Correspondence.

Chemical Fire Extinguishers for Car Stoves.

To the Editor of the Scientific American:

If the hand grenade fire extinguishers possess the real value and merits claimed for them, it seems to me that a number of these grenades, so arranged in proximity to each stove that in case of an accident they would break by the shock, would at once prevent or extinguish any possible fire. Nearly all steamboats are provided with such hand fire grenades, you find them in nearly all public and in a great many private buildings, but I do not remember ever having seen any of them carried as part of the equipment of a railroad car.

Possibly some different or better form than that of the hand grenade might have to be devised for a reservoir to contain the chemical liquids, and of such construction as would be specially adapted to the wants of the case in a railroad car.

G. E. MEISSNER.

Bushberg, Mo., February 7, 1887.

Black Heterodon, or Hog-nose Snake.

To the Editor of the Scientific American:

In your issue of February 5, 1887, E. R. of Williamsport, Pa., describes a serpent which he considers "another poisonous snake of Pennsylvania." His description, however, proves beyond a doubt that it is neither new to science nor in the least degree venomous. He describes plainly the black *Heterodon*, or hog-nose snake. In 1743, Mark Catesby gave it the name of *Vipera nigra* (black viper). He represents it in plate 44, armed with fangs, and says it is venomous (because he was so informed). Dr. Harlan of Philadelphia found it in eastern Pennsylvania previous to the year 1835. He considered it a new species, and gave it the name *Coluber thraso* (braggart snake), and classed it with the harmless serpents. Prof. Baird found it near Carlisle, Pa., many years ago, and describes it under the name of *Heterodon niger*, black viper; spreading adder; non-venomous.

The posterior maxillary teeth of these snakes (*Heterodon*) are larger than the anterior, fang-like, and separated from the others by an interspace. There are *no poison glands* attached to these teeth, as in the rattlesnake and copperhead, consequently they are harmless. "The horn attached to the nose," as described by E. R., is simply a prominent, broad, and turned up rostral plate.

There is no snake found here "with a head like an eel's." The head of an eel is covered with an apparently smooth skin, not with regular plates as in all true serpents.

C. FEW SEISS.

The Chicago Fire-Boat Geyser.

To the Editor of the Scientific American:

The fire steamer Geyser, which is owned by the City Fire Department of Chicago, was built at Chicago in 1886. The vessel is constructed of wood, having a length over all of 105 feet, a breadth of beam of 24 feet and 6 inches, and is of 71·60 tons burden.

To an admirer of fine lines, the portion of the body above the water line might seem to be deficient in gracefulness; but on close inspection of all the deck appointments one cannot help realizing that it is perfectly adapted to the purpose for which it was designed, and hence must be admired. The lines under the water, however, are very fine and carry the vessel with perfect ease and grace, the boat recently running to a fire through twelve inches of solid ice without once stopping.

The deck house is separated by partitions into four principal divisions, as follows: First, the wheel house and pilot's cabin, which are finely fitted up, and contain, besides the steering apparatus, two bed lounges and other furniture for the comfort of its occupants. The heating apparatus for this cabin is a novel and efficient one to the last degree, being simply a boxed register set into the forward end of the boiler jacket, this being made possible by the proximity of the boiler room, which adjoins the cabin.

The engine room forms the third division, and immediately in the rear of this lies the officers' cabin, which is heated by steam and compares favorably with the cabins of many of the finest private yachts. To an engineer, however, the real beauty of the vessel is concentrated in the engine room. Here indeed we find the perfection of engineering skill. The two high pressure engines have a piston stroke of 20 inches, the diameter of the cylinders being 18 inches, with 446 indicated horse power. These engines, which were designed and built by Chas. F. Elmer, are models of perfection in every respect, being supplied with steam reversing gear of most perfect action, which allows a cut-off at any point, and is instantaneous and sure in response to the simple reversing lever. The faultless working of the engines is shown by the fact that the boat when running at a rate of twelve miles an hour can be reversed and started back within a space of twenty feet, or less than one-fifth of the length of the vessel. The engines are coupled directly to a four bucket sectional wheel, eight feet in diameter.

Water for fire purposes is supplied by two double steam pumps, built by Clapp & Son. The steam cylinders of these pumps have a 17 inch bore and 10 inch stroke; the water cylinders having a bore of 9 inches with a 10 inch stroke, the pumps being vertical. The water is received through two 12 inch sea-cocks, one on each side of the boat, the cocks being so arranged that either or both may be used to supply either set of pumps. There are fourteen 3½ inch discharge gates. The pumps are capable of throwing eight two-inch streams 249 feet; but the greatest effect is produced from a stand pipe from which a four-inch stream is thrown 425 feet with sufficient force to splinter boards and even large timbers as though they were eggshells. Both engines and pumps are as near perfection in every respect as it was possible to make them, even being fed with oil by automatic oil pumps, thus dispensing with oil cans and their attendant bother and dirt. Steam is supplied by a single steel boiler 16 feet in length, 11 feet and 4 inches in diameter, with 4 flues 3 feet in diameter and three-eighths inch in thickness, built by John Mohr & Son, and is allowed to carry a pressure of 100 pounds per square inch.

The boiler plate is 0·62 inch in thickness, tensile strength 55,000 pounds, ductility 54·67. The grate surface is 84 square feet, and the heating surface is 2,780 square feet. The boiler is fed by both inspirator and pony pumps. In the forward part of the boat is a water tank holding 587 gallons, for use when clean water cannot be obtained through the sea-cocks, and is supplied with water from the city hydrants. On deck at the stern of the vessel are two hose carts, carrying 1,000 feet of hose three inches and a half in diameter, which can be run to any part of the deck.

With a steam pressure of 95 pounds, the engines make 150 revolutions and give a speed of between 17 and 18 miles an hour. The boat is supplied with both chime and modoc whistles, the latter being used as a fire whistle. There are sleeping accommodations on board for four officers and eight men, who comprise the crew and fire company. The Geyser is commanded by Capt. Wm. A. Cowan, a man of acknowledged ability, and is certainly a great credit to the Chicago Fire Department, and will undoubtedly render efficient service.

A. T. FAY.

Chicago, January 27, 1887.

India Paper.

The tenuity, softness, and strength of the paper manufactured in China have sometimes given it the name of silk paper. Many persons, deceived by the appearance or the name, really think the paper is made of silk; but a careful examination shows that it is of vegetable origin.

It was toward the end of the first century of our era that a mandarin of the palace—a distinguished physicist—discovered the secret of reducing the bark of a few trees, as well as old fabrics, into a very fine pulp, by boiling them in water. Out of this pulp he made various kinds of paper.

At present, *chi*, which is the Chinese name for paper, is made of various materials. It is made of hemp, of the bark of the mulberry and several other plants, especially the bamboo, of the bark of the cotton plant, of rice and wheat straw, and of the membrane found in the cocoons of silkworms.

Sometimes the substance is wholly bamboo. In this case it is taken from the largest canes, the shoots of the preceding year. After taking off the green epidermis of these, they are split into straight pieces six or seven feet long, which are allowed to set for a fortnight in a muddy pond. They are afterward washed in clean water and spread out in a dry ditch. Then they are reduced to a harl, which, after being bleached and dried in the sun, is thrown into large boilers, and after being boiled therein is pounded in mortars until it is reduced to a fluid pulp. To this pulp is added a definite proportion of a gum that the Chinese extract, through maceration, from a plant that produces long and little shoots, and the epidermis of which is smooth and is known in China under the name of *hotong*.

The mixing is done in reservoirs three or four feet in depth, from which the workmen dip up the pulp with their forms. These latter are made of bamboo threads drawn as fine as brass wire, by means of a steel draw plate, and then boiled in oil until they are well impregnated with it, in order that they may not be affected by humidity.

It is said that the Chinese make paper that is sometimes sixty feet in length. It is probable that they form this of many pieces, which they skillfully unite at the moment of depositing the sheets. On coming from the form, the sheet of paper is spread upon a wall covered with a very smooth cement, and which is hollow, and heated through a furnace. The paper is applied to the wall by means of a brush in the shape of a feather. This explains the striæ that we observe on the back of the paper, while the side that has been in contact with the wall is brilliant and satiny. This mode of drying may contribute to the quality that this paper possesses of receiving impressions.

India paper has a wrong and a right side. The right side is smooth and silky, and looks as if it had been calendered, while the wrong side is rough and full of little diagonal striæ, due to the friction of the brush above mentioned.

As this paper, because of its fineness, has little resistance, and has not enough body to take an impression, it is pasted upon unsized vellum paper, which serves as a mount, and which frames it, so to speak, through margins whose whiteness brings its color into relief. The pasting requires a peculiar preparation, as follows: In the first place, by means of a scraper, all foreign matters are removed, such as vegetable filaments, hairs, earthy substances, etc. Then the sheets are spread upon a large table and their wrong side is covered with a layer of thin starch or pulp paste. This pasting is done with a fine soft brush or, better yet, with a sponge. In this operation, care has to be taken to keep the paper from getting torn, and also to prevent inequalities in the paste, which would produce a disagreeable effect when met with behind the clear tones of the proofs; and special care must be taken not to let any paste get on the smooth side, since, in working off, the paper would tear or would take but a very imperfect impression.

The sheets thus pasted are spread upon cords removed as far as possible from a fire, as the latter would cause them to shrivel up. After this they may be kept for many years, either flat or in the form of rolls, but always in a dry place. When it is desired to use them, they are folded into as many divisions as the size requires, and are placed in thirties upon a sheet of glass lying upon a table. On the first sheet are traced the dimensions of the design, and finally the sheets are cut with a very sharp knife guided by an iron ruler.

At present, India paper is cut to exactly the size marked by the boundary lines of the design, while formerly a margin of about three-quarters of an inch was allowed.

Half an hour before they are to be used, these sheets are interposed between the sheets that are to serve as mounts, and that have been wet as for ordinary printing. The dampness of the paper suffices to moisten the paste and give the India paper the suppleness that it requires in order to take an impression.

When the stone is properly inked, the paper is adjusted upon the stone by means of datum marks made with a dry-point. Then the vellum paper is superposed, and through the pressure of the roller the two sheets become united in one.

Before the interposition of the India paper, it should be subjected to another inspection in order to ascertain whether it has been properly cleaned of foreign substances. Attention should be particularly directed to those parts of the paper that are to receive half-tones. Less attention may be paid to those parts that are to receive the blacks, as here the imperfections of the paper are almost always imperceptible. Even a hole in such parts would pass unnoticed, although, were there a necessity for it, this might be stopped up by interposing between the India and vellum paper a bit of India paper, not cut with the scissors, but torn irregularly, in order that the edges of the piece be not apparent on the proof.

The fineness of India paper, its color (varying from pearly to dirty gray), and the property that it possesses of taking impressions render it very valuable to lithography. This paper softens tones, blends one of them with another, harmonizes clear tones with vigorous effects and tempers their hardness, and thus gives the print an agreeable aspect.—*Bull. de l'Imprimerie et de la Librairie.*

Norwegian Wood Pulp Industry.

The wood pulp industry in Norway for the year 1886 shows a very large increase upon the figures of a few years back, albeit prices have ruled very low. The cause for this is attributed not so much to overproduction as to excessive competition among the sellers of this article; and as a great many sales for forward delivery have been booked at extremely low prices (2*l.* 15*s.* f. o. b. Hull has in many cases been taken for wood pulp with 50 per cent water), there are no immediate prospects of an improvement. The quantity exported during the year 1886 is about 120,000 tons; in the year 1885 it was 107,651 tons; 1884, 88,220 tons; 1883, 70,464 tons; 1882, 58,884 tons; 1881, 42,194 tons; 1880, 26,055 tons. Several of the old works have extended their production during the past year, and several new establishments are in the course of erection, so the production this year may probably be put at 150,000 tons wood pulp with 50 per cent water. There have been four cellulose manufactories at work during the past year. Two for the production of soda cellulose have worked with considerable success; two have produced sulphite cellulose; one of the latter has been burnt down. Nine more manufactories for sulphite cellulose are being built, with a capacity of about 10,000 tons dry cellulose. The greater part of the Norwegian wood pulp is exported to England, France, and Belgium; in Russia the increase in the duty has stopped business, and the same can almost be said of Germany. America, too, has drawn part of her supply from Norway, but this trade is not expected to continue.