Correspondence.

Phosphor-Bronze Wire for Mechanical Telephones.

To the Editor of the Scientific American:

In your issue of May 18 you describe a cheap telephone. I would suggest the use of phosphor-bronze wire, same gauge, as being far superior to copper. I have had considerable experience with the same. I used copper wire at first, but had considerable trouble in keeping it tight; the wire would finally get so thin that it would break.

I have used phosphor-bronze wire for about three years on one short line of about three hundred feet, and it has remained perfect. I use ferrotype plate for my diaphragm, having a rubber insulator between button and diaphragm. In the center of my line, at an angle, I have a weighted pulley that keeps the wire tight continually. This pulley plays an important part in winter, when the wire is covered with ice, yielding to the weight until relieved, when it immediately resumes its former position. WM. R. CALVERT.

Saint Davids, Del. Co., Pa., May 20, 1889.

The Harlequin Snake.

To the Editor of the Scientific American:

Your description of the venomous snakes of America is undoubtedly correct, except so far as the harlequin snake being non-venomous. It is generally calle throughout Texas the king snake, because it easi whips the rattlesnake and masters all other snakes though the name "king" is undoubtedly an error.

During the sixties, a three year old child of Alexander Stringer, living in Corpus Christi, Texas, caught one of them in the yard and brought it into the house in its hands, and was bitten in the face, near the lip, by it. Inflammation followed, and in a very short time the child died, having suffered intense agony. There can hardly be a doubt but that the child died from the bite of the (king) harlequin snake. I have heard of many other instances of the deadly venom of the harlequin snake, but the instance mentioned is the only one I can verify, as I lived in Corpus Christi at the time of the child's death and examined into the matter quite critically, as I was then editor of the Corpus Christi *Ranchero*, a newspaper.

The (king) harlequin snake is considered more deadly than the rattlesnake, from its bite, and it grows to a larger size than is indicated in your article on venomous snakes. H. A. M.

Brownsville, Texas, May 17, 1889.

[I think H. A. M. is mistaken in regard to the harlequin snake (*Elaps*). The article referred to distinctly says that it does possess poison fangs and is a venomous species, nearly related to the cobra. That, nevertheless, it is looked upon as a harmless and inoffensive little serpent in many portions of the Southern States, I am certain. Dr. Holbrook, of Charleston, S. C., and others, say that it is generally considered harmless. That it may be dreaded in portions of Texas I have no reason to doubt.

H. A. M. has evidently confounded two very different species of serpents. He says that the harlequin snake is generally called the "king snake" throughout Texas, because it easily vanquishes the rattlesnake and masters all other serpents. The average length of the Texan harlequin (*Elaps*) is about two feet, and one measuring over three feet is unusually large and the body at its thickest portion is rarely much thicker than a man's finger. Now, the supposition that this diminutive serpent attacks and conquers the large and powerful rattlesnake (*Atrox*) and the swift and vigorous black snakes, is to my mind absurd. The true king snake (*Ophibolus getulus*), however, is an entirely different serpent. It is black in color, crossed by about thirty narrow yellowish lines which fork out on the sides of the body. It has been found from New Jersey to Mississippi. Say's king snake (*Ophibolus getulus* var. *Sayi*) is common in many parts of Texas and adjacent States. The ground color above is lustrous black, each scale above with a white or yellowish spot in the center. Sometimes these spots cross the back in more or less regular lines. Beneath white or yellowish, with broad black blotches. They grow to a length of four feet and over, are active and powerful serpents, more or less constrictors, but without poison fangs, and consequently non-venomous. Say's king snake has been killed in the act of swallowing a moccasin snake, and other species of *Ophibolus* have frequently been taken with partly swallowed serpents in their mouths or doubled up in their stomachs, the victim in some cases being nearly as large as the swallower. It is generally admitted that the *Ophibolus* does not attack other snakes merely for sport, but for the purpose of securing a meal.—C. FEW SEISS.]

To Keep off Mosquitoes.

Take a small quantity of a two per cent carbolic acid solution and sprinkle sheets, coverlets, pillow, and bolster on both sides, the edges of bed curtains, and the wall next the bed. The face and neck may also be slightly wetted with the solution. Not a single gnat or mosquito, it is said, will come near.

Care of Fire Extinguishing Apparatus.

Some timely warnings—one of a most unfortunate character—have been recently sounded, calling attention to the necessity of taking care of fire apparatus. All over the country are villages and cities which for protection rely upon a volunteer or more or less efficient paid fire department. In some of these settlements fires may never have occurred. The natural consequences of disuse accordingly tend to overtake any fire engines, hose, etc., which they may possess. Years ago, it may be, a subscription was started and fire equipment was purchased. For a year or so the enthusiasm would last, and it would be carefully kept. But gradually the feeling of interest would die out and the effects of rust and decay would make themselves felt, and in the course of time the elaborately painted engine, hook and ladder truck, or hose carriage would be nearly useless, the hose couplings would become so corroded that they could not be screwed together, and the hose would become so buckled and stiff as to be incapable of effective manipulation.

The above is no imaginary picture. In a Massachusetts village the chief engineer of the fire department, in his annual report, calls attention to the bad condition of the fire ladders. They are, he says, "old, heavy, worm-eaten, and unfit for use." The same, we doubt not, could be said for many other pieces of apparatus in villages all over the land. From Washington, the new State just added to the Union, comes the re[port] of a fire that swept away the greater portion of [the] business portion of Cheney. The fire apparatus was drawn out and the hose was attached to the engine, when it was found that the nozzle was plugged with wood. Many thousands of dollars' damage was done because the fire gained such headway before the plug could be extracted that it could not be checked. The need of daily inspection was here emphasized.

The many thousand sufferers by the Johnstown disaster received warnings enough to have saved every life if acted upon, but they had come to regard them as an old story, so often had they been repeated in the past. Thus it is with the unused fire engines and general life and property saving appliances. The warning in the shape of danger from fires is ever present, and is disregarded. When the danger is realized, and a conflagration actually occurs, the fire guardians find themselves unprepared to cope with it.

Holy Land Railway.

Application has been made by Jos. Elias, formerly government engineer of the Lebanon, for a concession for a railway from Haifa, on the Mediterranean, about midway between Tyre and Cæsarea, by way of Lake Galilee, over the river Jordan to Damascus. Authority for the navigation of the lake and a priority of right for the extension of a line over any other applicant for three years is asked for. The line is to follow the river Kifhon for six miles, going within three and three-quarters miles of Nazareth, and then ascending the valley to the watersheds of the Jordan. The line will proceed along the northwest of the lake close to the plain of Genesaret, up the Jordan, crossing it about two miles below Merim. From that point the line turns toward the east to Damascus, a distance of one hundred miles from the coast. A branch line will go to Naova, the capital of the Hauran, with an option to continue on to Bosra, the ancient capital of Bashan.

The practical part of Mr. Elias' application is interesting. He estimates the population to be served at 500,000, or about 5,000 to the mile. Damascus has about 200,000 inhabitants and there are ten towns with from 1,000 to 10,000 inhabitants and about 5,040 villages. Although the district is very fertile, only one-sixth of the arable land is under cultivation. There is an abundance of streams, however, so that the country could be easily irrigated.

The Effects of Carbonic Oxide upon the Blood.

A statement by Professor W. P. Mason, of the Rensselaer Polytechnic Institute, respecting the poisonous character of water gas appears in a recent issue of the *American Gaslight Journal*. He refers to an event in the history of Troy, in the State of New York, where owing to a break in the street mains a quantity of fuel gas passed underneath the frozen crust of earth and percolated into the adjoining houses, causing four deaths and many more or less serious illnesses. The composition of the gas by volume was: Carbonic acid, 5; oxygen, 0·5; carbonic oxide, 37·5; light hydrocarbon, 0·9; hydrogen, 48; nitrogen, 7·1. It was practically odorless; and gave no warning of its presence in dangerous quantity in the atmosphere of the houses. The unconscious victims died without any struggle, their appearance when found indicating that the insensibility which passed into death overtook them without creating any previous alarm, or disturbing them from their occupations and attitudes at the moment of seizure.

What is most remarkable is that fires were burning and lamps lighted in the rooms invaded by the poisonous gas, which was therefore strong enough to kill without being strong enough to form an explosive mixture. Very searching *post mortem* examinations of the victims were made without disclosing anything abnormal, with the exception of the bright cherry red color of the tissues and the vivid redness and fluidity of the blood. When the operating surgeon opened the chest cavity, he endeavored to detect any unusual odor, and was immediately affected with giddiness, and the subsequent oppression did not wear off for twelve hours. A lawsuit followed the accident, and Professor Mason was retained to analyze and experiment upon the fuel gas and its effects upon living animals. In this way the analysis already given was made. It is placed upon record by Professor Mason that, both microscopically and by the spectroscope, the effects of carbonic oxide poisoning may be detected in a sample of blood kept in a bottle and not examined for a year after the death of the animal from which it was taken. Even after two years such a sample of blood will still retain the characteristics noted when first inspected.

Iron Shafts.

A revulsion of feeling regarding the supposed superiority of steel over iron for heavy shafts for steamboats has been gaining strength for some time, and it is said that nearly all steel shafts that break nowadays are being replaced by iron. It is also stated that those made by Krupp, the German iron worker, have fared no better in builders' estimation than some made in this country.

Considerable inquiry was made on the subject recently, and the only one who gave a good word for the steel shaft was Mr. David Shaw, superintendent of the steel works at Chartiers. He stated that he thought good steel would answer the purpose, but that some kinds would be no better than pig iron.

Mr. James A. Henderson stated that the shafts on the Scotia, Katie Stockdale, John Moran, and Beaver had all been replaced lately with iron. Mr. Henderson explained that steel seemed to be affected something like French plate glass. When a fracture is made in the latter, it continues to extend, unless a hole be bored at the end thereof, and the manner in which the particles of steel were pressed together appeared to deprive them of tenacity or coherence.

Mr. Henderson instanced the familiar experience of finding broken iron axles on various kinds of vehicles, where it is often seen that the axle has been doing duty for a long time partially broken, the old fracture being plainly visible. With steel it is different. When a shaft begins to give way, the fracture extends rapidly.

Iron shafts have been known to do duty for a quarter of a century, doing good service long after the fissure began to yield.

A gentleman at the office of Carnegie, Phipps & Co. stated that they had made quite a number of iron shafts for steamboats lately. He attributed their superior strength to the fine quality of iron used in making them and to their superior torsional strength.—*Pittsburg Dispatch.*

Detecting Minute Quantities of Iron in Minerals.

Alexander Johnstone, F.G.S., Assistant to the Professor of Geology and Mineralogy in the University of Edinburgh, states, through the columns of the *Chemical News*, that a new and rapid method for detecting minute quantities of iron in minerals is easily accomplished as follows:

By means of a good strong flame, produced in the ordinary way by the mouth blowpipe, heat for a minute or two a small portion of the mineral, preferably in a powdered condition, on *clean* platinum foil, with about four times its bulk of potassium nitrate or chlorate. The platinum should be heated from below, as it is not desirable that the flame should touch the assay. After the mass has been ignited as stated, add to it, *before it has cooled down*, by means of a piece of glass tubing, *pure* concentrated nitric acid drop by drop, until a single drop remains not dried up. Next pour on to the top of the unevaporated nitric acid, also by means of a narrow glass tube, two or three drops of an aqueous solution of potassium sulphocyanide. A *distinct* red coloration will immediately arise and remain if any iron was present in the mineral examined. As this test is extremely delicate, nitric acid quite free from iron must be obtained; and it is essential that the potassium nitrate or chlorate should also be pure. The platinum foil must be perfectly clean, and the dropping tubes must be rinsed with water before and immediately after the application of each test.

American Machinery Abroad.

It is a remarkable fact, observes the *Iron and Steel Trade Journal*, London, that in the manufacture of different kinds of machinery the Americans can beat us in price. Wages in the United States are about 50 per cent higher than in this country; materials are from 25 to 50 per cent dearer; yet the finished machines can be put on the market cheaper. It is true that the Americans cannot send out machines to neutral markets any cheaper than is done by our manufacturers; but it is surprising that they can at least meet us in price.

THE PARIS EXHIBITION—THE EIFFEL TOWER.