Correspondence.

Freaks of the Tornado.

To the Editor of the SCIENTIFIC AMERICAN:

In the Associated Press dispatches concerning the recent tornado in Oklahoma, mention is made of the occurrence of some remarkable phenomena which cannot be explained by our accepted physical laws. Among these is the statement that "all the corpses in the track of the storm were found to be without shoes." "In some instances the hair was taken from the head without injuring the scalp beneath." Similar storms have been reported with like curious phenomena, such as the removal of the feathers from one-half of a chicken, leaving the bird otherwise uninjured; driving of a piece of straw several inches into the trunk of a tree without breaking the straw, etc.

As such manifestations serve as the basis for the study of an unknown element in physics, it would be of great value if as many authenticated instances of this character could be accumulated as possible.

The undersigned would be very glad to communicate with persons having personal knowledge of such unusual phenomena found associated with tornadoes and cyclonic storms: F. PARK LEWIS.

454 Franklin Street, Buffalo, N. Y.

Another Explanation of the Stone Ball's Motion.

To the Editor of the SCIENTIFIC AMERICAN:

I submit the following explanation of the moving stone phenomenon:

Marion is located in a limestone region, beds of which underlie the entire city. In a northerly direction from the cemetery are several quarries, hence frequent blasting. The bed of stone transmits the vibration to the base of the monument, causing the pedestal to vibrate from north to south suddenly, but from south to north more evenly. Now, as the pedestal moves south with a jerk, the ball remains stationary. But when the pedestal moves north, its motion, being slower, overcomes the inertia of the ball, causing it to move south, or revolve.

As to the orientation: West of the city a sewage disposal plant has been under construction. The contractor encountering beds of limestone, proceeds to blast through them, causing east and west vibrations, which causing a compound motion of the ball, makes a spot in the south side appear to move east.

To illustrate the motion of the side of the ball next the base, take a yardstick, place a dollar on it, and holding the stick firmly, with the hand resting on a table, strike the end with a light hammer. The dollar will move toward the end struck. JOHN H. GILLOOLY.

Cochranton, Ohio.

First Arithmetic Published in the United States.

To the Editor of the SCIENTIFIC AMERICAN:

In notice of death of Col. Nicolas Pike (SCIENTIFIC AMERICAN, April 22, 1905, p. 322) it is stated that "Among the curiosities he leaves is a three-sheet autograph letter from Washington to his uncle, Nicolas Pike, commending him as the author of the first arithmetic published in the United States."

But the author (Pike) and George Washington to the contrary notwithstanding, Pike's book was *not* the first arithmetic published in this country. Pike's arithmetic was published at Newburyport, Mass., in 1788.

Hodder's arithmetic was reprinted at Boston, Mass., 1719; but that book was not by an American author.

An arithmetic was published at Boston, Mass., 1729, anonymously, but supposed to be by, and is accredited to, Isaac Greenwood, a Harvard professor, which is believed to be the first arithmetic by an American author published in the United States. It antedates Pike 59 years.

Several arithmetics by foreign authors were reprinted here before the appearance of Pike's scholarly work. See "Notes on American Text-Books on Arithmetic," by James M. Greenwood and Artemas Martin, Report of Commissioner of Education for 1897-98, pp. 796 and 802-809, where Washington's letter will be found. See also Cajori's "History of Mathematics and Mathematical Teaching in the United States," pp. 45-49 (Washington, 1890, U. S. Bureau of Education).

"The Youths' Assistant," by Alexander McDonald, was published at Norwich, Conn., in 1785, three years before Pike's book.

"Elementary Principles of Arithmetic," by Thomas Sarjeant, was published at Philadelphia in 1788, the same year as Pike's book. ARTEMAS MARTIN.

U. S. Coast Survey Office, Washington, D. C.

The "Black Boy Gum."

To the Editor of the SCIENTIFIC AMERICAN:

I write to you at this time at the request of a few friends, who are deeply interested in one of the products of Western Australia, namely, what is known as "black boy gum." I do not know what the technical name of it is. Much has been said about it, but we have heard of no real practical analysis and suggestion as to what commercial value it has, or what useful products may be derived from it. There are millions of tons of it, and it can be very cheaply placed on board ship. It is highly inflammable, and has been suggested as an excellent composition for fire kindlers. As a gum, we suppose it may be an excellent base for varnish or a sealing wax. The aboriginals employ it in sticking on their spear heads, etc. From the smell of it we would consider that it possessed some chemical properties that may be of commercial use, it may be in the healing arts or medicine. The bees utilize it largely, and the honey gathered while it is in blossom possesses its peculiar flavor. The leaves of the tree resemble a great grass bulb top, with the flower growing out of the top. The whole of the stem is of gummy scales. The diameter ranges from 4 inches up to 12 or more inches, and the height to 12 or 15 feet. They grow on ironstone ridges very thickly together. The core is quite soft, and one or two blows with the ax will lay them at our feet, but some of the best gum is immediately under the surface, and can be dug up with no trouble at all. A man could cut and load a great many tons in a day, as it is light and convenient to handle, only it is a bit sticky. Now, we wish to ask the favor of your assistance, knowing that through your most valuable paper you have access to the best means of ascertaining the real value of this commodity. You doubtless know of some firm who will have enterprise enough to find out the chemical properties, etc., of this article, and who would probably develop from it a new industry. We have no means of applying the requisite tests in this State, but we should be most willing to undertake the shipment of an unlimited quantity if we had the *bona fides* of a good firm, American, British, or Continental. In the mean time, I possess a small parcel of a few pounds weight cleaned and ready for analysis, and would forward it to a reliable firm for a genuine test. GEORGE JOHNSTON.

Sterling Terrace, Albany, Western Australia.

Wisdom of the Amalgamation of the Line and Engineer Corps of the Navy.

To the Editor of the SCIENTIFIC AMERICAN:

There has been a great deal said against the amalgamation of the line and engineer corps of the navy, which took place by act of Congress in 1899; but if the subject is carefully studied, it will be seen that it is the best arrangement.

The engineer corps was not abolished, and the standing of the engineer was not degraded, as has been said, for the line officer is now an engineer officer. Those who are not competent can qualify themselves in either branch, if below forty years of age, and all the younger ones can easily be given a training which will make them competent. Every commissioned officer doing deck or engine duty on a ship should be trained to do either, in case part of the complement is killed in action.

No commanding officer who is not an engineer has the knowledge which will enable him to get the best results out of his ship. Too often do commanding officers, who are without engineering training, treat the engine department as if it did not belong to their ship at all; and instead of helping along the officer in charge of it, many obstacles are often thrown in his way, and it is very hard to keep the department in a thoroughly efficient condition. All commanding officers should know what can be gotten out of the machinery and the men of the engineer force under different conditions, and also they should thoroughly understand the difficulties to be surmounted in overhauling and making repairs, and keeping the department in a thoroughly efficient condition. They would then certainly think the engine department as much a part of their ship as any other, and would always lend it a helping hand.

There was no mistake made in the amalgamation of the line and the engineer corps of the navy. What the navy needs is more officers. Those that desire to, can qualify for engineering duty only. When there are sufficient commissioned officers to give each ship the number for engineering duty that she needs, there will be a great improvement. A battleship should have a chief engineer and six assistants, commissioned officers, instead of a chief engineer and one assistant, as is the case at present. This shortage of commissioned officers has thrown great strain on those doing engineering duty on the ships.

The warrant machinists are a worthy class; there are doubtless some exceptions, but the greater part of them have neither the education nor the training to fit them for engineer officers. An educated engineer officer is necessary to obtain the best results.

There is really nothing necessary to the proper running of a ship in either deck or engine department that cannot be accomplished, with application, by an educated person brought up to sea life. If one has never seen a ship or a machine shop before, the United States laws allow him to qualify as master of ocean steamers in five years, or qualify as chief engineer of ocean steamers in six years, in the merchant service. Those who wish to specialize along the lines of designing and building machinery and ordnance, and otherwise, can do so, as particular aptitude shows itself. As years go by, the mechanical appliances on board ship are increasing. Every part of a gun is a machine. Everything is done by machinery. Seamanship has gone, and all that remains is handling a ship under steam and the navigation. What is needed now is engineers with training in navigation and in handling steam vessels. The all-around training and manual dexterity of Admiral Cochrane, R.N., who could show every man aboard, except the doctor, how to do his work, is as much needed now as it was then.

A CHIEF ENGINEER NOT IN THE NAVY.

New London, Conn.

Engineering Notes.

A large viaduct is to be constructed across the river Indus at Khushalgarh, one of the largest rivers in India. The bridge is to be of the double-deck type, carrying the railway on the top, with the roadway below. It will have a 470-foot cantilever span and an "anchor" span of no less than 303 feet.

Some new records in railroad speeds may be anticipated in France. A great effort in this direction is to be carried out experimentally between Paris and Bordeaux. The Orleans Company is constructing a special engine, which is to take an express through the journey in six hours. As the distance is about 372 miles, the rate of speed will have to be about 74½ miles per hour for six consecutive hours.

The new Allan transatlantic turbine steamer "Virginia," which is the sister ship to the "Victorian," attained a speed of 19¾ knots against the tide and 20 knots with the tide during her trial trip on the river Clyde. The contracted speed was 17 knots. The "Virginia" is similar in every respect to the pioneer Atlantic turbine liner "Victorian," described in these columns.

In a well-written article published in Revista Militar (Rio Janeiro), Major P. Ferreira Netto presents a very thorough review of modern explosives, some of his information being based upon an article published in the SCIENTIFIC AMERICAN SUPPLEMENT, which article he quotes with approval. From what we read, we take it that Major Netto considers the essay by Mr. Sy a most valuable contribution to the chemistry of smokeless powder. Major Netto is a military engineer of some note and visited this country several years ago to study our military improvements, and likewise for the purpose of making arrangements with one of our smokeless powder makers to build a factory in Brazil.

For some time past experiments have been carried out in England with several media such as westrumite, and so forth, for overcoming the dust nuisance on the high roads, which is created more especially by automobiles. These materials, however, have proved only partially successful. The results of some later experiments in this direction which have been carried out in Liverpool were recently described by Mr. A. Lyle Rathbone, deputy-chairman of the Liverpool Health Committee in a lecture at Liverpool. The surface of a selected roadway was coated with creosote oil mixed with resin. This mixture gave the cleanest and nicest appearance while the surface coated with ordinary petroleum was the least lasting; next in order came mixtures of creosote oil with tallow, and hot creosote oil. Heavy coal tar waste oil lasted rather longer than the creosote oil, and was very much cheaper. Considering the experiments as a whole, the result would seem to point to eventual success with the use of some classes of oil in the place of water on macadam roads.

An interesting application of the gasoline motor for marine purposes was recently demonstrated upon the arrival in the Thames of the auxiliary vessel "Sirra," of 500 tons from Dordrecht. This vessel is a three-masted schooner, and with the large area of sails provided in a fast boat on the high seas. The craft, however, is also intended for service upon canals, for which purpose the masts are hinged, thereby enabling them to be lowered for passage beneath bridges. When the sails are unavailable the boat is propelled by a gasoline motor. There is a small single propeller placed well below the water line. The motor is placed right aft so as to reduce the length of shafting as much as possible, and is controlled from the poop by means of a hand wheel and lever. The provision of this auxiliary power was strongly emphasized upon the arrival of the vessel in the Thames. Instead of waiting for the tide, or requisitioning a tug, the vessel was driven up by the gasoline motor at a steady speed of six knots, and as the masts were lowered could pass beneath the bridges easily. Such a combination of wind and motor power presents many possibilities, since a vessel so equipped has great economy in power, ease in working, and adaptability to circumstances. The "Sirra" was visited by many marine engineers interested in the problem of river navigation during her stay in the Thames. It afforded a concrete example of how the question of dealing with canal traffic may be efficiently and economically handled. Such a system is much cheaper than electrical towage both from point of initial expense and maintenance, and far more expeditious than animal traction for canals and similar waterways.