

haps through many ages. Then came another period of activity, less grand and violent than before, and marked especially by the vast quantities of volcanic stone and sand, which must have made the whole region seem like night.

Again the monster slept; but will he wake again?

El Misti is not an extinct volcano. The vapor which always rises from its crater bears witness to great forces which still dwell within. It is true that the nature of the emanations from the volcano are such as are in many cases characteristic of volcanoes that are approaching total extinction, but there are exceptions, and the laws that govern them are not well understood. I believe it lies outside man's wisdom, at the present day, to predict with any marked success the future of volcanic or of earthquake activity. In spite of claims to the contrary, there is no knowledge which can predict with any certainty whether a violent earthquake will visit a given locality, e. g., Arequipa, within one or many years.

Vesuvius, in A. D. 79, after long ages of quiet, when the people had even forgotten that it was a volcano, gave an eruption which was one of the greatest in history. Later it was almost completely quiet for fifteen centuries, when it became active again. In the course of nature a thousand years are but as a day.

Will El Misti have a similar history?

I believe not, for the emanations from the crater indicate that it is slowly approaching extinction, but of this there is no certainty.

At least it may be pleasant to know that, in general, eruptions are less destructive than earthquakes, and that, unless extremely violent, an eruption of El Misti would be more interesting than dangerous.

THE COLUMBIA MOTOR CARRIAGE.

In January, 1895, the Pope Manufacturing Company, of Hartford, Conn., the well known manufacturers of the Columbia bicycle, decided to enter the horseless carriage field, and during the two years and a quarter which have elapsed since that date, elaborate investigations and experiments have been carried on without regard to expense to determine what is the best type of horseless carriage. The result of these experiments is a two-seated phaeton designed to be used for business or pleasure. The first public test of this interesting vehicle was held at Hartford on May 13 in the presence of a number of representatives of the scientific press of England and America. The particulars of the test which we give are furnished by the representative of the SCIENTIFIC AMERICAN who was present at the trial.

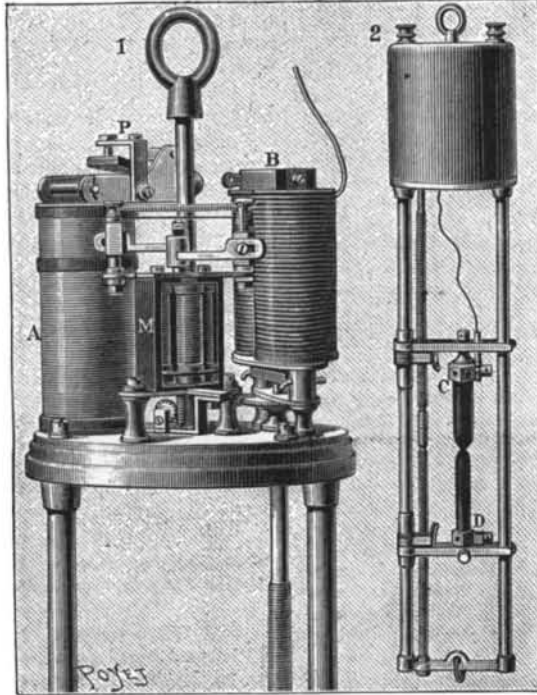
The frame is of the Pope Tube Company's 0.50 carbon steel, and the vehicle is equipped throughout with ball bearings, and possesses several of the features of bicycle construction which have made the Columbia wheel so famous. The wheels were fitted with heavy rubber pneumatic tires, which are practically unpuncturable, being used for 3,500 miles without being punctured. The general design of the carriage is shown in our engraving. The motor power is electricity, which is stored in four sets of batteries. There are forty-four cells in all. The current is used at a pressure of 110 volts. When once charged, the battery is sufficient to run the vehicle for thirty miles, and if the roads are good and free from mud, this distance may be increased. The motor is attached to the rear axle wheel of the carriage, where it is readily accessible. The motor is a little over two horse power. The rates of speed are four, the maximum being fifteen miles an hour and the others twelve, six and three miles an hour respectively. The entire weight of the carriage is 1,800 pounds, 850 of which is in the battery. The expense of charging the batteries is about fifty cents, so that it will be seen it only costs a trifle over a cent a mile to run it, which only goes to prove that the horseless carriage is an extremely economical vehicle.

The exhibition of carriages on the day of the test was under the direction of Lieut. Harold H. Eames, manager of the motor carriage department, assisted by Mr. Hiram Percy Maxim, a mechanical engineer and other officials of the department. The speed test showed that the car-

riages were able to take sharp grades at ordinary speed, and that the carriage is stopped and started slowly or rapidly by turns on a sharp downward incline. The guests of the company were allowed to run the carriages themselves, and it was found that those who were totally unfamiliar with the horseless carriage were able to manage and turn them with as much ease and success as they would have guiding the gentlest horse, which only shows that no previous apprenticeship is necessary for one to be able to run an electric horseless carriage.

AN ARC LAMP THAT OPERATES IN ANY POSITION.

There are very few regulators that permit an electric lamp to operate in all positions. Those that do exist



ELECTRIC LAMP FOR OPERATING IN ANY POSITION.

(there are, perhaps, two or three) are very high priced. All the rest, which are very satisfactory when the lamp is left horizontal, operate irregularly, or even do not operate at all, if they be inclined. This is explained by the fact that their mechanism is based upon the action of gravity to obtain the descent of the upper carbon. The use for which they are generally designed, that is to say, for public or private lighting, requires no other position. In lanterns for projections, however, it is often of advantage to be able to incline the apparatus slightly, although the limits of inclination prejudicial to the operation of the regulator are rarely exceeded. This may happen, nevertheless; but it is rather in theater projectors, that are designed to throw

a luminous pencil upon a given point of the stage, that it is indispensable to be able to incline the apparatus strongly and even to exceed 45°. It then becomes necessary to use lamps in which the juxtaposing of the carbons is effected by hand, and a man is required near each projector. If the action of the carbons is to be prolonged, it would be preferable to have automatic lamps. Mr. Mougin has recently devised a type of regulator that seems to us capable of being utilized with advantage in such cases. The bringing together of the carbons is entirely independent of gravity, whatever be the position of the apparatus.

To this effect, the two carbons are mounted upon cross pieces, C and D, sliding upon two rods. A third rod, passing through the cross pieces, is threaded in such a manner that, upon being made to revolve in one direction, the two cross pieces, and, consequently, the carbons that they carry, approach each other. Now, this motion of the threaded rod takes place every time that the carbons become so worn that they need to be brought together. It is produced by a small electric motor, M, which transmits the rotary motion to the rod in question through the intermedium of a bevel wheel. The current traverses the motor and sets it in operation only at the moment desired, because it is mounted in derivation upon the circuit, and the interrupter, P, severs the communication as long as the arc has its normal length. But if the arc happens to elongate, the resistance increases and a part of the current passes through the fine wire bobbin, A, which then attracts the armature of the interrupter, P, and closes the circuit of the motor.

The coarse wire bobbin, B, is mounted in the circuit, and, as soon as the current passes, attracts the armature, which is connected with the cross piece that carries the upper carbon, and thus effects the separation of the carbons for the beginning of the operation. Such initial separation is regulatable by hand, and, once effected, is maintained through the mechanism of which we have above spoken.

These lamps are now constructed, in the form shown in our engraving, for use in general lighting. By slightly modifying their form in such a way that the regulating mechanism shall be inclosed in a base capable of being placed upon a table, the manufacturer may adapt them for use in lanterns and projectors.—La Nature.

Mysteries of the Persian Gulf.

Sir Henry Mance recently, in his inaugural address as president of the Institution of Electrical Engineers, speaking of the development of oceanic telegraphy, said in the Persian Gulf one occasionally witnessed natural phenomena which to the untraveled might appear incredible. In the midst of the mountains near Mussendom he had seen during a thunderstorm such displays of lightning as baffled description. He had, at certain seasons of the year, observed the water in the bay—which was large enough to hold all the fleets of the world—present exactly the appearance of blood. Not many miles from Mussendom he had witnessed

mysterious fire circles flitting over the surface of the sea at a speed of 100 miles an hour—a phenomenon which no one had yet been able to explain. While steaming along the coast of Belochistan, he had been called from his cabin at night to observe the more common phenomenon of a milky sea, the water for miles around being singularly white and luminous. In the same locality the sea was, for short periods, as if putrid, the fish being destroyed in myriads, so that to prevent a pestilence measures had to be taken to bury those cast up on the beach. This phenomenon was doubtless due to the outbreak of a submarine volcano and the liberation of sulphureted hydrogen. In these waters jellyfish were as large as footballs, and sea snakes of brilliant hue were met with in great numbers. On one occasion a swarm of sea snakes forced their way up one of the creeks in Karachi Harbor, apparently for the purpose of having a battle royal, for the ground between high and low water mark was thickly covered with their bodies in positions betokening a deadly struggle.



THE COLUMBIA MOTOR CARRIAGE, TESTED MAY 13.