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.

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.

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 identification.

(1) J. L. H. asks: Will it take a greater length of piston rod to drill the crank pin of an engine from one dead center to the top quarter than it will to drive it from the top quarter over to the other dead center, and if so, why? A. It takes more motion of the piston to make one half of the revolution of the crank than the other, the difference depending upon the length of the connecting rod.

(2) C. W. asks: Where and how long the longest draw bridge is in the United States? A. The longest draw or pivot span is, we think, in the bridge just completed over the Harlem River, connecting with the New York and Northern Railroad. The whole length of pivot span, 300 feet, and the pivot pier, 60 feet, giving a clear passage of 120 feet on both sides of pier.

(3) E. G. M. asks: 1. How can I make an electric battery small enough to carry in the pocket, and strong enough to give a sensible shock? A. Use one of the forms of bichromate battery with a small induction coil and interrupter. 2. What is the best easy system of short-hand writing? A. Phonography is most used. See SUPPLEMENT, No. 316.

(4) F. J. R. asks how to compute the horse power of an upright tubular boiler, also horizontal return flue boiler. A. For upright tubular boiler allow 18 to 20 feet heating surface per horse power; for return flue 12 to 14 feet per horse power.

(5) W. M. F. asks: Is all lead pipe made by hydraulic pressure, or can it be made by any process but the one? A. All lead pipe is now made by hydraulic pressure, up to about four inches diameter. Soil pipe is sometimes made by turning up sheet lead and burning or soldering the seam. The only other way to make lead pipe is to cast in cylinders, and draw or roll it out upon a mandrel. This might be good for some purposes where straight, hard pipe is needed, but too expensive for ordinary uses.

(6) E. S. P. asks: Will you give us a good formula for preparing gunpowder from charcoal, sulphur, and niter? A. The composition of powder is varied considerably to adapt it to special usage. Theoretically the proper composition for a powder in which the full force of a completed reaction between the ingredients employed would take place, would be:

Niter (pure)	74·64
Carbon (pure charcoal)	13·51
Sulphur (pure)	11·85
	100·00

In practice, however, the following are found best adapted for the several purposes indicated:

	Niter.	Charcoal.	Sulphur.
For U. S. military service.	76	14	10
For sporting.	78	12	10
For blasting.	62	18	20

Of course much depends upon the thoroughness with which these ingredients are mixed together, granulated, and dried.

(7) W. C. B. writes: 1. We have been using for about two weeks some cotton seed oil for cooking purposes, and like it so far better than lard, but somebody has told the women folk that it is not safe to use it, that it is poisonous. Is there any danger in using this oil? It is made at New Orleans, and it is claimed by the merchant who sells it here "that it was made expressly for cooking purposes." A. Pure cotton seed oil is quite as wholesome as lard. 2. I have a mechanical telephone line, about one-quarter mile long, between my house and office. It is No. 20 copper wire, suspended from poles, trees, etc., by twine, and the wire goes through holes in the walls of house and office, and is attached at each end to a button on a sheepskin diaphragm in a wood frame. It passes at one place under and within about two feet of a telegraph wire. I wish to know if there is any danger of lightning from it; and if there is, would the danger be increased or diminished by connecting the wire to the (iron) pipe of a driven well at one end, a "ground" at the other end? A. There is a possibility of danger from lightning which might be averted by grounding your line as you propose. 3. I am superintending, without pay, the putting up of a town clock in our court house steeple. It will have four five foot dials, and I would like to know whether or not the hands would show in the night if I had the dials painted with phosphorescent paint. One of the leading clock firms in New York says not—says the paint is a humbug. Another firm indorses the paint. I do not know anything about it, but if I knew it would illuminate the dials so that the hands could be seen at night, say four hundred yards, I would put it on the dials at my own expense. A. Some of our dealers in paints are now selling a fair article of phosphorescent paint or varnish. These phosphorescent coatings could hardly be depended upon to illuminate such a dial sufficiently to show time in the dark at four hundred yards.

(8) W. H. J. writes: Some of us have had quite an argument about a "siphon." Suppose a pipe were made perfectly air tight, and one end of this pipe be placed below the surface of a body of water, and from thence up an incline mountain, to a height of two or three hundred feet above the body; then down on the opposite side of said mountain to a distance of about seven or eight hundred feet below the level of the above mentioned body of water; this line to be charged full of water at the highest point, and being air tight. When opened at each end at once, would the heavy column siphon the water over and down to the lower level in one continuous stream? A. A siphon will not operate over an obstruction or embankment exceeding about thirty feet in height, above the surface of the water to be discharged.

(9) P. asks for the best known ointment or mixture to put on exposed parts of the body to keep mosquitoes from biting. A. Camphorated glycerine is perhaps the best.

(10) F. P. C. writes: I am carpenter in a city mill, and the engineer and myself have had a dispute regarding the running of belts. I claim that if two pulleys are out of line with each other connected by a straight belt that the belt will run to the low on short side of the pulley. He says not, that the belt will follow the high on long side. A. Belts will run toward the ends of the shafting that are nearest to each other, or down hill, or toward the low side. On pulleys that are crowning the belts run toward the high part, which is the center, and therefore stay in their proper place, notwithstanding small errors in lining the shafting. When the pulleys are slightly conical, the belts will run toward the high or largest side of the pulley. Sometimes pulleys will wear more on one side than the other and dispose the running of the belt towards the high side, and may be economically corrected by altering the line of one of the shafts, so that the end of the shaft on which the wear takes place shall be nearer to the other shaft. But this is not recommended as good engineering.

(11) H. S. asks: 1. Is a single three-quarter inch stay bolt sufficient for a steam drum head? Drum is 2 feet diameter, of the horizontal style, connecting two boilers; the stay extends from the bottom of drum to center of head; head is of best flange steel; amount of steam, 85 pounds. A. No. You should have at least three stays, seven-eighths inch diameter. 2. Would a common alcohol lamp and blowpipe produce heat enough to braze iron, say one-quarter inch diameter? A. Yes.

(12) C. A. writes: I have seen in "Answers to Correspondents" in the New York *Sun* (I think in February), that the North Star is fixed a star. I am sure it revolves in a small circle about two degrees in the same time that the Great Bear makes its revolutions around it. Looking at it at a difference of six hours, there is an apparent change in the altitude. A. The so-called North Star does not coincide exactly with the North Pole of the earth. It is distant 1° 32′ 39″ from the true pole, and apparently sweeps around the true pole in a circle of 3° 5′ 18″ diameter. It comes to the meridian with Alioth in Ursa Major, or the third star from the end of the tail of the Great Bear. When Alioth is on the meridian *above*, the Pole Star is 1° 32′ 39″ below the true pole.

(13) M. L. S. asks: Is there any two liquids (or chemicals) neither of which when used separately will eat through paper, but yet will, when one is applied to the paper in certain spots, and the entire paper afterward washed with the other, cause the paper to be eaten through in those spots, leaving the rest uninjured? A. We know of no such liquid or combinations of liquids.

(14) A. F. E. asks: Does the friction of the shot or load against the barrel of a gun cause an increase of the recoil? If so, why? A. Yes; as the greater the resistance to the issue of the ball or shot, the greater must be the recoil pressure.

(15) H. B. and C. ask: Which will be most economical practice: A shaft is to be driven at 60 revolutions per minute, engine and main shaft 50 revolutions per minute, to gear from main shaft with wheels, 60 cogs on it to 48 cog pinion, on the driven shaft (to run 60 revolutions) or speed engine, and main shaft up to 75 revolutions, and gear from the 48 cog on main shaft to 60 cog on driven, the driven shaft to supply the same power in both cases, and steam pressure to be the same? Suppose the same case, which would be best: to reduce the steam pressure proportionate to the gain in power, by the increased speed and leverage of gearing, 48 to 60 cog, if you decide that the high speed is most economical? We have three or four times as much power as we desire to utilize at present, and want to know the most economical way to run the engine and get the specified speed, 60 revolutions, and are compelled by circumstances to use wheels of that proportion. A. Where there is, as you say, plenty of power, the most economical practice is to speed your engine to 50 revolutions per minute, arrange your gear 60 to 48 for the speed of the driven shaft, and carry the pressure in the boiler just high enough for the work. If you can do this with not more than 50 pounds pressure in the boilers, you will save the wear and tear of high speed engines, save oil, and save much fuel.

[OFFICIAL.]

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Letters Patent of the United States were Granted in the Week Ending

June 6, 1882,

AND EACH BEARING THAT DATE.

[Those marked (r) are reissued patents.]

A printed copy of the specification and drawing of any patent in the annexed list, also of any patent issued since 1866, will be furnished from this office for 25 cents. In ordering please state the number and date of the patent desired and remit to Munn & Co., 261 Broadway, corner of Warren Street, New York city. We also furnish copies of patents granted prior to 1866; but at increased cost, as the specifications not being printed, must be copied by hand.

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English Patents Issued to Americans.

From May 30, 1882, to June 6, 1882, inclusive.

Dynamo electric machine (3), J. J. Wood, Brooklyn N. Y.
Electric insulation (2), G. S. Page Stanley, N. J.
Electric lamp, J. J. Wood, Brooklyn, N. Y.
Electric lamp, A. Bernstein, Boston, Mass.
Screw threads, machine for cutting, W. D. Forbes, Bridgeport, Conn.