## exsints and exsomal.

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as early as Thursday morningto appear in next issue.

Portable and Stationary Engines; Boilers of all kinds; 5 Cortlandt St., N. Y. Erie City Iron Works, Erie, F Alcott's Turbine received the Centennial Medal. Bolt Forging Machine \& Power Hammers a specialty勆 for circulars. Forsaith \& Co., Manchester, N. H. New Lathe Attachments, such as Gear Cotting, Tap
and Sptine Slotting. W. P. Hopk ins, Lawrence, Mass. Wanted-A situation by a practical man as Manager
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ourposes. Walker Bros. \& Co., 23 d and Wood St., Phila. Skinner Portable Engine, Improved, 21.2 to 10 H. P. kinner \& Wood, Erie, Pa.
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Frank 1 ln Co., Pa
SafetyLinen Hose. Protects factories and etores. Saves
insurance. Greene, Tweed \& Co., 18 Park Place, N. Y. Machine CutBrass GearWheels for Models, etc. (New
List.) D. Gilbert \& Son., 212 Chester St., Phila., Pa.
The Scientific American Export Edition is pubnumber comprises most of the plates of the fou number comprises most of the plates of the four preced-
ing weekly numbers of the Sctentiric American, with other appropriate contents, business announcements,
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The Cameron Steam Pump mounted in Phosphor
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Hydraulic Presses and Jacks, new and second hand. Lathes and Machinery for Poissh ing and Buffing metals. F. Lyon \& Co., 470 Grand St., N. Y

F Lunkenheimer's Brass Goods for Engine Builders, ers. etc. Address Cincinnat Brass Works.

## NEW BOOKS AND PUBLICATIONS.

The Magazine of Art is a new illustrated monthly
periodical, vublished by Cassell, Petter \& Galpin, of London, Paris, and New York. It is devoted exclu. svely to what are known as the fine arts, in contradis cinded undertne narrowerand higher term of art. The mitial number is quite up to the high standard which is aimed at; is replete with illustrations, some of the cuts being of anusual excellence; and the descriptive text and miscellaneous art notes furnish much interesting information. It is intended to draw largely upon the re sources offered by the Paris Exhibition, with its great array of art treasures; and certainly the Maga
tersupon its career with remarkable facilities.

## 

(1) A. P. asks how to prepare a strong so ation of silver-potassium cyanide. A. Add to a soluno further precipitation is occasioned; after settling pour off the iquid and wash the precipitate several times with water; then dissolve it in the smallest pos-
sible quantity of a strong aqueous solution of potas sible quantity of a strong aqueous solu
sium cyanide by the aid of gentle heat.
(2) A. P. R. writes: 1. I am about to put eed water heater into the smoke arch of a boiler (lo comotive type) on a steamboat. The heater will be
made of several rows of steam pipe paesing backward made of several rows of steam pipe passing backward
and forward by the ends of the tubes in the smoke arch, being heated by the heat from the furnace. The pater is. Will it work well9 A. Probably you will need a blower, or some equivalent. 2. Where should the
check valve be put in? A. Place it close to the boiler with a stop valve between that and the boiler.
(3) O. H. T. asks: What liquid can be vaiquid hydrogen. The boiling points of several of the more volatile liquids are as follows: Sulphurous anhymore volatile liquids are as follows: Sulphurous anhy-
dride, $17.6^{\circ}$ Fah.; ethyl chloride, $51 \cdot 9^{\circ}$; methyl bro-
mide, $55^{\circ} 5^{\circ}$;aldehyde, $69^{\circ} 4^{\circ}$; methyl formiate, $92 \cdot 1^{\circ}$ mide, $55^{\circ} 5^{\circ}$; aldehyde, $69.4^{\circ}$; methyl formiate, $92 \cdot 11^{\circ}$;
ether (ethylic), $94 \cdot 8^{\circ}$; ethyl bromide, $105 \cdot 8^{\circ}$; methyl ether (ethylic), $94.8^{\circ}$; ethyl bromide, $105.8^{\circ}$; methyl iodide, $111 \cdot 4^{\circ}$; carbon disulphide, $118 \cdot 5^{\circ}$; formic ether,
$12 h^{\circ} \cdot 7^{\circ}$; acetone, $133^{\circ} \cdot 3^{\circ}$; methyl acetate, $133 \cdot 3^{\circ}$; bromine,
 iodide,
$173 \cdot 1^{\circ}$.
(4) A. O. asks: Is there any advantage in having a pair of cone pulleys tur:ed, the one concave (5) F. S. asks: With what can the brass aps of steam boilers be varnished, to prevent tarnishng? A. Dilute alcoholic solution of shellac or sandarac is sometin
is warm.
(6) W. P. asks for a formula for making an invisible ink which will become visible on the appli(iron protosulphate); tannic acid or any liquid containing it (as strong tea) quickly develops a black ink when broughtinto contact with the writing. Dilute nitric acid orchlorine water will also render the writing visible, especially if treated afterward with a dropof ammonia or potassium ferrocyanide.
(7) C. K. asks: What will cement hard rubber? A. Fuse together equal parts of gutta percha and genuine asphaltum; apply a very little hot to the oint, closingthe latter immediately with pressure.
(8) In answer to F. C., S. H. K., and others, who ask how to make an aquarium watertight. -The joints may be packed in caoutchonc, and further a gentle fire a 1 lb . of resin, 4 ozs . of good tar, and about 1 oz . of linseed oil. If an excess of oil is used the cement willbecome too fluid; to obviate this it should be tested before use by allowing a small quantity to cool
under water, and if not sufficiently firm, allowed to nder water, and if not sumficiently firm, allowed to simmer longer or have more tar and resin added. The
cement should be poured in the angles of the aquarium while in a liquid state, but not when boiling, as it would rack the glass. The cement, when properly made, becomes firm in a few minutes.
(9) J. G. S. asks: What would be the approximate cost per mile of a narrow gauge railroad, complete, througha level country? A. The cost of such the country and the length of the road. The followng estimate was made for a road of 3 feet gauge. 100 miles long, over a prairie country: Grading, bridges, ties, tracks, stations, etc., $\$ 9,520$ per mile; rolling stock, 3,791 per mile
(10) W. H. H. asks: What is the process commonly practiced in bleaching white goods? A. The goods areffrst immersed in dilute solution of chloride of lime (bleaching powder), and then transferred to a vat cantaining very dilute sulphuric acid. This treat-
ment may be repeated if necessary, and the material ment may be repeated if n
finally thoroughly washed.
(11) O. H. K. writes: I have a steam launch and condense the exhaust through a copper pipe runell me that the feed water will injuce the boiler from the action of the copper pipe. Is this the case, and if so is there any remedy? A. Any deleterious action ca
(12) P. C. O. asks: How shall I loosen the sale in a steam boiler? A. Without knowing the charcterof the scale, we cannot suggest any remedy. Generaly, by allowing the water to remain in the boiler antil cold, the scale is softened so much that it ca
easily be removed. If there is a great accumulation, this blowing off must take place very frequently.
(13) W. \& B. write: We have a garret room that we wish to ventilate so that we can work in it. It has a sheet iron roof, is $25 \times 90$ feet, and 7 feet high; ha
twe windows in each end,butthey do not give air enough Could a fan be put in the roof; and if so, of what kind? A. If you have an opening to admit cool air, and an
other for the discharge of heated air, a suction blower placed by the latteropening,or a pressure blower by the placed by the latteropening,or a pressure blower by the
ormer, will answer very well.
(14) S. E. T. writes: 1 am building a tank x 8 feet, 6 feet deep, in my stable to hold water for
ousehold purposes. t is made of pine strips, $11 / \mathrm{in}$ in. 2 in. , laid fart, with whitelead joints. Do you think it will be necessary to line it, and if so, what had I better properly made. If, however you desire to do so, wa properly made. If, however, you des.
terproof paper wiLa answer very well.
Is it advisable to let the water from the leader of a hay window ana piazza run into the trench flled with
broken stone which forms the foundation of a drive way? A. We think not.
(15) C. D. asks: How shall I make a " belows body " (like an accordion) for a camera, to be of 16 inch strips, $51 / 2$ inches wide, and 8 inches high when
inished 9 A. Cut the four strips to size, stitch the edges anshed A. Cut the four strips to size, stitch the edge the edges oetween each of these points to form the base of the hinges, and insert the pore pieces. These may be 3 inches wide and $31 / 4$ or $31 / 5$ inches long, slit lengthwise $1 / 8$ to $1 / 4$ inch on the 1 and square about 2 료 inches wide; then placed reverse side down and folded once to a triangle. A few blows with a mallet will then set the folds. The pieces are in-
serted, obtuse angle outward, in the seam edge of the serted, obtuse angle outward, in the seam edge of the
hinge, and the slit edges unfolded and glued to the inhinge, and the slit edges unfol
(16) "Sapphire" asks what cement is used by lapidaries for cementing precious stones. A. Armenian or diamond cement. Soak isinglass in water until
it 18 soft; then dissolve it in the smallest possible it is soft; then dissolve it in the smallest possible
quantity of proof spirits by the aid of gentle heat (over warin water); in 2 ozs. of this dissolve 10 grains of pale gum ammoniacum (1n tears) by trituration in a mortar;
then add six large tears of gum mastic dissolvedi n not more than 6 times their weight of rectified spirits. Keep in a well stoppered bottle, and soften for use by (17) the bottle in hot water.
(17) W. H. A. asks for a recipe for making good indelible ink, in shape that can be conveniently applied by means of a rubber stamp. A. Genuine as phaltum, 1 part; benzole. 4
(18) R. H. H. writes: A friend and myself had a dispute in regard to steam boilers. I claim that, with a full supply of water in the boiler, and not using any steam, you can get pressure enough to burst the boiler cannot burst with steam pressure so long as the supply of water is kept up. A. If you get pressure
enough, the boiler will be ruptured all the same hether it contains water or not.
(19) F. G. S. asks for a recipe for black varnish. A. A mber, 1 lb .; fuse; add hot drying oil, $1 / 2$ pint; powdered black rosin and Naples asphaltum, of each 3 ozs.; when properly incorporated and consider-
ably cooled, add oil of turpentine, 1 pint. of the finest black varnishes in use.
aphtha, 4 ozs; lamplan. A. Shellac, 1 oz.; wo (20) S. P. S. asks: What is the prope course of study for one who wishes to become a steam
ngineer? A. He should study works on mathematics engineer? A. He should study works on mathematics, natural philosophy, and prime.movers: and should also tion, he should practice drawing and the use of machine
(21) In answer to O. T. K.-If jou take the dimensions of a large engine, say $24 \times 48$, you can get a fair idea of what is needed for an engine built on (22) C. W. K. asks: In the propulsion of a oat, is the speed attained in direct proportion to the power employed; if not, what proportion does the power bear to the speed? A. The ratio is not exactly determined, as it is not constant at all speeds. For mod
erate speeds, the power varies nearly as the cube of the
speed.
(23) G. I. B. asks: What should be the dimensions of a floating dock larce enough to lift and
contain a vessel of the following dimensions: 300 feet contain a vessel of the following dimensions: 300 fee
ong, 40 feet beam, and drawing 22 feet of water? ong, 40 feet beam, and drawing 22 feet of water? A that each cubic foot of water displaced by it requires a oad of $62 \% \mathrm{lbs}$., from which data you can obtain the equisite dimensions.
(24) W. S. W. writes: I have a clinker buill boat, 20 feet long and 6 feet beam, which $I$ wish to convert into a steam launch. Is a screw of more adand what kind should 1 use to give a good rate of speed? A. Youcan use a verticalengine, $3 \times 5$, and a propeller with diameter equal to draught, and 3 feet pitch: We think this arrangement will be more desirable in some respects thanpaddle wheels. If the boat is very light,
it may need to be stiffened somewhat for the ma-
(25) In answer to T. L.-The expansion of various metals, on being heated $1^{\circ}$, is as follows:

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(26) T. A. P. asks: 1. Can I make a small owboat by stretching canvas upon a wooden frame? . Yes; such boats are sometimes used for hunting. They are easily damaged. 2. How can I make the canas waterproof? A. Paint it, after securing to the frame,
(27) In answer to J. R. E.-The samples of test paper appear to be georgina (dahlia) paper, prepared by steeping slips of white, uncalendered paper a not over strong tincture of Georgina purpurea. It
found in most well ordered laboratories. Though found in most well ordered laboratories. Though may often oe conveniently substituted for the latter The faint purplish coior of the paper is rendered pink ish red by dilute acids and green by wcak alkalies.
(28) E. O. H. asks: At what rate does ound travel? A. At 1,090 feet per second in air, under ordinary conditions.
What preparation can be applied to the inside of potery to make it waterproof A. Almost any of the
itreous glazes will answer. Borax, fint, glass, etc., are monly used.
Minerals, etc.-Specimens have been received from the following correspondents, and examined, with the results stated:
C. W. C.--Slate containing pyrites.-J. A. P.--The eposit consists mainly of clay, silica, lime sulphate a cheap pigment, either before or after calcination. It does not contain phosphates.-J. J.-No. 1 is red jasper, an impure quartz, the coloring matter of which is
iron sesquiozide. No. 2 is iron sesquioxide. N
pyrites, of no value.

## communications recerved.

 The Editor of the Scientific American acknowledges ith much measure the receipt of original papers and Hearing by the Teeth. By W. B. W. Antiquity of Civilization. By F. S. J.Scienceof Light. By T. B. McC.
A Mechanical Question. By J. D. H.
Causes affecting the Taste of Drinking Waters. By
(A)

 EXPLOSIVE DUST. A CoMrrbhen.


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