

**What a Horse Would Say if He Could Speak.**

Don't hitch me to an iron post or railing when the mercury is below freezing. I need the skin on my tongue.

Don't leave me hitched in my stall at night with a big cob right where I must lie down. I am tied and can't select a smooth place.

Don't compel me to eat more salt than I want by mixing it with my oats. I know better than any other animal how much I need.

Don't think because I go free under the whip I don't get tired. You would move up if under the whip.

Don't think because I am a horse that iron weeds and briars won't hurt my hay.

Don't whip me when I get frightened along the road, or I will expect it next time and may be make trouble.

Don't trot me up hill, for I have to carry you and the buggy and myself too. Try it yourself some time. Run up hill with a big load.

Don't keep my stable very dark, for when I go out into the light my eyes are injured, especially if snow be on the ground.

Don't say whoa unless you mean it. Teach me to stop at the word. It may check me if the lines break, and save a runaway and smash up.

Don't make me drink ice cold water, nor put a frosty bit in my mouth. Warm the bit by holding it a half minute against my body.

Don't forget to file my teeth when they get jagged and I cannot chew my food. When I get lean, it is a sign my teeth want filing.

Don't ask me to "back" with blinds on. I am afraid to.

Don't run me down a steep hill, for if anything should give way, I might break your neck.

Don't put on my blind bridle so that it irritates my eye, or so leave my forelock that it will be in my eyes.

Don't be so careless of my harness as to find a great sore on me before you attend to it.

Don't lend me to some blockhead that has less sense than I have.

Don't forget the old book that is a friend of all the oppressed, that says: "A merciful man is merciful to his beast."—*Farm Journal*.

**The Source and Force of Electricity.**

"All the energy in the world," said Dr. C. F. Chandler, in a recent lecture before the Columbia School of Mines, "comes from sunshine. Even the energy in the electric battery that rings the door bells of our homes has its origin in the light of the great solar system. The force in the copper wire that sets the bell to ringing comes from the zinc plate in the battery jar. The energy in the zinc plate comes from the anthracite coal with which it was burned when taken from the mines, and, finally, the energy in the anthracite coal was put there by the sunlight that fed and nourished it when it existed, ages ago, as trees and plants."

"An interesting misapprehension that exists in the minds of a good many persons is concerning the vital dangers that lurk in the pressure of say a thousand volts. The newspapers often tell us that a man has been killed by such a pressure, whereas, in fact, such a pressure alone couldn't kill a humming bird. I have frequently caught in my hand sparks possessing an electro-motive force of 100,000 volts without feeling anything more than a very slight burn.

"The danger arises only when the volts are re-enforced by a good many amperes or currents, as when one takes hold of a charged wire. Then one feels a shock that is unmistakable, because the force of a great many currents in the wire suddenly decomposes all the fluids in his body. The salt in the blood at once turns to chlorine gas, and the man whose veins are charged with this deadly poison cannot in reason be expected to live long."

It is computed, in recently made statistics, that the glass bottle production of the world amounts to a daily output of a little over eleven million bottles. Of these, Germany, Belgium, and Austria-Hungary make more than three-fourths, England and Sweden coming next, while the production of France and the United States combined is said to be quite inconsiderable in comparison.

**ORIENTAL METHOD OF VAULTING.**

Layard describes some curious channels or drains found in excavating at Nimroud and Kouyundjik. At Khorsabad he found the same thing in better condition and more carefully constructed. The drains were formed of arches, pointed, semicircular, and elliptical. These are illustrated by very good engravings taken from Perrot and Chipiez's "History of Chaldea and Assyria."

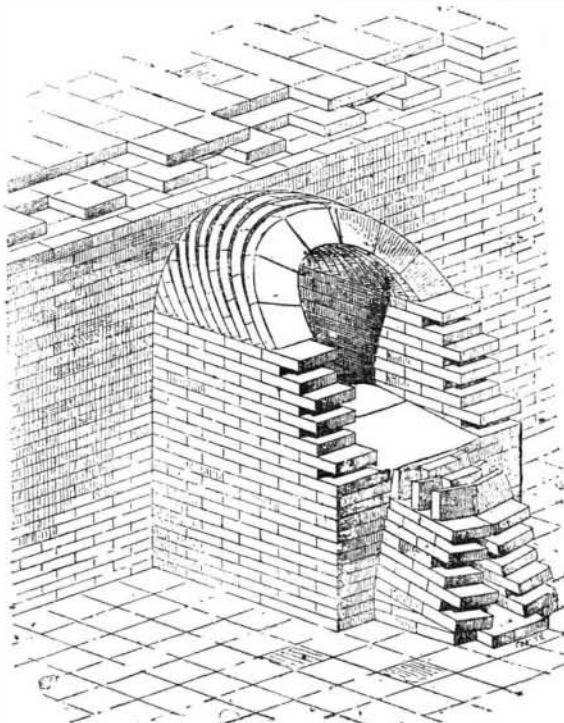
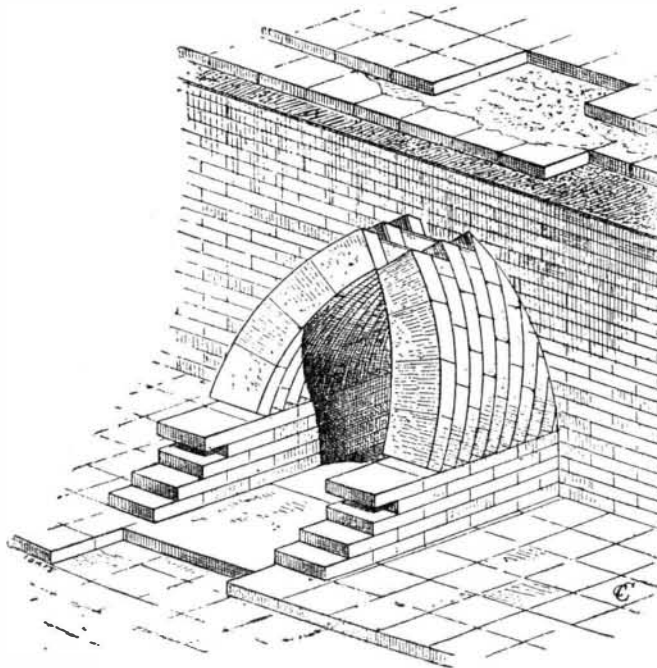
In the case of the pointed arches, there are no key-stones. The openings left at the summits of the courses

**VAULT FORMED WITH SLANTING ARCHES.**

are filled in with brick earth beaten tight, and serving the purpose of keys; but the most remarkable peculiarity of these drains is the fact that the different courses of the arches have considerable inclination in the direction of the length of the drain or vault. The most plausible explanation of this peculiar construction is that it was adopted to facilitate the work of the bricklayers.

According to this explanation, the first course of voussoirs would be sloped, and would rest upon a mass of crude brick at the center of the building; the bricks of the second course would lean against those of the first, and so on throughout the entire structure. This method of building could be easily carried out without an internal support, and as a consequence this kind of work could be rapidly carried forward with but few laborers.

In a lecture recently delivered before the Brooklyn Institute, by Prof. W. R. Ware, of the Department of Architecture, Columbia College, a very interesting description of this mode of vaulting without timber centers was given, and applications of the principle to the formation of large arches and vaults were illustrated. Among the noteworthy illustrations was one which we here present of a vault built upon this principle by some of the students of Columbia College School of Mines at Col. Auchmuty's Industrial School in this

**SEWER AT KHORSABAD-SEMICIRCULAR VAULT.****DRAIN AT KHORSABAD-POINTED ARCH.**

city. This experiment clearly proves that a vault can readily be built according to this system without timber centers.

In view of the simplicity and practicability of this method, it would seem to be worthy of the attention of modern mechanics, as long stretches of vault suitable for many uses can be quickly made in this manner, and the time and material required for the erection of timber work can be wholly saved.

It will be seen that only enough inclination is required in the successive courses to cause the bricks to retain their position by their own friction until the course is complete.

**Life of Incandescent Lamps.**

In the manufacture of incandescent lamps, success may be said to depend on several small points. The exhaustion, we know, must be as complete as possible to insure long life and reasonable efficiency. During the exhausting process it is the usual practice to heat the carbon filament to incandescence, in order that all air contained in the substance may be expelled. It has been found that if the filament is heated at too early a point during the exhausting process, it produces a more or less porous condition of the carbon and that a lamp made in this manner has neither a very long life nor a high degree of efficiency after having been in use for a short time. As an improvement on this, the globes are exhausted to as great a degree as may be and in as short a time as possible; then the current is passed through the carbon, and it is brought to incandescence for a few moments while the vacuum pump is still working. The vacuum pump used in this process is wholly mechanical and very quick acting and is reported to be much quicker in its action than the mercury pumps commonly in use for this purpose. From two sets of lamps made from similar filaments, a writer in the *Stationary Engineer* has discovered that one set exhausted in the usual way by mercury pumps, while the filaments were heated by the current, the other set treated with the mechanical pump and the current sent through the filament just previous to sealing the lamps, showed in the latter case the highest efficiency and longest life. The reasons for this may be inferred to have been that in the former case the filaments were partially disintegrated in the rarefied atmosphere.

**The Chinese Can Sing.**

An impressive scene recently was presented at the Congregational church in Stockton, California. The occasion was the celebration of the anniversary of the Chinese Mission in that city. A part of the exercises consisted of singing in chorus and solos and addresses by the Chinese. The singing, especially of solos and hymns, was a surprise, as it was generally supposed that the Chinese were destitute of capacity in that direction and incapable of appreciating harmony, judging by what travelers in China tell us and of the barbarous exhibitions given in this country by untaught immigrants. One soloist particularly carried the audience by storm and elicited applause that was with difficulty checked.

**Filing Commutators.**

Whenever it becomes necessary to file the commutator of a dynamo or motor, the persistency with which the copper will stick in the creases of the file causes considerable annoyance, and not only this, but the particles will scratch the copper segments. Filing a commutator is not the best way of dressing one up, but it is infinitely superior to allowing it to run while in a rough condition.

If the filing is done steadily while the machine is running at a fair speed only, no difficulty need result from such practice. The greatest trouble will be found in the particles of copper sticking in the grooves of the file. This can be practically avoided, says the *Stationary Engineer*, by first wetting the file in a bucket of water, which will prevent the copper particles from sticking, although it allows them to accumulate, but that is no detriment, as they can be easily washed out simply by the application of water while rubbing with the fingers. To keep the file wet, a bucket of water should be kept close at hand, into which the file is to be dipped before com-

mencing work and as often afterward as occasion may require. The small amount of moisture that will adhere to the file will not in any way injure the commutator or its insulation. The greatest difficulty to be met with will be in keeping the commutator round. If filed out of round to such an extent as to cause any trouble, the commutator should then be chalked and the high places filed down, which will bring it sufficiently true to work without trouble of any kind. From a number of experiments in drilling and filing copper we have found, says the writer, that the use of water assists materially in the work when the tools are kept wet with it.