always the best. Always get th additional piecem the driver as possible. Ever essive friction.-J. E. E., of Pa.
(30) B. P. F. asks: 1. Can you give me the dimensions for a drying house for lumber? A
The size of your house should conform to the dimensions and quantityof the lumber you propos sightanswer in the absence of ans particular quirements, 2, at what point or points shoul he steam be allowed to euter and escape? The steam should circulate tbrough a coil of
n ch iron pipe to the extent of, say, one superfiial foot of heating surface to every 50 cubic fee of air in the house. Place the pipe in stacks abjut the ends andgraded to discharge the drip water rom the top to the bottom; let the pipe from the boiler connect at the top, and another pipe return this will keep up the circulation and return the rip water to the boiler. Provide ventilation a described in answer to G. J. P., No.43,in this issue A. The lumber should dry in from four to si A. The
(31) J. B. Jr. asks: What shall I put on pine knots so that they will not show through, a
ter painting the boards? A. Shellac varnish.
(32) A. S. asks: 1 . Which is the best of the following two plans for heating the rooms in fac-
tortes, putting the steam pipes round the rooms torles, putting the steam pipes round the rooms ceiling? A.Below the windows. 2. Would it take from the ceiling than with them below the win dows? A. Yes. 3. Which of these ways would be most liable to cause fire? A. Over the win-
dows. 4. Would 2 six inch cast iron pipes heat room with less steam than 6 one inch wrought iron pen, $1 ?$ Ahe same condtionsas mentioned in ques urface in pour pipes for evers 70 cubic feet of contained in your room; the one inch wrought ron pipe is the best; let the steam enter at the the pipe in a continuously descending grade between those points, that the pipes may not be
(33) S. A. T. says: We have a paper mill built on a light bottom of quicksand, and within 200 feet of a hill or bluff 100 feet high. In the nill
are twolarge tubular boilers forgeneratingsteam, are twolarge tubular boilers forgeneratingsteam,
using an iron stack or chimney, which is very expensive on account of its short life, and a brick sandy foundation. It occurred to us to dig a trench or ditch of suitable size from the boilers to the top
of the bluff, and there build a brick chimney of proper hight, the whole to act as chimney to our boilers. Could we get a good draft in that way, and would dampness of earth affect it? A. 8uch lined with brick. In starting the fres, it might be necessary to build a temporary fire at the foot of the vertical portion.
(34) T. A. W. asks: Is there any means of
revivifying the common hydraulic cement when revivifying the common hydraulic cem a A. Yes; reburning it.
(35) J. L. C. says: I wish to build a cistern
hich, on account of the nature of the soil must be built nearly all above ground. My experience is that the ordinary square walled cisterns, erally leak. It is not convenient for me to build round cistern, and I have planned one, shown in the diagram, which I think will be very strong and principle of case exactly. It is constructed on th

er strengthens rather than weakens the walle, buttresses, are made to bear the strain. This be ing so, I can save material and make the cistern walls 9 inches instead of 14 , inches thick. Please give me your opinion. A. The principle is a cor-
rect one. A good foundation would be required or the whole of it, to prevent settling, which ould cause cracks. Greater strength could be one buttress to the opposite one; these could be made of iron pipe covered with tar, and secure y means of nuts over plate washers.
(36) E. C. H. says: 1. I have some photographic lenses,double convex, of good quality : one
$21 /$ in chesin diameter and of 8 inches $f o c u s ;$ the is $21 / 4 \mathrm{inchesin}$ diameter and of 8 inches focus; the
ther is 1 inchin diameter and of 5 inchesfocus.Can construct a telescope with thera, by the addition other glasses, if necessary? A. You canno ography. The simplest possible telescopeconsists of an object lens of very long focus, say from 20
to 40 inches, and an eye piece, which is one small ns or is compounded of two or more small lense of very short focus, say 1 inch or less. 2. How Iall I arrange them, and what other lenses would
require? A. We refer you to the firstnumberof the Scientific American Supplement, where and illustrated. 3. Can a magic lantern be made with these lenses, and how should I arrange them 1. HYou can make a magic lantern with them; pho ographic lenses are excellent for that purpose but when the picture to be enlarged and the light These bullseye lenses mustbe some 3 or 5 inches in diameter, and have a focus of about 6 inches.
(37) F.E.D. B. asks: How many chair rock hour with a band saw? We have a man here wh ayshe can saw 400 inan hour. Is it possible? A.Th man claims that be can saw $63 / 3$ pieces per second he average length of a rocker is 2 feet, to be saw on both edges, equal to having $131 / 5$ feet (lineal)pe teach cut; and in most cuts, the concave part of ne and the convex of the other would be made ame cut. Thisrenderssuch a feat possible, an it seems no more difficult than for one circula
aw to cut 9 boards $2 t$ inches in width, 1 inc thick, and 16 feet ling in minute. This I hav een done. At this rate of sawing the incredible in 10 hours. -J. E. E., of Pa
(38) W. H. snys: We want to convey abou
12 horse power into a building 37 feet distant
here any way of making cotton rope impervious
to the weather, so as to make it serve the abov
pose? A. We wonld recommend a rubber belt.
(39) I. A. M. says : 1 . Of what diameter ticularly on oak logs? A. From 50 to 60 inches . How many horse power would be necessary to un it? A. From 15 to 30 horse power. These an age size of the timber, and amount of work to b oried, whed. As a rule, each horse power, well applied, wh.1 saw one thousand feet of lumber with
a circular saw ; this varies slightly with the hard ness of the timber and power used. For example,
it is easier to make 30,000 feet of lumber with 30 horse power than 5,000 with 5 horse power, partl owing to the greater proportionate amount of ous causes.-J. E. E., of Pa
(40) J. E. J. says: 1. Would an achromatic ical purposes? Would it show the globular form of the planets, and Jupiter's moons and Saturn's ings? A. Yes, if it is a gond one. 2. How far
could a man te seen with such a glass on a clear could a man tee seen with such a glass o
bright day? A. Fifteen or twenty miles. Would it besafe for a person never having see a course of chemical experiments to attempt to
perform those given in elementary chemistry with out the aid of an instructor? A. Yes, in most cases, if done with proper care.
(41) C. L asks: In building a telescope, the ought the lenses to be set? Focus of object gla is 72 inches. How many, and of what sizes,should the remaining lenses be? A. The object glas should be made of two lenses placed in contact he outside lens is a double convex; the oute 16 inches. The inside lens is a concavo-convex flint with the concave side fitting the crown, also of 16 radius. The eye piece may be made of two plano-
convex lenses, of equal focal lengths, with their
convex sides toward each other. Their distance apart should be two thirds the focal length either. The lens toward the objective should be $\%$ inch, the other $1 / 2$ inch in diameter
(42) J. T. H. says: I have been troubled drel, atd months with heating of a sawmill manarel, ald would like to know the cause. A. See
article in Scientific American Supplenent, No. , on the heating of journals.
(43) G. J. P. asks: We have 2 drying
houses, $18 \times 32$ feet, with 6 lines of 4 inch cast iron pipe 25 feet long. One party says that ventilation is required, so he has cut 3 holes 18 inches square in the roof, and put a square box pipe up through
the 3 holes, and then cut a hole in the end 2 feet square; but be does not think it best to make the buildings tight. I tell him be ought, in order to keep his houses warm,to keep them as tight as possible. Whichis right? A. There should be some ventilation, and it had better be under con trol.
Provide a box shaft about 16 inches square, at one Provide a box shaft about 16 inches square, at one end of the building, extending from near the
floor to 2 feet above the roof, covesed at top and with openings on the sides above the roof; at the other end of building, provide a like shaft, but short, horizontal, passing through the side of the building near the floor; in each shaftplace a board
valve or damper working on centers, and by mean of ve or damper working on centers, and by means of these you can have as much or as littl
lation as the circumstances mas require.
(44) F. J. F. says: In reply to a correspon 18 feet wide and $31 / 6$ feet deep, sou told him usc 2 engines of 7 inches bore by 12 inches stroke If he puts 2 such engines in the boat, he might as well have no boat at all. I bad a boat of 14 feet engines of 7 inches bore and 24 inches stroke, and all she would'make up stream was $21 / 2$ or 3 milespe our. A. Our advice to our correspondent ourse the model of the boat may affect the pow nall a boiler, a wasteful engine, or the like.
(45) E. H. R. says, in reply to A. E. R.' query as to closing the drip cocks of steam heat-
rs: If the air is out of the pipes, in either case rs: If the air is out of the pipes, in either case
he heat will be just the same whether the wate the heat will be just the same whether the water
only is run through the drip cocks or whether nly is run through the drip cocks or wheter
steam goes with the water. The pressure of steam in the pipes should be no more in
the back pressure valve is all right.
(46) H. L. P. says: In reply to N. W., wh the earth, you replied that "it persisted in it motion by the absence of resisting obstructions. Is not the air which presses on the surface an ob-
truction? A.The air which surrounds the earth no more obstruction to the motion than is the waer in the ocean, as both belong to the earth and ove with it. Remember that the diameter of the mosphere only a few miles, while at the hight of 30 or 40 miles scarcely a trace is left. The earth moves with the atmosphere tbrough the practical empty space beyon
(47) W. P. H. says, in answer to J. D. H. ho asks how to thicken his stove patterns, so as
o take a heavier set of castings from them : Prepare the mold as usual, and then insert something ill separate them sufficiently for the additional thickness desired. The cavity is small, and ca usually be filled by sprinkling sand on the face of he flask whet open. An ingeniousman can als vary the additional thickness as he desires.
(48) W. S. D. says, in reply to the question ow to construct a perfect square, with divider compasses only, without the aid of scale, pen mert, on a given base or a line drawn betweentro

as a center, with a radius $=1 \mathrm{~B}$, describe the arc EC; then with B as a center, describe the ar
F C; with C as a center, describe the arc, A D B then again, with $C$ as a center and a radius= $A$ and $F$; then will the points, $A, B, E, F$, form
(49) E. H. R. says, in reply to H. F. K.' query as to boiler capacity for a steam heater eet) as you have of radiating surface in the steam pipes,
omy.
(50) M. R. C. says, in raply to I. O. A., who complainsof the fatigue of the eyes: The trouble vous coat of the eye, caused by bright white light and it may be obviated by decomposing, the rays
from the lamp by meass of a tinted shade. Whit orcelain is very rood, or thin tissue paper (whit straw-colored, or such), hung between the ligh will do. If the person be short-sighted he woo quire a concave glass to suit the sight. If he be
long-sighted from advancing years, weak lenses may be required. If the glasses are suitable for
the sight, and the fatigue continue, rest should be
enjoined. Strengthen the general health ; sea bathing or bathing with sea salt and water is good.
(51) S. says, in reply to A.'s query as to how to get a good color on casehardened goods:
Use leather scraps for the purpose. The leather shculd be charred sufficiently to pulverize easily, and then be pounded, not too hae, say about the size of peas. The articles should be imbedded in red hot for from 1 to 6 or mind and heated to be hardened to a greater or less depth, and then dumped into cold waterand dried off before they (52)
(52) M R. C. S. says, in reply to J. H. I. The splitting of the nails may be due to dry heat, cut short ; during cold weather. Keep thenails ten with a little glycerin or file the surfaces, mich a little liquor potassce has been added. The nails becoming concave is not, I believe, due to debility
always, as I have seen it in one case where the always, as I bave seen it in
person was well nourished.
(53) A. W. C. says, in reply to R. I. S., who asks how to sertle rain water : The best plan that has as set been found in Canada is to put about 2 ty barrel cistern of black rain water; in a few hours the water will be purilied, and compara tively waste water may thus be made fit for cooking purposes. This mixture has the same effect cles to the bottom of the receptacle
(54) A. W. C. says, in answer to T. B, who asks as to using potatoes for manufacturing puran article of diet by the naval and mercantile marine of Great Britain; and they were the staple diet of the explorers of the northwest passage under McClintock.
Minkrals, etc.-Specimens have been received from the following correspondents, add oxamined, with the results stated:
Dr. T.-It contains 85 per cent lead and a trace clay.-R.T. W.-No. 1 is mud shale, containing

## COMMUNICATIONS RECEIVED

The Editor of the SCIENTIFIC AMERICAN acanowledges, with much pleasure, the receipt of
original papers and contributions upon the following subjects:
On Drawbridges. By C.V.W.
On the Tails of Comets By E. B.
On a New Wash Bottle. By E. B. K.
On a New Motor. By T. H.
On a New Motor. By T. H.
On a Double Channel Theory. By W. T. C.
On a Boiler Explosion. By G. H. K.
On a Meteor. By E. S.
On Bored Wells. By R A.
On CleansingWater Mains. By H. O. A.
Also inquiries and answers from the following


## HINTS TO CORRESPONDENTS

Correspondents whose inquiries fail to appear
hould repeat them. If not then published, thes may conclude that, for good reasons, the Edito 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 b pubashed here. All such questions, when initial
only are given, are thrown into the waste basket it would fill half of our paper to print them all; but we generally takepleasurein answering briefly by mail, if the writer's address is given.
Hundreds of inquiries analogous to the following gines? Who makes the best team pumps? Who ells mica lamp chimneys? Who makes pape tlue? Why do not makers of elect, ic telegrap uparatusadvertise in the SCIENTIFIC A MERICAN? All such personal inquiries are printed, as will be ob erved. in the column of "Business and Personal," which is specially set apart for that purpose, sub et to the charge mentioned at the head of tha his way be expeditiously obtained.
[OFFICIAL.]
INDEX OF INVENTIONS
Letters Patenx of the United States were Granted in the Week Ending January 18, 1876,
AND EACH BEARING THA'T DATE.


