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Works, Drinker St., Philadelphia, Pa.

Notes & Queries

HINTS TO CORRESPONDENTS.

No attention will be paid to communications unless
accompanied with the full name and address of the
writer.

Names and addresses of correspondents will not be
given to inquirers.

When our request that correspondents, in referring
to former answers or articles, will be kind enough to
name the date of the paper and the page, or the number
of the question.

Correspondents whose inquiries do not appear after
a reasonable time should repeat them. If not then pub-
lished, they may conclude that, for good reasons, the
Editor declines them.

Persons desiring special information which is purely
of a personal character, and not of general interest,
should remit from \$1 to \$5, according to the subject,
as we cannot be expected to spend time and labor to
obtain such information without remuneration.

Any numbers of the SCIENTIFIC AMERICAN SUPPLE-
MENT referred to in these columns may be had at the
office. Price 10 cents each.

Correspondents sending samples of minerals, etc.,
for examination, should be careful to distinctly mark or
label their specimens so as to avoid error in their identi-
fication.

(1) C. W. G.—We do not think the appli-
cation of compressed air in the manner proposed will
be a success. Better apply your manual power direct
to the screw or propeller.

(2) C. E. M. writes: I am building steam
launch 16 feet long, 40 inches beam. Boat will weigh
only 150 pounds, engine and boiler 200 pounds; cylinder
2x3, 100 pounds steam, 500 revolutions. What size pro-
peller shall I use, and how many blades, and give proba-
ble speed of boat? A. About 18 or 20 inches diameter,
3 blades; speed probably 6 miles per hour.

(3) F. F. W. writes: I have a steam launch
which has a boiler of about 30 inches in diameter, 4½
feet high. The gauge glass on it is 14 inches long.
Now, can you tell me why the glass breaks, one nearly
every day or two? It is five-eighths of an inch in diam-
eter, and it cracks when the steam is between 40 and 90
pounds pressure. A. Perhaps on account of currents
of cold air striking the glass. Protect your glass by a
screen made of sheet tin, copper, or brass.

(4) P. S. M. asks: Are not V-cone pulleys
and round belts as powerful as flat belts on light ma-
chinery, and would they not be better for foot lathes?
A. V-cone belts—jointed belt built up in this shape—
are used to some extent in places where a large amount
of power has to be transmitted, and there is not room
for a large flat belt, but these belts are not considered
as efficient as flat belts. In light machines, such as
sewing machines and those of similar requirements for
power, round belts are used on a pulley with chan-
neled face, with perhaps as good or better effect than
the same weight and strength of leather would give if
flat, but the object is rather to serve convenience in
construction than gain power.

(5) J. F. M. asks why a steam pump work-
ing with forty or fifty pounds of steam will not pump
water against sixty or higher pressure. A. It will
pump against 60 or 100 pounds pressure if properly
proportioned.

(6) R. F. H. asks: 1. In making a dynamo
half as large again as the one in SUPPLEMENT, No. 161,
so that the armature and field magnets will be six
inches long, what sizes silk covered wire should I use
to obtain the greatest electric lighting power? A. That
depends somewhat on the manner in which you intend
to use the dynamo. If for an arc light—which will
give the greatest illuminating power—it would be best
to wind the armature with No. 18 wire. 2. About
what candle power would such a dynamo have? A. Probably
12 or 15. 3. How much power would it require to drive
it? A. About one-half horse power.

(7) G. M. G. asks: Is there any kind of
paper, or anything, that upon a current of electricity
passing through it, it will change its color? A. Ordina-
ry paper dipped in the following solution changes to
blue color when a current of electricity passes through
the paper: Nitrate of ammonia 2 pounds, muriate of
ammonia 2 pounds, ferrihydrate of potassium 1 ounce,
water 1 gallon.

(8) J. B. D.—Hydrochloric acid will clean
off the rust scale better than sulphuric acid. Any acid
is rather troublesome to apply to the inside of a keel.
Pieces of sandstone or broken grindstone are very good
to rub off the rust with, but will not reach the corners
and seams, or around the rivets. A file with the end
broken off, used as a scraper, will work in the corners
and seams.

(9) A. W. B.—There is nothing that can
be added to sodium silicate or water glass to prevent its
dissolving when water is poured upon it. A coat of
varnish over the dry coat of the silicate will naturally
help to preserve it.

(10) J. T. B. S. writes: 1. I want some ap-
paratus that will show the vibrations, or rather count
the vibrations, of plates of wood or metal, so as to de-
termine their relative pitch and qualities of vibration,
and show them to the eye. Can you help me? A. Ar-
range a very light but rigid lever to amplify the vibra-
tion. Provide the lever with a needle point, and make
your tracing on a cylinder carrying enameled paper
smoked to receive the impression. 2. Can carbons for
arc lights be made of different grades of conductivity,
so that one will last longer than the other, say in the

proportion of 1 to 2, or 1 to 1.5? A. They can be made
of varying conductivity, but the light will vary also.

(11) W. E. V. writes: 1. A claims that a
vessel sinking at sea does not sink to the bottom,
owing to the density and pressure of the water under-
neath, but only sinks to a certain depth, while B claims
that a vessel going down at sea will certainly reach the
bottom of the ocean. A. There is great pressure at the
bottom of the ocean, owing to the weight of the water
above. Water is so slightly compressible that there is
very little additional density at great depths. Every-
thing that will sink will go to the bottom of the ocean,
unless it is porous and contains air that may sustain it
for a while, or until the air becomes absorbed by the
water. The great pressure soon watersoaks all woody
substances when carried to the bottom by being at-
tached to denser substances. 2. Haswell gives as the
estimated depth of the Atlantic, 26,000 feet; depth of
the Pacific, 29,000 feet; and the depth of the course of
the Atlantic cable varying from 20,000 to 18,000 feet. Is
the latter depth (18,000) estimated, or taken from actual
soundings? A. The cable soundings were actually
made. See SCIENTIFIC AMERICAN SUPPLEMENT, Nos.
433 and 434, for an interesting account of deep sea work.
The sea is filled with animal life at great depths.
Fishes live at from 3,000 to 13,000 feet below the sur-
face, where the pressure maybe as great as a thousand
to fifteen hundred pounds per square inch, and how
much greater we do not know. See SCIENTIFIC AMER-
ICAN SUPPLEMENT, No. 437.

(12) C. M. G. writes: I have a magnet of
five-eighths square steel, horseshoe pattern; have tem-
pered and charged it as directed in SCIENTIFIC AMER-
ICAN SUPPLEMENT, No. 206, that is, I have wrapped it
closely with fine insulated copper wire and placed it in
the circuit of a 40 lamp power (Brush) generator, run-
ning full capacity. The charge received in magnet is
not sufficient to lift its own weight. What is the cause
of so slight a charge, and how can I obtain a charge of
magnetism in this magnet sufficient to lift ten pounds
or more? A. It would be difficult to point out the cause
of your failure without knowing more of the details of
the experiment. Your wire may have been so fine as
to offer too much resistance to the current. Your steel
may have been either too hard or too soft, or it may
have been of a kind poorly adapted to the purpose. Try
chromium steel, and use coarse wire for your coil. 2. What
is the cause of one pole being stronger than the other?
A. Probably some defect in the bar or in its temper.

(13) F. A. B. asks: 1. If I buy an incan-
descent lamp, is there any patent to prevent my using it
when I choose, or must all lighting be under control of
patentee? A. We understand that one at least of our
largest electric lamp manufacturers furnishes lamps,
and with them the privilege of using. 2. Why will not
a plunge chemical battery furnish current for incan-
descent lamp? A. Such a battery composed of a suffi-
cient number of elements will furnish the current; but
the expense and trouble will be great.

(14) F. W. J. asks: What kind of lining
can I put into a steam box so as to have it air tight and
not cut out? Have used both zinc and galvanized iron,
and both have failed. A. Wood is generally used for
steam boxes, especially for steaming wood. The ship
builders use 2 inch pine plank held together with out-
side frames and bolts.

(15) F. E. W. asks: Is there any process
for depositing 8 or 10 carat gold by the electrical pro-
cess for practical purposes? If so, will you please give
the formula and describe the process? A. See SUP-
PLEMENT, No. 310.

(16) J. F. N.—On page 937 of SCIENTIFIC
AMERICAN SUPPLEMENT, No. 59, is given a process for
bleaching soap; it may be suitable for your wants. We
should think, however, that the most satisfactory way
would be to bleach the resin with which your soap is
prepared. Tin crystals are the stannic chloride or per-
chloride of tin, and are largely used in dyeing and calico
printing. The preparation consists in dissolving granu-
lated tin in hydrochloric acid and evaporating the so-
lution.

(17) F. L. writes: Some time since I sent to
you for SUPPLEMENT No. 161, containing instructions
for making a dynamo electric machine. I made one,
and cannot get it to work, except with the aid of 2 or
3 cells of Bunsen battery, and then it gives only a very
weak current. A. As a large number of successful
machines have been made by different persons in dif-
ferent parts of the country from the directions given,
we conclude that the fault is yours. Try changing your
commutator; try reversing the wires running to your
magnets. You ought to succeed.

(18) J. E. asks: How can I case harden
small wrought iron objects, such as small set screws?
A. Take a length of gas pipe of from 6 to 12 inches and
of suitable diameter, screw on thimble caps, and pack
the screws in them with bone dust, or with equal parts
of charcoal dust and unslaked lime; heat to a red for
two hours, then chill in cold water. A charcoal or a
coke fire is best; anthracite will do, but bituminous
coal is objectionable.

(19) A. B. writes: I see in your paper of
May 3, a view of the Quaker dam as contemplated. As
apparently the shores are rocky, would not, in stead of
the straight dam, a horizontally curved one, with apex
against the water pressure, form a lighter, stronger,
and cheaper construction? A. No.

(20) H. B. R. asks: What would be the
best material and proper dimensions to make a spline
30 feet long, to lay off the draught of a boat? A. Straight
grained cedar or fine grained white pine, say
about three-eighths inch wide and three-sixteenths to
one-quarter inch thick.

(21) F. B. asks if it is necessary to get two
or three engineers to sign application papers when ap-
plying for engineer's license. Also where and what
places in Minnesota is it necessary to apply to be ex-
amined for license, and what are the fees for the same?
A. We think there is no rule as to the number of en-
gineers signing the application. We do not know what
the State law of Minnesota is in respect to engineers.
If you wish to obtain a license as a steamboat engi-

neer, you must have license from United States In-
spectors. You can get information by addressing
Mark D. Flower, St. Paul, Minn., Supervising Inspector
of Steamboats.

(22) J. B. Z. writes: In *Harper's Weekly*,
in giving dimensions of steamship Oregon, it says,
length 520 feet, 84 feet beam; would you be kind enough
to answer through your paper if 84 feet beam means the
actual width of the ship, and is the Oregon that wide?
This part is in dispute, left to you to settle. A. This
is an error; it should be 54 feet beam, not 84 feet; 54
feet is the actual width of the vessel.

(23) H. L. C. writes: I have made a dy-
namo electric motor for running sewing machines; am
using 3 cells, 4x6x8 carbon battery, but would prefer a
single fluid battery. What is the best form of battery
for the purpose—the common Smee battery or a carbon
and zinc? What fluids are used in the carbon and zinc
battery, with single fluid? A. With carbon and zinc
battery use the bichromate solution, which has been re-
peatedly given in these columns.

(24) H. M. H. asks: 1. How can we test
wall paper, cloth, etc., for arsenic, in some simple way?
A. To identify the presence of arsenic in wall paper,
dissolve the coloring matter off in a little ammonium
hydroxide, pour off this solution on a piece of glass,
and drop into the liquid a crystal of silver nitrate. A
yellow coloration around the crystal indicates the pre-
sence of arsenic. This will answer as a general rule,
but it is only a rough test. 2. How can we test water
from a well to determine if it is injurious for drink-
ing? A. See answer to Query No. 18, in SCIENTIFIC
AMERICAN for March 29, 1884. 3. How is the fine black
polish got on carbon contacts in transmitters? Have
tried on all kinds, both hard and soft, and cannot do it;
they look as if varnished. A. Polish the carbons by
rubbing them on sheets of very fine French emery
paper. The emery paper to be placed face up on a hard
bevel surface. The French carbon is best. 4. Is cast
brass or gun metal as good for the frame work of
transmitters as cast iron? A. Brass will do. 5. Also
please give directions for making fluid for bichromate
of potash batteries. A. You will find this given in
several of the recent numbers of the SCIENTIFIC AMER-
ICAN in the Notes and Queries columns.

(25) W. C. M. asks: Could the exhaust
steam from a 35 horse power automatic cut-off engine,
Hampson patent, which is only working up to 15 horse
power, be used for heating to carry the exhaust 125 feet
underground, and then through 13 small radiators situ-
ated on three floors? How should it be connected?
What amount of back pressure would there be? A.
Your exhaust steam can be utilized for all it is worth.
In leading it so far underground care must be taken to
box the pipe, so that it will retain as much heat as pos-
sible, putting a drip at the end. Use three inch main,
and make all the branches to the various radiators so
that the aggregate area or opening shall not be less
than the main pipe. The drips from the radiators
should also be nearly the same area as the main, and
open freely. You can then heat all the radiators with
very little back pressure, say half a pound to the square
inch. If well proportioned, with ample outlet, you may
accomplish the work with a quarter of a pound back
pressure.

(26) W. F. B. asks a simple way of clean-
ing and roughening or recutting old mill saw files—a
dip or solution of some kind. A. Old files are some-
times put to additional service by boiling in strong soda
or potash water to clear them of grease or oil; scrub all
dirt and filings from the teeth with a wire brush, rinse
in hot water, then dip for 10 to 20 minutes in a bath
of nitric acid 1 part, water 4 parts. You must use your
judgment by inspection as to the exact time, and should
also in regard to the exact strength of the bath. A
coarse or bastard file will stand a stronger bath than a
second cut file. This process is very little used here;
there are parties who recut files in the regular way.

(27) D. J. R. asks: How will it answer to
put a circulating boiler for bath tub into the cellar,
running the pipes to a hot water back in the room above?
Will there be danger of an explosion, or will the hot
water circulate downward to the boiler from the range,
and the cold water rise from the boiler to the range?
A. Your plan will not work. There will be no circula-
tion. Put the boiler in the same floor with the range,
and draw from the top into the bath; make the cold
water connection into the bottom of the boiler, and
have the pipe open to the reservoir or water supply, so
as not to produce undue pressure from overheating
when the hot water is not required for use. Care
should also be observed in making the connections be-
tween the water back and the boiler so as to insure cir-
culation.

(28) W. J. M.—The lacquer blisters be-
cause the tubes are not heated before they are lacquered.
The solution for platinizing is platinum chloride, and it
is put on the plates by means of electricity or electro-
deposition. As to the silver plate being hard or soft,
it is immaterial. The composition of the alloy is of no
consequence. The soldering fluid is made by dissolv-
ing as much zinc chloride as possible in a pint of
alcohol, and then adding 1 ounce glycerine. Carbon
itself is about as hard a material as can be procured.
Manganese dioxide is stable, and will not change. The
Leclanche cell will last six months if properly taken
care of.

(29) J. E. S. asks how the small corundum
wheels used by dentists are made, and how, if moulded,
they are prevented from sticking to the mould. A.
We believe that the wheels are prepared by using the
ordinary ground emery, and caking in plastic moulds
to such a degree of heat that the corundum solidifies
into the given shape. The mould is then broken off.

(30) M. L. P. asks how to temper small
steel springs, such as plain springs, for gun and small
ratchet springs. A. Where gun lock springs are made
in quantity, they are packed in iron boxes with pul-
verized charcoal and sand, heated to a full red, and
dumped into a trough of oil. For a single spring this
is not necessary. Cover the spring with a little
soap and powdered charcoal to keep it from scaling,
heat to a cherry red in a charcoal fire slowly, by cut-
ting down the blast; when evenly heated dip in lard oil.

Clean and polish, then draw to a light blue by holding
over the fire until the color is obtained.

(31) B. Y. Y. asks: Is there any circulation
of the water in a steam boiler, when steam has been
generated so the gauge shows 25 inches pressure, when
all the valves are shut off and no steam escapes or is
drawn off; and if there is any, will the increase of pres-
sure increase the circulation; and if the circulation only
takes place when the steam is drawn off, where will
circulation be the greatest, if much or little steam is
drawn off? A. There will be circulation as long as
steam is generated. The more rapid the generation,
the greater the circulation. If steam is drawn off more
or less rapidly, the circulation will be increased. The
direction of the circulating currents will depend upon
the design or character of the boiler.

(32) C. W. T. asks for a liquid composition
of an adhesive nature, that could be applied to any
kind of paper, and when dried by hot air will make the
paper hard and tough. A. Flour paste is much used
by book binders for fastening sheets of paper or paper
and cloth together. This may be made much stronger
by the addition of a small quantity of glue. Starch is
also much used for mounting where clear work is re-
quired. A little white glue added to the starch
strengthens it. A little gum tragacanth in the paste or
starch also strengthens, and makes clean work. The
sheets should be pressed if you require flat work.

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