Business and Personal.

The Charge for Insertion under this head is One Dollar a line for each insertion about eight words to a line. Advertisements must be received at publication office as early as Thursday morning to appear in next issue.

☞ *The publishers of this paper guarantee to advertisers a circulation of not less than 50,000 copies every weekly issue.*

NEW BOOKS AND PUBLICATIONS.

RIVER SURFACES. By Henry F. Knapp.

A lecture delivered last April before the polytechnic branch of the American Institute, in opposition to the employment of jetties for the improvement of river mouths, as at the passes of the Mississippi. Mr. Knapp believes that the work done by Captain Eads will be overwhelmingly and permanently disastrous, and asserts that all similar works in Europe have not only been great engineering failures, but terribly injurious in their effects. The pamphlet does not say by whom or where it is published nor where it can be purchased.

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

We renew 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 published, 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 SUPPLEMENT referred to in these columns may be had at this office. Price 10 cents each.

(1) J. S. M. writes: I have a six inch (21 inch swing) lathe, foot power 3 speeds, 1 inch belt. 1. What size and weight balance wheel do I require? A. From twenty four to twenty-seven inches diameter and eighty to one hundred lb. weight. 2. Which bearings are preferable, friction wheel or wheels, boxes, or points? A. Either good journal boxes or roller bearings will do. 3. What advantages do swivel bearings possess? A. They admit of springing the lathe frame without binding the journals. 4. What is the proper speed for a 1½ inch circular cutter (1-16 inch thick) for metal? A. It depends on the material being cut. For steel and wrought iron, about two hundred turns per minute; for brass, from four hundred to five hundred turns per minute.

(2) A. W. C. asks for a preparation for coating paper to make it resist the action of acids, alkalies, and water. A. Dissolve caoutchouc cut into small shreds, in a mixture of bisulphide of carbon with six per cent of absolute alcohol. The solution may be diluted as desired with the mixed solvents.

(3) D. E. writes: I have some silicate of soda that has got so thick that I can hardly get it out of the bottle that it is in. Will you tell me how to soften it, or what solvent to add to it in order to make it thinner? A. Use boiling water.

(4) H. C. T. asks whether there is any difference by using solid piece of charcoal iron well annealed, or is it best to use several wires bunched, for a core of a medical battery in the coil. A. The core formed of a number of wires is best, as it is more readily magnetized and demagnetized.

(5) J. A. H. asks. Does the combination of all colors produce black or white? A White light is union of all the colors of the spectrum. Black is the absence of color

(6) W. E. J. writes: My store front contains two plate glasses, measuring five feet by ten feet each, and during cold weather are heavily coated with frost in such quantity that it is impossible to get a view of contents in window. What shall I do to prevent it? A. Some of the storekeepers in this city place a gas pipe provided with a number of burners along the bottom of the window near the glass; a small flame burns from each burner, the heat thus generated prevents the moisture from condensing on the glass.

(7) J L. asks (1) how to make toy rubber elastic faces, such as are shown by street men, by pressing into all manner of expressions with the finger and thumb. I think gelatine and sugar are used. A. The composition consists of glue, 5 parts; glycerine, 5 parts; zinc white, 2 parts; oxide of iron—rouge—q s. Soften the glue in cold water, dissolve it in the hot glycerine, and continue the heating over the water bath for several hours, to expel as much of the water as possible; then add the coloring matters reduced to impalpable powders, and cast in warm oiled moulds. 2. We find 1 part of white glue and 4 parts of glycerine make too soft a copying pad. How shall we remedy? A. Heat over a water bath to expel excess of water. See notes on this subject, p. 325, current volume. 3. Your advice to use tungstate of soda in which to dip lamp wick to make it non-combustible does not work. Would silicate of soda answer, or would a mixture of glue and asbestos powder answer? A. If tungstate of soda is properly used, it will answer admirably; silicate of soda will also answer, but not so well. The mixture you suggest would be of little use.

(8) G. A. H. writes: I have been constructing an annular hydro-oxygen blow pipe, and find the effect better when I let the hydrogen come from the inner jet, and the oxygen from the outer one. A. If your blow pipe is properly proportioned you should get the best effect by allowing the hydrogen to escape through the outer orifice, and the oxygen through the central one.

(9) E. S. M. writes: I have been experimenting on lens grinding and polishing, with a convex and concave tool, using the one to keep the figure of the other perfect After grinding I coat one of the tools with pitch, and shape it by pressing the other on it while still warm, with a piece of paper between them, according to Dick's practical astronomer. I have made my tools ⅛ of the diameter of the lens larger. Now, the center of the lens polishes nicely, gradually growing more dim toward the edge. What is the cause? A. Your difficulty probably arises from your method of grinding and polishing. When the tool in grinding seems to bear hardest and cut most near the edges of the lens, it is necessary to take long, bold circular strokes, with the pressure principally sideways.

(10) W. H. S. asks (1) how to make a good rheostat. I am using a Wallace electric machine, and wish to use nearly all the current at one bath and only a small part at two others. A. A good rheostat for your purpose can be made by winding copper wire in open coils on wooden reels. This arrangement allows the heat to escape readily from the wire. 2. Also how to bronze iron door hatch catches and hinges, by dipping or brushing—something quick and cheap—a brown color that we see on cheap hardware? A. The finish you mention is obtained by dipping the articles in linseed oil and baking them until the required color appears We do not know of a quicker or cheaper way of doing it.

(11) P. J. H. writes: I have a Bunsen cell with a six quart jar: can I arrange it to give shocks? A. You can give shocks by connecting with your battery an induction coil like that described on page 203, Vol. 39, of SCIENTIFIC AMERICAN.

(12) R. H. B. writes: A dispute arose among certain parties in this city which it was agreed to leave to your paper (SCIENTIFIC AMERICAN) to decide. A argues that on January 1, 1879, the Christian world was eighteen hundred and seventy-nine years old. B that it was only eighteen hundred and seventy-eight. A. Both wrong. The custom of dating from the birth of Christ was introduced about the middle of the 6th century by a Roman abbot named Dionysius Exiguus, who placed the event some four years too late. That would make the "Christian world" actually about eighteen hundred and eighty-two years old at the close of 1878, assuming, of course, that the second year of the "Christian world" began at the close of the first twelve months after the birth of Christ. With the 31st of December, 1878, the 1878th year of the Christian era was completed. The next day and date marked the beginning of 1879.

(13) W. G. H. asks: 1. How many telegraph cables between America and Europe are there at the present time, and what are the termini on this side? A. Anglo-American has two cables in operation from St. Pierre, and one from Heart's Content. The Direct U. S. Cable Company has one cable in operation; lands at Torbay, U. S., and connects by short cable to Rye Beach, N. H. The French cable, which is one of the two landing at St. Pierre, is connected by short cable to Duxbury, Mass. 2. Is there any truth in the statement sometimes made that the rotation of the earth on its axis from west to east, tends to wear the eastern rails of railroads running north and south more than the opposite side? Is such difference in the wear capable of any actual proof by experience of railroad managers? A. It has been asserted by some railroad men that this is the case; we know of no direct experiment or observations to determine the question, nor have we heard any good reason assigned why it should be true.

(14) J. W. S. asks: 1. Could an astronomical eye piece be made of two plano-convex lenses to give a power of 100 times on a telescope having an object glass 3 inches in diameter and a focal length of 48 inches? A. Yes, the magnifying power of the instrument is represented by the ratio of the focal length of the object glass to that of the eye piece; therefore in order to get a power of 100 times with an objective having a focal length of 48 inches, the eye piece should have a focal length of 0·48 inch. 2. If so, of what size and focal lengths should they be? A. The eye lens should be about ¼ inch in diameter and ½ inch focus, the field lens ⅝ inch in diameter and 1½ in focus. 3. How far apart should they be placed? A. 1 inch—one half the sum of their focal lengths.

(15) E. G. M. writes: I am about to build a road machine on a large scale; it is to be like a three wheel velocipede. The front wheels to be 12 feet in diameter, the rear 4 feet. What kind of motor is light and strong? How would two springs do, each one to work separately while one is running down, the other to be wound up, and so on? A. Springs might probably do, but manual effort is the real power after all, and might be much better applied direct to the work.

(16) W. C. M. writes: 1. Will the induction coil described in SCIENTIFIC AMERICAN SUPPLEMENT, No. 160, be too strong to use for giving shocks with small battery power? A. Yes. 2. How many small bichromate battery cells will be necessary with the induction coil to give a 1½ inch spark? A. 6 or 8. 3. Could the coil be fixed in any way so as to be used with an electric pen? A. Yes; see experiments with induction coil in SUPPLEMENT 166.

(17) G. G. P. asks: Is there a vacuum in a siphon pipe when the siphon is in operation? A. There is a vacuum more or less perfect produced when the siphon is first started in the usual way, but if as it continues to operate it remains full, there can be no vacuum, as the whole pipe is filled with liquid.

(18) R. C. asks: 1. Why are inches on American carpenters' rulers and yard measures numbered from left to right, while the English are from right to left? A. We do not know that this is the universal practice. 2. Why are the closing exercises of American colleges and academies always called "commencements?" A. Because it is the time when students commence bachelors.

(19) N. P S. writes: 1. I notice in a late number of the SCIENTIFIC AMERICAN an excellent article on "brass finishing." Now will you please give some instruction how to finish small iron castings, japanning and bronzing, or coppering? A. A good black japan varnish is made by melting together 50 lb. of pure asphaltum, 8 lb. dark gum anime, and 12 gallons of linseed oil. Boil for 2 hours. Melt 10 lb. dark gum amber, boil it with 2 gallons of linseed oil. Add this to the other with a quantity of drier, and boil for two hours longer, or until a little of the mass when cooled may be rolled into pills; then withdraw the heat and thin down with 30 gallons of turpentine. Apply with a brush, and bake the japanned articles in a hot oven. For process of coppering castings, see p. 219, Vol. 40 (43), SCIENTIFIC AMERICAN. 2. In performing the well known experiment of producing a musical note on a glass tumbler, I am unable to understand why in filling the same with water the pitch of the note changes from a high to a low, as the quantity of water increases. A. The water retards the vibration of the walls of the tumbler, and consequently lowers the tone.

(20) S. S. W. asks for a good recipe for polishing wood, such as walnut, cherry, and maple. A. Mix three parts of rather thick alcoholic shellac varnish with one part of boiled linseed oil. Shake well and rub briskly on the wood with a cloth rubber.

(21) J. McG. writes: I have made a copying pad according to the directions given in your last issue, and have been quite successful apparently, as it seems just as good in every respect as those which are being sold in this city at ten dollars. I have, however, not succeeded so well with the ink, for although I have followed your directions, I cannot get more than ten copies with it, and each copy is fainter than the preceding one. The ink seems quite thick, but does not assume that green color which you speak of. Can you give me any further particulars as to making the ink? A. You have probably not selected the proper dye. Use 3 B aniline violet, and do not add an excess of glycerine. From ink prepared according to the formula referred to 170 clear copies have been taken.

MINERALS, ETC.—Specimens have been received from the following correspondents, and examined, with the results stated:

J F McC.—No. 1 contains a small quantity of gold associated with copper pyrites. No. 2. It is a cephalopod (*Orthoceratite multicamerata*) replaced by iron pyrites. The *orthoceratite* had a long straight shell divided into sometimes as many as 70 chambers, formed to accommodate the periodic growth of the animal, which, as it increased in size, moved forward into larger quarters and built a new apartment with wall behind it. Thus, in time, a long series of chambers were made, each larger than its predecessor but all connected by a membranous tube ("siphuncle"). The animal had many muscular arms, with which it seized and entangled its prey Some of these shells have attained a length of 30 feet and a foot thick. They inhabited the Lower Silurian ocean. No. 3. Portions of a crinoidal column or "stone lily," an order of radiates, of the animal, not vegetable, kingdom. No. 4. It is a magnesium limestone (dolomite), not a very good building stone. No. 5. They have practically the same composition, namely, sulphate of lime, but are known by different names; the transparent crystal is selenite associated with satin spar; the reddish amorphous piece is common gypsum (from which plaster of Paris is made) and the other sample is alabaster.—H. P. K.—The crystals in the sandstone are quartz.

COMMUNICATIONS RECEIVED.

On Rats. By W. M. P.
On Telephone. By G. H. S.
On Ice Yachts. By E. F. M.
Sailing Faster than the Wind Blows. By L. M.
On the Value of $\sqrt{-1}$. By I. B. N.
On a New Musical Instrument. By J. M. B.
On Employment of Farmers in Winter. By S. B.
On Ice Boat Propulsion. By J. I. V.