Correspondence.

Guard Rails for Rational Railroad Track.

To the Editor of the SCIENTIFIC AMERICAN:

Your first article in last week's paper, "Needed, a Rational Railroad Track," is sound. Have you ever noticed (in this State anyhow) how the law compels the railroads to guard-rail all railroad bridges? Would it not be a wise plan to compel all railroads to use all worn-out rails to guard-rail the main line, especially at high embankments, and clear through as soon as they can? LEROY TOBEY.

Penn Yan, N. Y., May 26, 1907.

Reformed Scientific Spelling.

To the Editor of the SCIENTIFIC AMERICAN:

In several recent articles in your valued paper, in which chemical terms are used, I notice that you adhere to the old spelling of some of these words. Thus you retain the unnecessary *e* in words ending in *ide* and *ine*, such as *oxide*, *chloride*, *iodine*, *bromine*. The improved method of spelling these words is *oxid*, *chlorid*, *iodin*, *bromin*. Also *ph*, instead of *f*, in such words as *sulphur*, *sulphate*, *sulphide*. (*Sulfur*, *sulfate*, *sulfid*.)

This improved form of spelling chemical terms was introduced years before Mr. Carnegie's "fonetic" spelling was first heard of, and should not be confounded with it. This spelling is now being used by progressive chemists; books in chemical technology have been published in which the improved spelling is used, and it is gradually coming into general use.

In this connection, I cannot do better than to quote the following from the Standard Dictionary:

"The rules for the spelling of words in chemistry, as *bromin*, *chlorid*, *morphin*, *sulfid*, were adopted in compliance with a resolution passed by the Chemical Section of the American Association for the Advancement of Science, advising that the report of the committee of that association on spelling and pronunciation of chemical terms be followed. This action has received the approbation of many eminent chemists in the United States. Referring to this subject, H. W. Wiley, M.D., Ph.D., chemist of the United States Department of Agriculture and president of the American Chemical Society, has written to the editor: 'I consider the plan a great improvement over the old methods of spelling and pronouncing chemical terms'; and many other recognized authorities have written, strongly commending the reform." C. B. ROWLINGSON.

Syracuse, N. Y.

Lubricate the Outer Rail on Curves.

To the Editor of the SCIENTIFIC AMERICAN:

As everyone is interested in the safety of railroad travel, it seems to me that it behooves the public in general to give this matter all the thought possible.

Acting upon this idea I have formulated a plan in my mind, which, though simple, will, I think, tend to lessen derailing of trains on curves. In my limited experience with railroads I have found that the wheels rub very hard against the outer rail of a curve, so hard that the rail wears quite rapidly from the friction induced thereby. Your valuable paper gave an article not long ago, also cuts showing the proper elevation for outside rail of curve.

In my opinion these conditions are met with in very few curves, whether because it will tilt the cars too much, or for some other reason, I know not; but the fact remains, as may be readily seen by looking at any curve's outer rail, that it sustains great friction. Now in running a small railroad, used for hauling logs, I found that when it was raining we had very little trouble in the curves, and when dry, with heavy loads on trucks, a great deal. In view of this, my plan is to have pipes so arranged that they would throw a jet of water or cheap oil against the side of the outer rail when the locomotive struck the curve, thereby lubricating same and reducing the tendency the wheels have to climb.

It would be a very simple matter to arrange the feed valves for the control of lubricant so that they would open only when engine struck the curve, closing again when straight track was reached. By a system of this kind, and a practice of bolting the two rails together in curves, so that they could not spread, I think the public would hear less of wrecks in such places.

Morgan City, La. F. M. O'BRIEN.

[The suggestions of our correspondent are sound. The practice of directing a fine stream of water against the outer rail was tried in the West some years ago with good results.—ED.]

Sound from a Moving Source.

To the Editor of the SCIENTIFIC AMERICAN:

The following is an extract from pages 51 and 52 of "Recreations in Astronomy," by H. W. Warren, D.D., 1879. It is a good explanation of the effect of sound waves on the ear as the distance of the source of the sounds in increased or diminished, and adds to what has been said in explanation of the experiment of the boys with the bell illustrated in your issue of March 16.

"One of the most difficult and delicate problems solved by the spectroscope is the approach or departure of a light-giving body in the line of sight. Stand before a locomotive a mile away; you cannot tell whether it approaches or recedes, yet it will dash by in a minute. How can the movements of the stars be comprehended when they are at such an immeasurable distance?

"It can best be illustrated by music. The note C of the G clef is made by two hundred and fifty-seven vibrations of air per second. Twice as many vibrations per second would give us the note C an octave above. Sound travels at the rate of three hundred and sixty-four yards per second. If the source of these two hundred and fifty-seven vibrations could approach us at three hundred and sixty-four yards per second, it is obvious that twice as many waves would be put into a given space, and we should hear the upper C when only waves enough were made for the lower C. The same result would appear if we carried our ear toward the sound fast enough to take up twice as many waves as though we stood still. This is apparent to every observer in a railroad train. The whistle of an approaching locomotive gives one tone; it passes, and we instantly detect another. Let two trains running at a speed of thirty-six yards a second approach each other. Let the whistle of one sound the note E, three hundred and twenty-three vibrations per second. It will be heard on the other as the note G, three hundred and eighty-eight vibrations per second; for the speed of each train crowds the vibrations into one-tenth less room, adding 32+ vibrations per second, making three hundred and eighty-eight in all. The trains pass. The vibrations are put into one-tenth more space by the whistle making them, and the other train allows only nine-tenths of what there are to overtake the ear. Each subtracts 32+ vibrations from three hundred and twenty-three, leaving only two hundred and fifty-eight, which is the note C. Yet the note E was constantly uttered."

Klamath Falls, Oregon. F. M. PRIEST.

The Gila Monster.

To the Editor of the SCIENTIFIC AMERICAN:

Referring to Dr. Goodfellow's article in the SCIENTIFIC AMERICAN of March 30, concerning the poisonous qualities of the bite of the Gila monster, I desire to call attention to the reputed antagonism existing between the monster and the rattlesnake. A two years' residence in Arizona made me quite familiar with both of these reptiles; for a good part of the time I had one of the former tied to the leg of my office table by a string. In his native habitat the monster is credited with being the enemy of the rattlesnake and is said to kill him. Chancing to have both reptiles on hand at the same time, I put them in a large box together and awaited results. The rattler coiled in one end of the box; the monster would waddle up to him, root under his coils with his nose and finally nip down on a coil near the tail. The rattler would then spring to the other end of the box and recoil. After this had happened a number of times, the monster finally succeeded in seizing the snake by the neck just back of the head and held a firm grip until the snake was choked to death. The monster sickened, vomited, and died a couple of days afterward. On removing his skin I found two punctured wounds on his back, evidently the result of the snake's having struck him once.

Although the Gila monster shows an undoubted disposition to attack the rattlesnake in captivity, I am unable to understand how it would be possible for the monster to injure the snake in the state of nature. The former is very sluggish and slow in his movements, and if unconfined the snake should have no trouble in avoiding his attack.

JAMES B. BULLITT, M.D.

Louisville, Ky., May 17, 1907.

The Need of an Inventors' Aid Institution.

To the Editor of the SCIENTIFIC AMERICAN:

We are marvelously impressed with the rapidity of invention. Work has been transferred from hand to horse-power, and from horse-power to steam and electricity by countless labor-saving devices. And yet the march of human progress is not as fast as it should be. As we read the lives of inventors, we see how wofully they have been hampered by want of means to make experiments. Many of them have fallen by the wayside, and others have been sadly hindered by poverty. Although the patent system is a great stimulus, yet it fails in the most critical place.

Some multi-millionaire should found a great institution to aid the worthy inventor; and this institution should be provided with a competent board of examiners. Then whenever an inventor wishes help, he can appear either personally or in writing before this intelligent board, and set forth his invention so far as he has developed it, and state what course of experiments he would like to try in completing it. Then this board could investigate the matter as fully as would the examiner in the Patent Office to determine whether he has an invention that will justify him and the institution in perfecting.

If so, it can be reduced to writing and sworn to and subscribed by the inventor. Then a contract can be entered into by the inventor and the institution. The institution can furnish the tools, machinery, materials and mechanics to develop the invention. The inventor can give such mental and mechanical aid as he is able to do. The experimenting can be systematically done, and duly recorded in the archives of the institution, for the benefit of this invention and future ones.

When the invention is perfected, then the inventor can, with the aid of the institution, apply for patents in the various countries. When the patents are obtained, the institution can further aid the inventor who lacks funds and perhaps business ability by advertising and selling or licensing the rights to persons who will manufacture and sell the goods. For these great aids to the inventor, the institution can reserve a certain share of the revenues, and this will generally pay it well for its services.

As many thousand inventors would soon apply for help, the institution should be well equipped with experimental farms, mines, buildings, tools, and machinery. It could lease these until it could become able to buy them. It should have competent officers, examiners, workmen, attorneys, and agents, so that it could furnish the most prompt, efficient, and economical aid possible to the inventive ingenuity of the world.

Many of the inventions would be much more thoroughly perfected in a few months by the institution than they would otherwise be in as many years. Then the institution could exhibit them at the fairs and expositions throughout the world on such a scale as few inventors could do, and that far more economically than could the individuals, because it could ship and show many at the same time. Further, it could soon build up a great reputation for good inventions and fair dealing, that would induce the manufacturer to make and the public to buy. Moreover, the institution with its systematic records and its able attorneys could defend the rights so vigorously that unscrupulous persons would hesitate much to infringe the patents under its control. All of these things would greatly benefit the inventors, the institution, the manufacturers and the public, and wonderfully accelerate human progress.

The institution could protect itself against fakers and unworthy schemes by accepting no invention from any one for development, until it be examined and recommended by a board of examiners competent in that special field of inquiry. Of course, some of the inventions would fail to reward the institution; but the great majority of them would bring in revenues, and some of them would prove so highly remunerative that they would far more than reimburse the institution for all of its outlays. Consequently it could well afford to provide libraries and evening schools for its inventors and workmen, so that they would become more intelligent, do better work, and produce still greater inventions.

Such an institution would make inventing a pleasant and profitable profession for those having inventive genius, for they could then devote themselves to pure invention, and leave the manufacturing and business part to those who are better fitted for such purposes. Then the reward all around would generally be much greater. Of course, such an institution could be started by capitalists for profit. But it would be a temptation for them to take undue advantage of the needy inventors and the public, so that the institution would not be such a grand blessing to the world.

So some wealthy person would render his name immortal and greatly benefit mankind by giving ten millions to establish an institution for aiding poverty-stricken inventors in their noble work for humanity.

New York, June 5, 1907. G. W. WISHARD.

The Current Supplement.

The modern gold dredge is one of the most important factors in gold mining of to-day. It is rapidly changing conditions in mining districts where the bedrock is soft and the gold finds are easily amalgamated. Mr. George E. Walsh thoroughly describes these new devices in the current SUPPLEMENT, No. 1644. It is not generally known by amateurs and others who have occasion to use direct current for experimental work that such a current can be easily and conveniently obtained from an alternating current by means of the aluminium cell electrolytic rectifier. Frederick E. Ward describes how such an electrolytic rectifier can be made at home. Complete drawings accompany his text. Of technological interest are articles on varnish for wicker work and soldering. Harold J. Shepstone writes on the Nile-Red Sea railroad. Mr. H. Henriet contributes a very exhaustive discussion on the atmosphere of cities. Venomous fishes are described by Dr. A. Calmet in an article which gives much curious information. A. D. Hall's paper on "Artificial Fertilizers: Their Nature and Functions," is concluded. The usual engineering notes, electrical notes, and trade notes and formulas are published.